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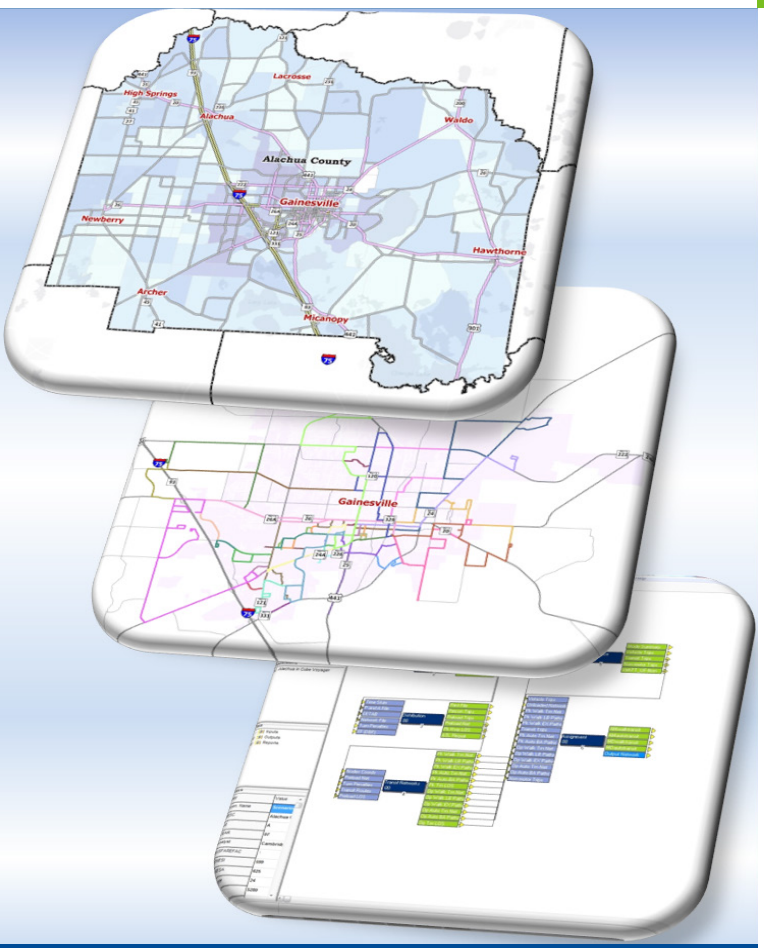

Gainesville Urbanized Area Year 2040 Long Range Transportation Plan Update

Technical Report No. 4

Model Update and Validation Report

Livable Community - Creating Connections
Year 2040

Prepared for:

Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area

HDR

Gainesville Urbanized Area Year 2040 Long Range Transportation Plan Update

Technical Report No. 4:

2010 Model Update and Validation

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1 Introduction

This report documents the update and validation of the Gainesville Urbanized Area Transportation Study 2010 base year travel demand model conducted as integral part of the Gainesville Urbanized Area Year 2040 Long Range Transportation Plan update. The 2010 model study area covers all of Alachua County, including the nine municipalities within the county (cities of Alachua, Archer, Gainesville, Hawthorne, High Springs, Newberry, Waldo and towns of La Crosse and Micanopy). The effort involved updating the input files of the previous 2007 model to 2010 and reviewing and enhancing the model parameters and scripts for trip generation, distribution, highway and transit network development, mode choice, assignment and reporting steps. The Florida Department of Transportation's *FSUTMS-Cube Framework Phase II: Model Calibration and Validation Standards* was followed as a technical guide for the validation effort.

The structure of the report generally follows the sequence of the processes in the model chain. It starts with documenting the update of the external trips in Section 2. Sections 3 and 4 cover trip generation and trip distribution. Section 5 documents transit accessibility and path building followed by mode choice in Section 6. Sections 7 and 8 document highway and transit assignments. Finally, Section 9 concludes the report with closing remarks.

2 External Trips

The external zones are placed along roadways entering and leaving the Gainesville Urbanized Area Transportation Study model region. The zones used in the 2010 base model are based on the 2007 model. There are 26 external zones outside of study area, and they are assigned unique Traffic Analysis Zone numbers from 600 to 625.

2.1 Internal-External and External-External Trips

External trips are vehicle trips having at least one trip end outside of the model study area. External trips include two categories: External-to-External trips and Internal-to-External trips or External-to-Internal trips. External-External trips are trips with both ends outside the study area, and trips with one end inside and one end outside the study area are called either Internal-External trips or External-Internal trips depending on the origin and destination.

External trips are generated or attracted at the external stations located outside of the model boundary. As described above, these stations are points of entry or exit of the study area. The external stations for the Gainesville Urbanized Area Transportation Study regional travel demand model are shown in Figure 2.1.

In the validation process of external trips, the External-External and External-Internal should ideally be estimated based on an external station origin-destination travel survey. In the absence of a recent origin-destination travel survey, the base year 2010 External-External and External-Internal trips were derived from the 2007 External-External and External-Internal trips factored by the 2010 traffic counts obtained from Florida Department of Transportation and Alachua County. There are two input files that influence external trips. These are the INTEXT and EETRIPS files with scenario year at the end of each file name. The percent of External-External and External-Internal trips were calculated from the 2007 model. However, because the external trips are derived from traffics counts without an origin-destination travel survey, it is necessary to make adjustments based on logic and local knowledge. These adjustments were conducted in an iterative manner in order to ensure that generated traffic volumes correspond to the 2010 traffic counts.

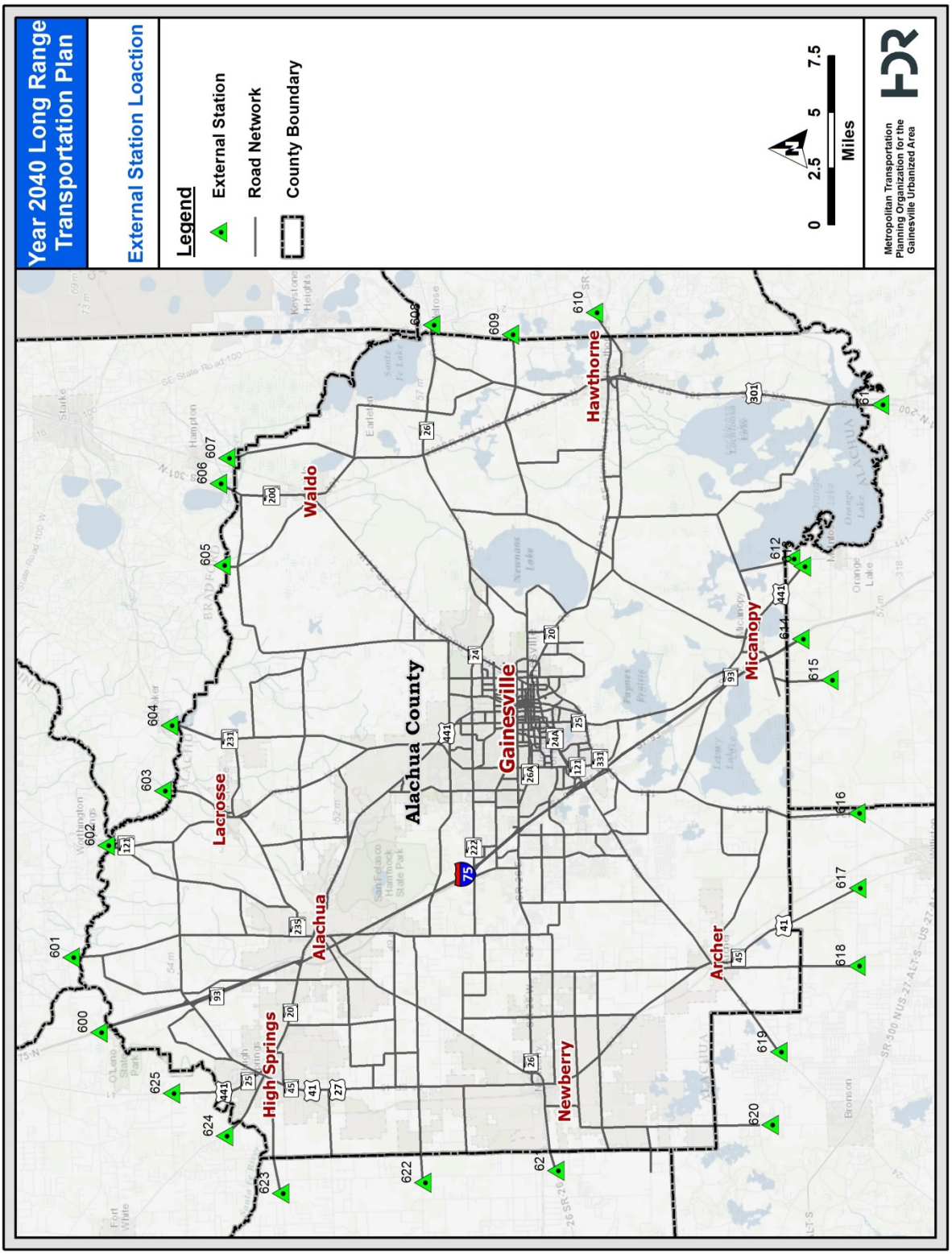


Figure 2.1 External Station Locations

The final 2010 External-External and External-Internal trips are shown in Table 2.1. Since the traffic patterns in Florida are heavily impacted by seasonality, the annual average daily traffic (AADT) is converted to peak-season weekday average daily traffic (PSWADT) through a model output conversion factor (MOCF) before coding into the model. The percentage of External-External and External-Internal are applied to the peak-season weekday average daily traffic for each external zone to calculate total External-External and External-Internal trips.

Table 2.1 Internal-External and External-External Percentage Splits

External Traffic Analysis Zone	Total External Trips	Road Way	Total IE Trips	Total EE Trips	IE %	EE %
600	47,368	*I-75 (North) at Columbia County Line*	11,290	36,078	24%	76%
601	1,029	*CR 241 (North) at Union County Line*	699	330	68%	32%
602	5,446	*SR 121 (North) at Union County Line*	3,740	1,706	69%	31%
603	103	*CR 237 (North) at Bradford County Line*	89	14	86%	14%
604	2,783	*SR 235 (North) at Bradford County Line*	2,519	264	91%	9%
605	669	CR 1475 *(North) at Bradford County Line*	469	200	70%	30%
606	23,077	US 301 *(North) at Bradford County Line*	9,081	13,996	39%	61%
607	1,132	CR 325 *(North) at Bradford County Line*	776	356	69%	31%
608	6,392	SR 26 *(East) at Putnam County Line*	3,178	3,214	50%	50%
609	412	CR 1474 *(East) at Putnam County Line*	264	148	64%	36%
610	8,830	SR 20 *(East) at Putnam County Line*	4,386	4,444	50%	50%
611	11,251	US 301 *(North) at Marion County Line*	1,261	9,990	11%	89%
612	344	CR 225 *(South) at Marion County Line*	288	56	84%	16%
613	7,938	US 441 *(South) at Marion County Line*	7,090	848	89%	11%
614	48,947	I-75 *(South) at Marion County Line*	17,123	31,824	35%	65%
615	1,336	CR 234 *(South) at Marion County Line*	870	466	65%	35%
616	6,906	SR 121 *(South) at Levy County Line*	5,230	1,676	76%	24%
617	4,520	SR 45 *(South) at Levy County Line*	3,190	1,330	71%	29%
618	973	CR 241 *(South) at Levy County Line*	745	228	77%	23%
619	7,296	SR 24 *(Southwest) at Levy County Line*	5,190	2,106	71%	29%
620	1,233	CR 337 *(South) at Levy County Line*	885	348	72%	28%
621	9,999	SR 26 *(West) at Gilchrist County Lin*	7,639	2,360	76%	24%
622	2,052	CR 232 *(West) at Gilchrist County Line*	1,474	578	72%	28%
623	3,742	NW 182 *(West) at Gilchrist County Line*	2,672	1,070	71%	29%
624	8,350	US 27 *(Northwest) at Gilchrist County*	5,988	2,362	72%	28%
625	6,062	US 441 *(Northwest) at Columbia County Line*	4,262	1,800	70%	30%

2.2 External Validation Adjustments

In the absence of a travel survey, several iterations of adjustments were conducted to achieve a goal of 1.0 volume-over-count ratio at each external station. For external zones 601, 603, 605, 607, 609, 615, 618, 622 and 623, 2010 annual average daily traffic was not available. Traffic count data from 2007 and 2011 were used to interpolate counts for 2010. For external station 612, which is located on a minor collector road, the count used in the 2007 model was utilized due to the absence of any nearby count station. Traffic counts at adjacent links were used with appropriate adjustments for the external zone 610.

An Iterative Proportional Fitting (IPF) process was used by creating a seed distribution and iteratively adjusting the cell values until a good match between the target row and column totals was achieved. For External-External trip tables, the row and column total targets represent the portions of the external station productions and attractions. For the External-Internal and Internal-External trips, productions and attractions are generated for both ends of the trip, the internal end of the trip and the external end of the trip. The traffic counts acted as control total at each external zone such that the total number of vehicle trips (Internal-External, External-Internal, and External-External) generated at an external station is equal to the traffic count at the external station.

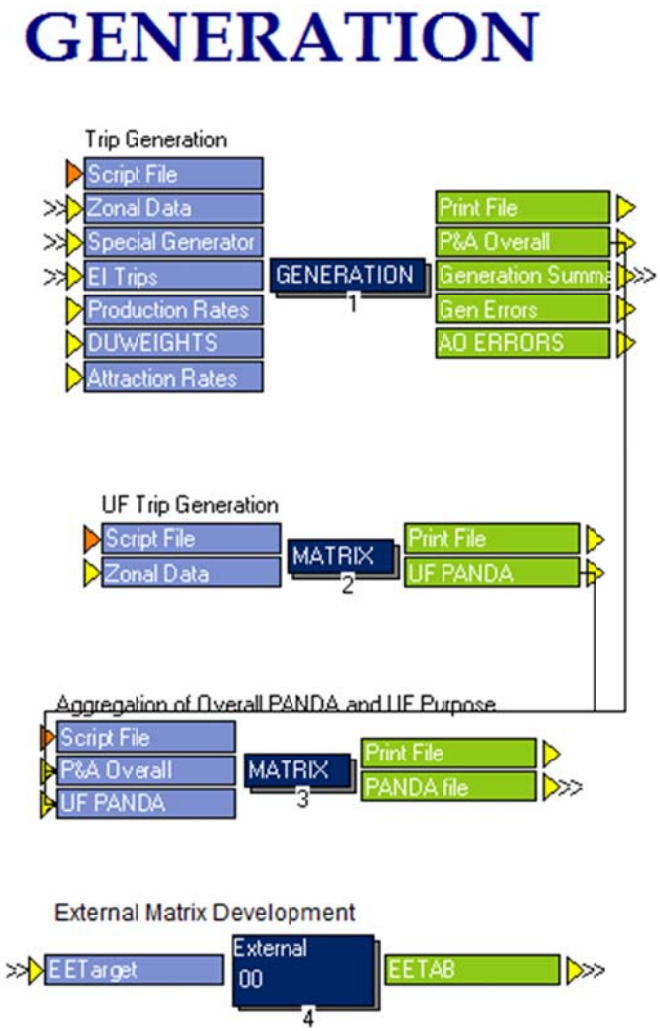
2.3 External Validation Results

The final model validation results will be discussed in the highway assignment section. The assignment results indicate reasonable match between the external travel movements estimated by the model and the traffic counts. The external cordon line achieves a volume-over-count ratio of 1.00. Corridors leading to or nearby external zones also were validated to satisfactory levels, based on this iterative adjustment process.

3 Trip Generation

Trip Generation is the first step of the four-step travel demand forecasting process. In this step, the amount of travel by trip purposes are calculated. Trip generation focuses on the locations generating the travel, and not the directionality of travel. Trip generation models provide the estimates of the number of trips by purpose produced by (trip production) or attracted to (trip attraction) a traffic analysis zone as a function of the demographic, socioeconomic, and land use characteristics of the zone. The most common forms of trip production and attraction models are cross-classification and linear regression. Cross-classification is generally used for trip production models and regression is used for trip attraction models. Figure 3.1 shows the trip generation model chain.

Figure 3.1 Trip Generation Model Chain



3.1 Trip Generation Process

The Alachua County 2010 model uses cross classification trip production rates stratified by auto availability (0, 1, 2, and 3+ auto Households), dwelling unit type (single-family, multifamily, and transient units), and household size (1, 2, 3, 4, and 5+ persons per household). Trip production rates for home-based work, home-based shop, home-based social/recreation, and home-based other purposes are shown in Table 3.1. The original source for these trip production rates was the North Florida Household Travel Survey, consistent with the previous 2007 Alachua County model. These trip production rates were not updated since there is no updated household travel survey available at this time.

Trip attraction rates were originally derived from the 2005 Northeast Florida Regional Planning Model (NERPM). As the Gainesville Urbanized Area Transportation Study model and the Northeast Regional Planning Model are from Northeast Florida, both model regions share similar socioeconomic characteristics, such as less of a reliance on tourism and seasonal residents than other parts of Florida. The trip attraction rates and dwelling unit (DU) weights are kept the same as the 2007 Gainesville Urbanized Area Transportation Study model, as shown in Table 3.2 and Table 3.3, respectively. Again, these were kept unchanged since an updated source of trip attraction rates is not available. The 2010 small area demographic were not available at the time that this study was completed, so the dwelling unit weights were retained from the 2007 model.

The Alachua County 2010 model uses 11 trip purposes:

1. Home-based work;
2. Home-based shop;
3. Home-based social/recreation;
4. Home-based other (Home-based non-work, excluding university trips);
5. Non-home-based;
6. Home-based university;
7. UF campus/dorm;
8. Four-tire truck;
9. Single-unit truck;
10. Tractor-trailer; and
11. Internal-external.

Table 3.1 Trip Production Rates

Home-Based Work

Dwelling Unit Type	Number of Autos Available	Number of Persons in Household 1	2	3	4	5+
Single Family	0	0.35	0.64	1.01	1.5	2.08
	1	0.69	0.98	1.35	1.84	2.42
	2	1.35	1.64	2.01	2.5	3.08
	3+	1.76	2.05	2.42	2.9	3.49
Multifamily	0	0.41	0.7	1.01	1.31	1.62
	1	0.95	1.49	2.02	2.56	3.1
	2	1.65	2.3	2.95	3.6	4.25
	3+	2.21	2.89	3.59	4.27	4.96
Hotel/Motel		1.04	0.72	0.5	0.39	0.39

Home-Based Shopping

Dwelling Unit Type	Number of Autos Available	Number of Persons in Household 1	2	3	4	5+
Single Family	0	0.3	0.53	0.95	1.55	2.34
	1	0.59	1.02	1.55	2.18	2.89
	2	0.65	1.08	1.61	2.23	2.95
	3+	0.77	1.22	1.76	2.39	3.1
Multifamily	0	0.22	0.57	1.02	1.54	2.11
	1	0.5	0.95	1.4	1.83	2.27
	2	0.72	1.22	1.66	2.08	2.46
	3+	0.84	1.35	1.79	2.2	2.56
Hotel/Motel		0.33	1.43	2.2	2.75	3.19

Home-Based Social/Recreational

Dwelling Unit Type	Number of Autos Available	Number of Persons in Household 1	2	3	4	5+
Single Family	0	0.21	0.28	1.28	1.47	2.2
	1	0.48	0.85	1.43	1.31	2.37
	2	0.53	0.89	1.85	2.07	2.77
	3+	0.7	1.07	2.04	2.24	2.97
Multifamily	0	0.18	0.63	1.08	1.53	1.98
	1	0.22	0.67	1.12	1.57	2.02
	2	0.64	1.09	1.54	1.99	2.44
	3+	0.84	1.29	1.74	2.19	2.64
Hotel/Motel		0.66	1.81	2.97	4.29	6.49

Home-Based Other

Dwelling Unit Type	Number of Autos Available	Number of Persons in Household 1	2	3	4	5+
Single Family	0	0.29	0.64	1.67	3.38	5.78
	1	0.48	1.29	2.59	4.38	6.67
	2	0.62	1.79	3.34	5.2	7.33
	3+	0.68	1.94	3.58	5.59	7.99
Multifamily	0	0.35	0.78	2.28	4	6.23
	1	0.74	1.36	3.16	4.92	6.91
	2	1.12	1.87	3.71	5.59	7.34
	3+	1.17	2.09	4.05	5.75	7.56
Hotel/Motel		0.55	1.32	2.31	3.63	4.84

Table 3.2 Trip Attraction Rates

Purpose	Manufacturing	Other Industrial	Commercial	Service	Total	Dwelling Units	School Enrollment
Home-Based Work	0	0	0	0	1.8	0.5	0
Home-Based Shopping	0	0	6.1	0	0	0	0
Home-Based Social/Recreational	0	0	0.5	0.5	0	1.61	0
Home-Based Other	0	0	1.5	1.5	0	0.3	1.5
Non-home-Based	0	0	3.54	1.71	0	0.3	0
Four-Tire Truck	0.47	0.55	0.45	0.22	0	0.13	0
Single-Unit Truck	0.12	0.15	0.13	0.04	0	0.05	0
Tractor-Trailer	0.05	0.09	0.04	0.01	0	0.02	0

Table 3.3 Dwelling Unit Weights

Average Persons Per Dwelling Unit	One-Person Households	Two-Person Households	Three-Person Households	Four-Person Households	Five-Person Households
0.00-1.12	0.89	0.11	0	0	0
1.13-1.37	0.76	0.22	0.02	0	0
1.38-1.62	0.59	0.34	0.05	0.01	0.01
1.63-1.87	0.46	0.34	0.11	0.06	0.03
1.88-2.12	0.32	0.36	0.16	0.11	0.05
2.13-2.37	0.24	0.36	0.18	0.14	0.08
2.38-2.62	0.21	0.33	0.19	0.16	0.12
2.63-2.87	0.12	0.35	0.19	0.23	0.11
2.88-3.12	0.13	0.34	0.18	0.16	0.19
3.13-3.37	0.12	0.29	0.18	0.17	0.24
3.38-3.62	0.08	0.24	0.2	0.2	0.28
3.63-3.87	0.05	0.2	0.19	0.23	0.33
3.88-4.12	0.04	0.16	0.17	0.24	0.39
4.13-4.37	0.02	0.15	0.14	0.21	0.48
4.38-4.62	0.01	0.15	0.13	0.17	0.54
4.63-5.99	0	0.05	0.07	0.14	0.74
6.00+	0	0	0.02	0.05	0.93

Home-based university and University of Florida Campus/Dorm trip purposes are unique to the Gainesville Urbanized Area Transportation Study model. These additional purposes also were used in the Gainesville Urbanized Area Transportation Study 2007 and 2000 models. It is important to capture these trips in a university town, such as the City of Gainesville. The home-based university purpose is for trips traveling from off-campus housing to parking spaces within

the University of Florida Campus. On the other hand, the University of Florida Campus/Dorm trip purpose is trips from University of Florida on-campus dormitories to classrooms that are specified in the ZONEDATA file. It should be noted that the model has limited capabilities in simulating parking capacity beyond the number of parking spaces being stored in the ZONEDATA file and used in the attraction equations.

Home-based university and Dorm trip production and attraction equations for the Home-based university and Dorm purposes are listed below, as extracted from the model scripts. During validation, these trip rates were relocated to the Cube catalog keys (names depicted in {brackets}) to enhance model transparency.

Home-Based University Productions:
RO.HBUP = {RATE_HBUP}*ZI.1.UF_OC_ST
; UF_OC_ST is off-campus (students)
; Default value of {RATE_HBUP} is 2.996
Home-Based University Attractions:
RO.HBUA = {RATE_HBUA}*ZI.1.UF_PARKING
; PARKING is UF Parking Spaces
; Default value of {RATE_HBUA} is 1.375
UF Campus/Dorm Productions:
RO.HDORMUP = {RATE_HDORMUP} *ZI.1.UF_DORM_ST
; UF_DORM_ST is Campus housing/Dormitory students
; Default value of {RATE_HDORMUP} is 2.262
UF Campus/Dorm Attractions:
RO.HDORMUA = {RATE_HDORMUA} *ZI.1.SEATS
; SEATS is UF Classroom Seats
; Default value of {RATE_HDORMUA} is 0.7513

3.2 Socioeconomic Data and Traffic Analysis Zone Structure

Socioeconomic data is a very important input to the trip generation process. During the last model update in 2007, the ZDATA files were converted to the new Florida Standard Urban Transportation Model Structure file formats to be consistent with the Cube-Voyager scripting. The Gainesville Urbanized Area Transportation Study 2000 model used the NERGEN FORTRAN program for trip generation and relied on a number of ASCII text file formats for input data. The base year 2007 model used Cube-Voyager scripting in place of NERGEN FORTRAN routines and used input files in a database, rather than text format. As part of the 2010 effort, staff from the Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area updated the 2007 socioeconomic data files to the new base year 2010, which were reviewed and refined by the consultant team in coordination with staff. Special generator and external trip files were updated by the consultant team.

Like the Gainesville Urbanized Area Transportation Study 2007 model, the 2010 model study area covers the entirety of Alachua County, including all nine municipalities within the county. The zonal structure of the 2007 model was reviewed by the consultant team and no changes were deemed necessary. The 2010 model has a total of 586 traffic analysis zones; 560 internal zones and 26 external zones within and outside study area. Figure 3.2 shows the Gainesville Urbanized Area Transportation Study travel demand model geographic coverage and the traffic analysis zone structure of the study area.

As mentioned earlier, staff from the Gainesville Urbanized Area Transportation Study developed the 2010 socioeconomic dataset which includes information on population disaggregated by single family, multifamily, and hotel/ motel units. It also provides information on auto availability, property vacancy rates, and seasonal use. On the employment side, the dataset contains information disaggregated by service, commercial, manufacturing, and other industrial sectors. It also contains information on school enrollment, university employment, dormitory students, and parking. The parking costs in the 2010 dataset were borrowed from the 2007 dataset based on discussions with staff from the Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area.

Error! Reference source not found. and Figure 3.4 show the total population and employment of each traffic analysis zone within the regional travel demand model. The details of the SE data format are included in Appendix A of this report and the data is summarized in Table 3.4.

Table 3.4 Year 2010 Socioeconomic Data Summary

Socio-Economic data summary	2010
Permanent Population	247,336
Total Population	251,951
Permanently Occupied Dwelling Units	99,089
Transient and Permanently Occupied Dwelling Units	101,996
Total Service Employment	91,399
Total Commercial Employment	32,669
Total Manufacturing Employment	4,048
Total Other Industrial Employment	9,478
Total Employment	137,594
Permanent Population per Permanently Occupied Dwelling Unit	2.50
Total Population per Total Occupied Dwelling Unit	2.47
Total Employment per Permanent Population	0.556
Service to Total Employment	0.664
Commercial to Total Employment	0.237
Manufacturing to Total Employment	0.029
Other Industrial to Total Employment	0.069
Internal Person Trips per Permanently Occupied Dwelling Unit	11.63
Internal Person Trips per Total Occupied Dwelling Units	11.29
Internal Person Trips per Employee	8.372

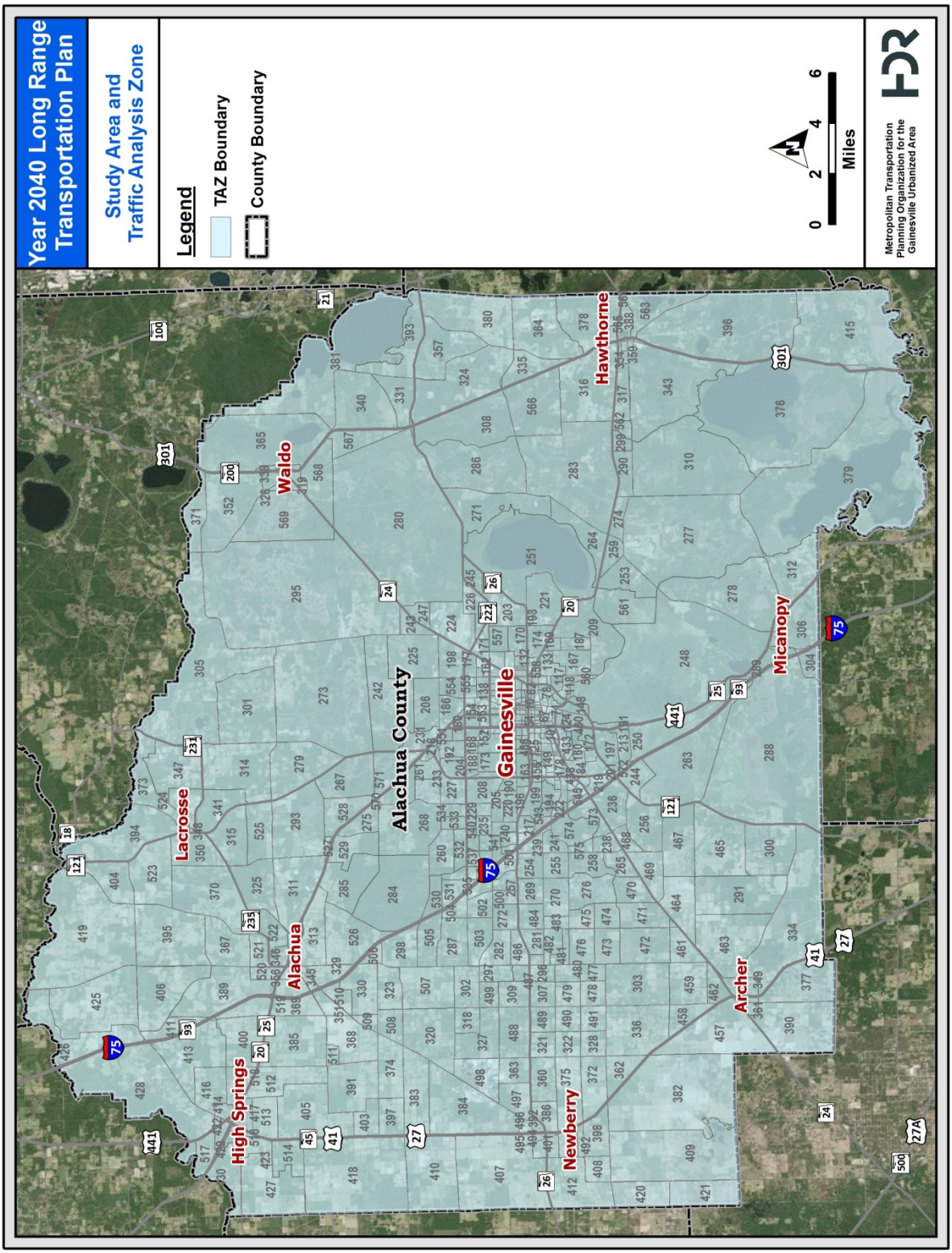


Figure 3.2 Study Area and Traffic Analysis Zone Structure

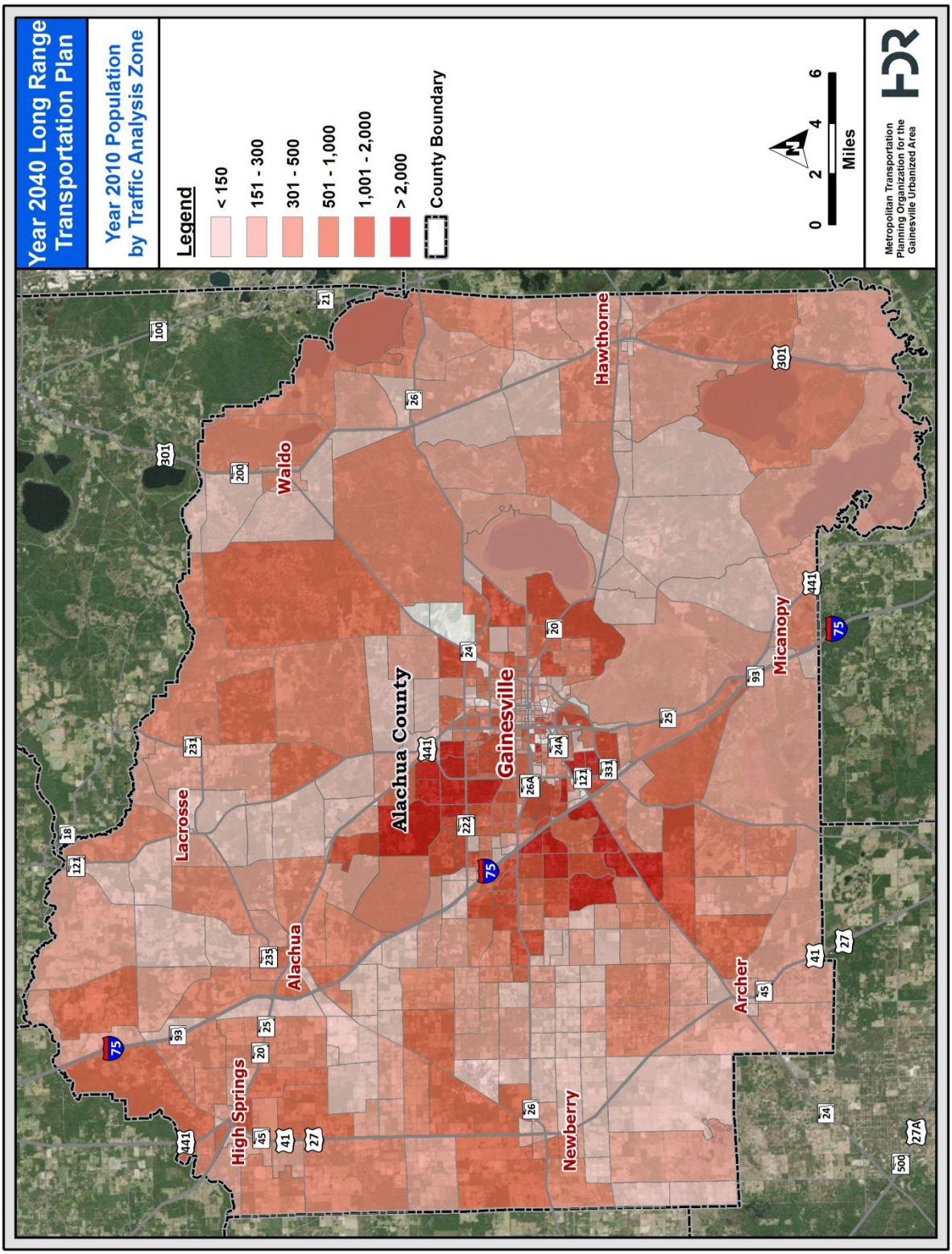


Figure 3.3 Year 2010 Population by Traffic Analysis Zone

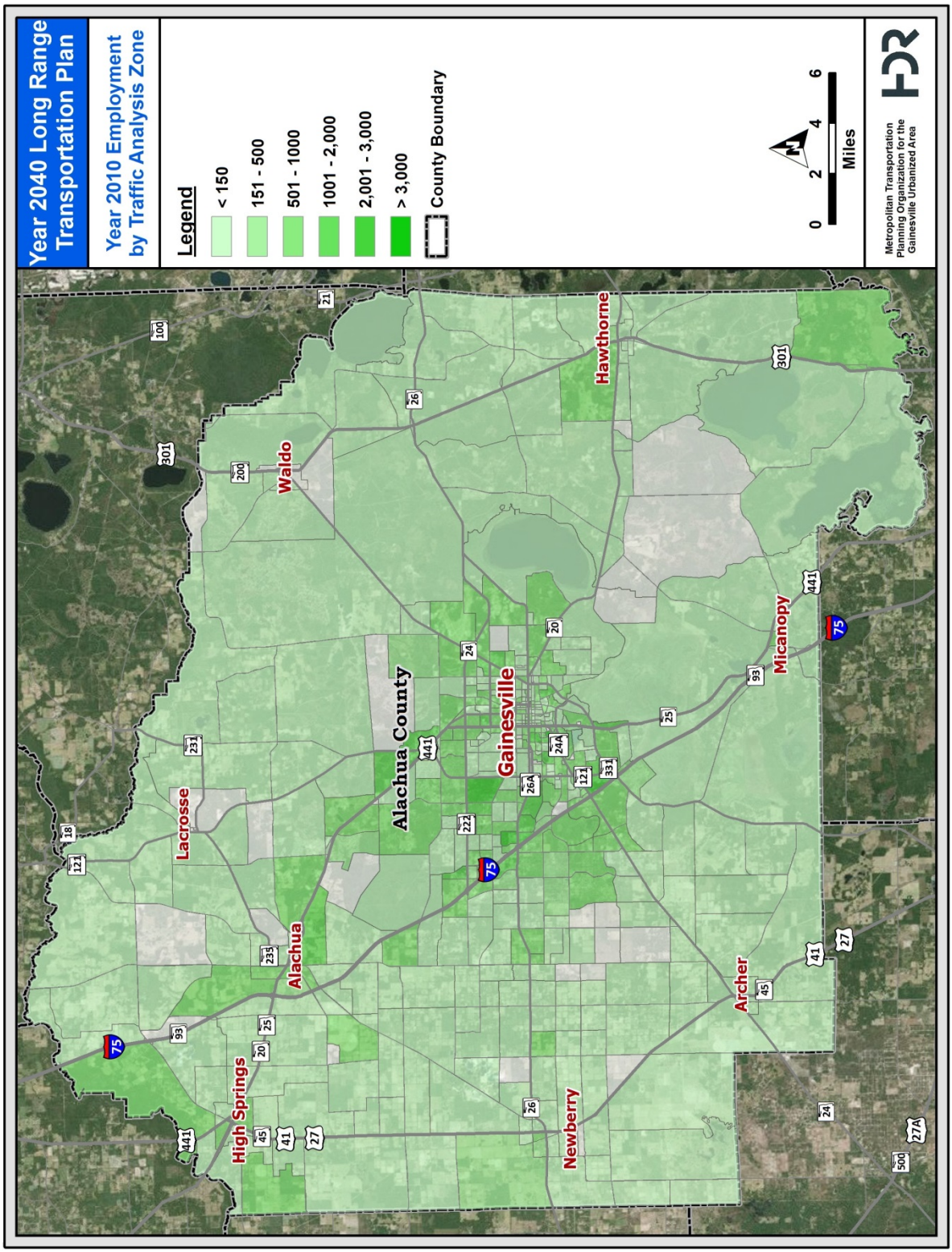


Figure 3.4 Year 2010 Employment by Traffic Analysis Zone

3.3 Special Generators

There are certain traffic analysis zones where the standard trip generation algorithms did not produce sufficient trips due to the special land use characteristics of these zones. These traffic analysis zones are called special generators. It is best practice in travel demand forecasting to minimize the use of special generators. Special generators should only be used where validation discrepancies exist that cannot be corrected with edits to other model files and parameters. The special generators are shown in Table 3.5.

Table 3.5 Special Generators

TAZ	PA dummy	Addition or Subtraction	Person Trips	HBW %	HBSH %	HBSR %	HBO %	NHB %	Description
536	A	+	27,000	2	2	2	92	2	Santa Fe College
440	A	+	655	20	38	38	0	4	University of Florida
441	A	+	576	20	38	38	0	4	University of Florida
443	A	+	408	20	38	38	0	4	University of Florida
449	A	+	662	20	38	38	0	4	University of Florida
453	A	+	1,816	20	38	38	0	4	University of Florida
460	A	+	362	20	38	38	0	4	University of Florida

TAZ = traffic analysis zone
PA = production/attraction
HBW = Home-based work
HBSH = Home-based shopping
HBSR = Home-based social-recreation
HBO = Home-based other
NHB = Non home-based

3.4 Trip Generation Validation Results

Throughout the validation process, trip generation statistics were summarized to assess model validity. Statistical comparisons were made between the Gainesville Urbanized Area Transportation Study 2007 and 2010 models as well as model validation standards from the *FSUTMS-Cube Framework Phase II: Model Calibration and Validation Standards Final Report*. The trip generation validation statistics is summarized in Table 3.6 and Table 3.7. As shown by the results, the trip generation estimated by the model is within acceptable ranges. Figure 3.5 and Figure 3.6 show the trip productions and attractions by traffic analysis zone.

Table 3.6 Percent Trips by Purpose

Purpose	Gainesville Urbanized Area Transportation Study 2010 Model			Gainesville Urbanized Area Transportation Study 2010 Model		FSUTMS*
	Production	Percent by Productions	Unbalanced Attractions	Production	Percent by Productions	Percent by Productions
Home-Based Work	185,994	13.87%	356,347	183,299	13.96%	12-20%
Home-Based Shopping	135,822	10.13%	201,523	132,480	10.09%	10-20%
Home-Based Social-Rec.	120,838	9.01%	259,957	119,659	9.11%	9-12%
Home-Based Other	270,822	20.20%	336,606	253,457	19.30%	14-28%
Non home-Based	354,086	26.40%	354,806	329,228	25.07%	20-33%
Home-Based University	64,423	4.80%	20,070	75,939	5.78%	NA
Dormitory-Based University	22,767	1.70%	21,288	23,570	1.79%	NA
Truck-Taxi	84,379	6.29%		81,502	6.21%	NA
Internal-External	101,877	7.60%		114,036	8.69%	NA
Total	1,341,008	100.00%		1,313,197	100.00%	NA

* Table F.1 - FSUTMS-Cube Framework Phase II Model Calibration and Validation Standards

Table 3.7 Trip Generation Aggregate Rates

	Gainesville Urbanized Area Transportation Study 2010 Model	Gainesville Urbanized Area Transportation Study 2007 Model	Gainesville Urbanized Area Transportation Study 2000 Model	FSUTMS*
Persons/Dwelling Units	2.47	2.21	2.84	2.00 - 2.70
Employment/Person	0.56			0.35 - 0.75
Internal Person Trips/Dwelling Units	11.63	11.05	11.35	NA
Internal Person Trips/Person	4.66	5	4.65	NA
Internal Person Trips/Employment	8.37	9.05	7.73	NA

* Table F.1 - FSUTMS-Cube Framework Phase II Model Calibration and Validation Standards

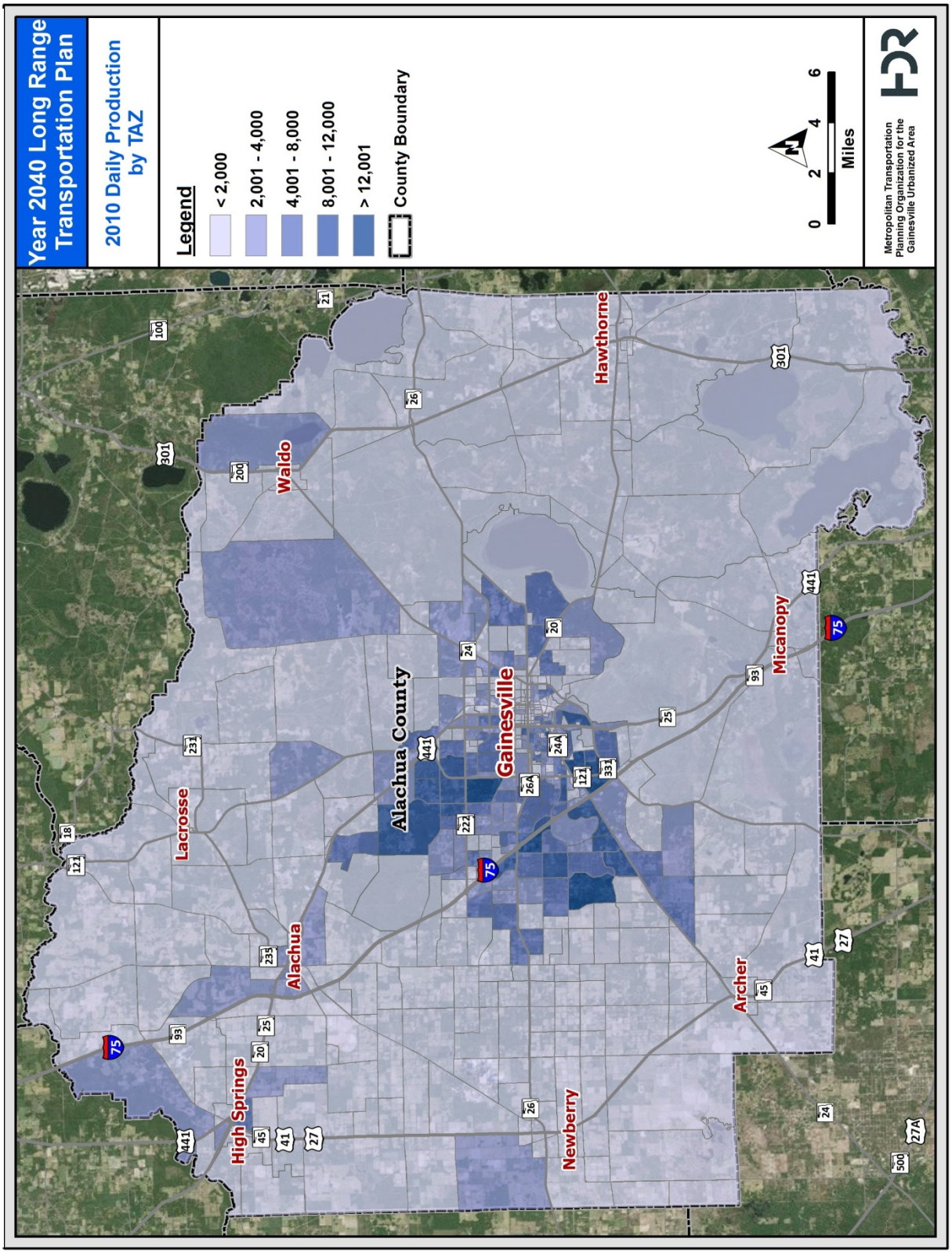


Figure 3.5 Year 2010 Trip Productions by Traffic Analysis Zone

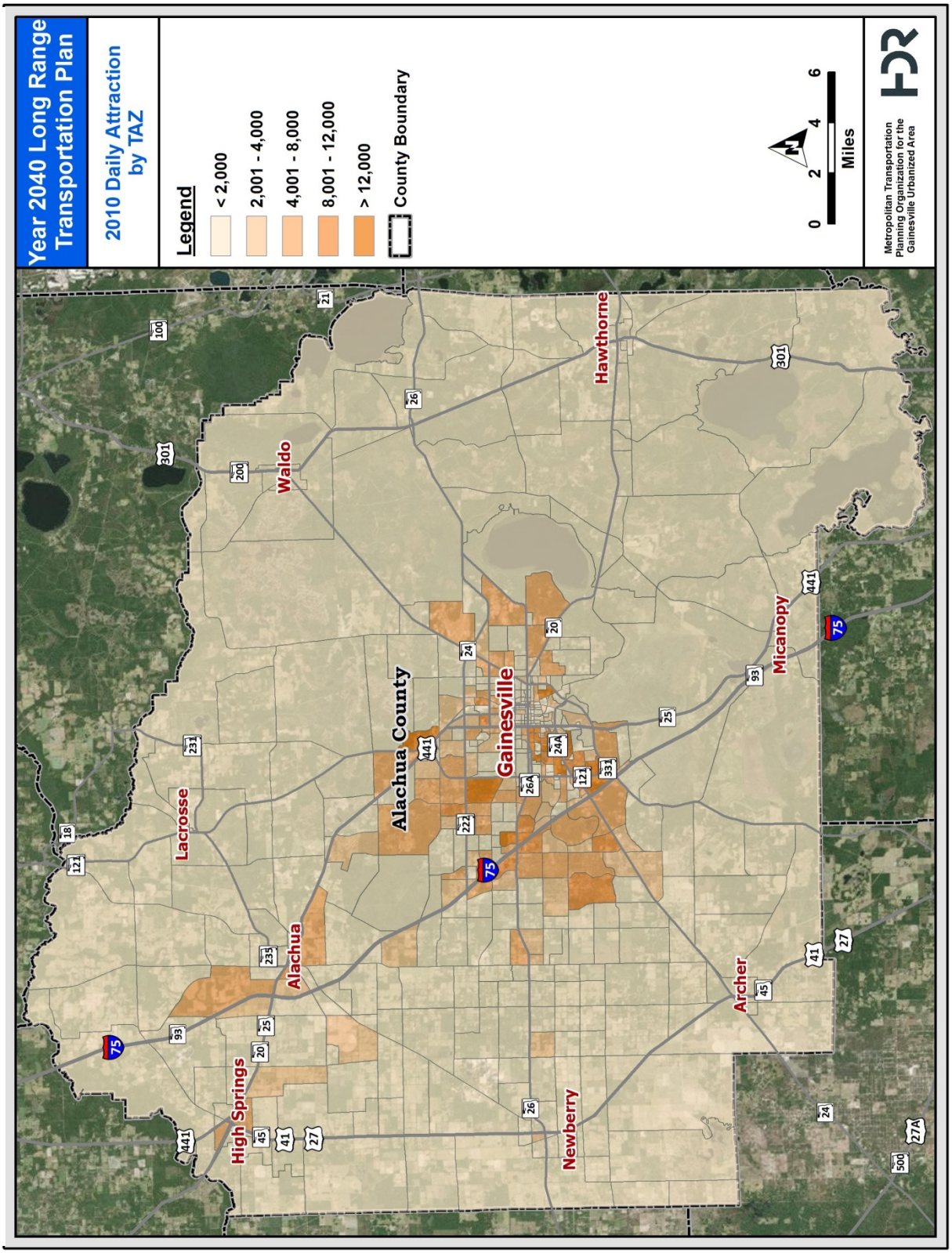
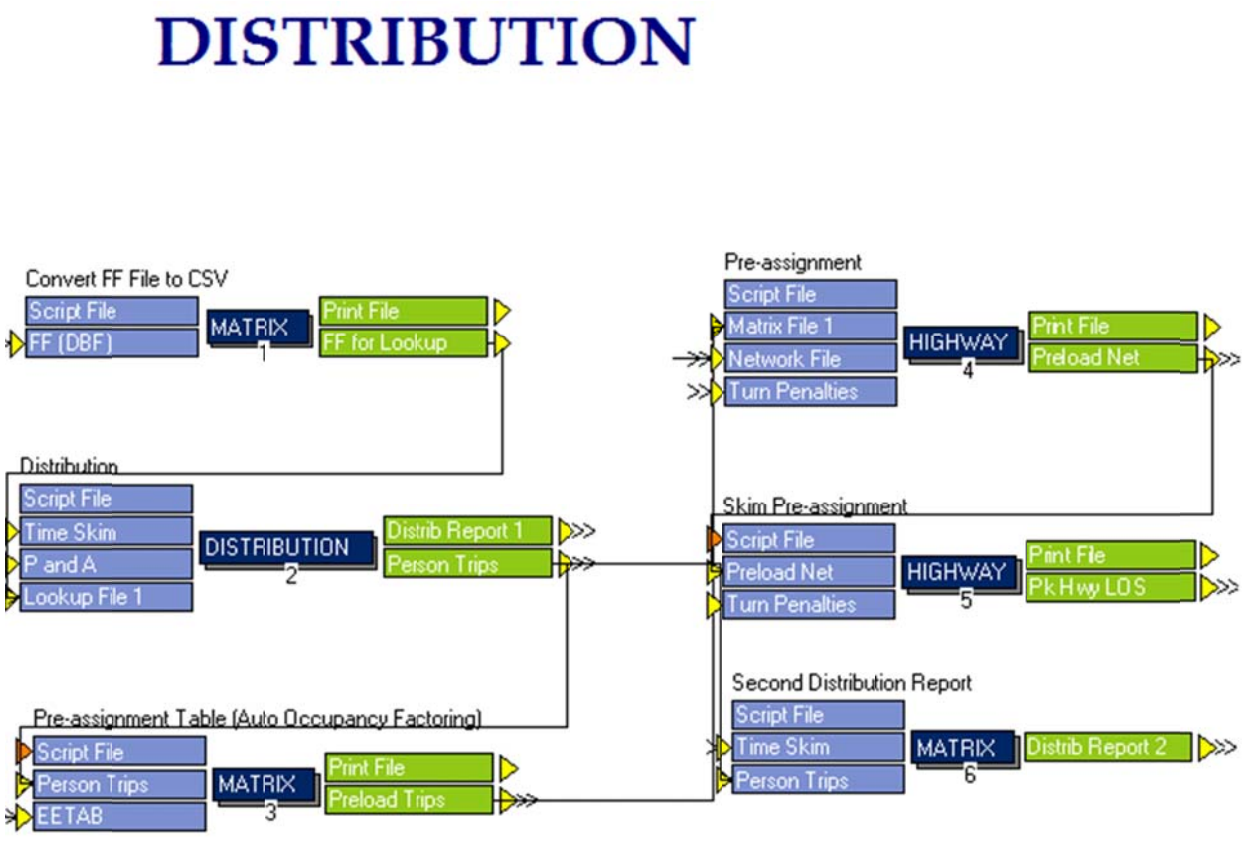


Figure 3.6 Year 2010 Trip Attractions by Traffic Analysis Zone

4 Trip Distribution

Trip distribution models link trip productions and attractions between pairs of traffic analysis zones. The most common method for trip distribution in four-step models is the gravity model. The trip distribution step distributes all trips produced in a zone to all possible attraction zones using a gravity model. The gravity model uses the trip productions and attractions estimated in the trip generation model and the network friction to distribute the trips. Friction factors are used to represent the effects of travel impedance. Friction factors can be computed by a formula, such as gamma function, or can be calibrated such that a modeled trip length frequency distribution matches an observed trip length frequency distribution. Trip distribution results in person trip matrices detailing the trips between each production and attraction traffic analysis zone. These person trips matrices are later processed in the model chain during mode choice to allocate trips by auto occupancy and transit categories. Figure 4.1 shows the trip distribution model chain.

Figure 4.1 Trip Distribution Model Chain



For evaluation of trip distribution, the *FHWA Travel Model Validation and Reasonability Checking Manual* recommends two general types of aggregate checks of trip distribution model results - trip length checks and origin-destination pattern checks. For this model, evaluation was accomplished by comparing statistics for average trip length and the percentage of intrazonal trips between the Gainesville Urbanized Area Transportation Study 2010 model, the Gainesville Urbanized Area Transportation Study 2007 model, and the Florida Standard Urban Transportation Model Structure standards. Additionally, desire line maps were prepared to show travel movements between zones and trip length frequency distributions were reviewed for reasonableness.

4.1 Trip Distribution Model Structure

The general distribution process includes the building of highway networks and travel time skims as well as application of the gravity model. The elements of these processes are described below.

Building Highway Networks

The Florida Standard Urban Transportation Model Structure includes a module known as "Highway Network" to process highway networks of model areas. As part of the model validation process, the consultant conducted an in depth review of the highway network. Network characteristics (number of lanes, area type, and facility type) were updated to reflect 2010 conditions of the roadway system throughout Alachua County.

Travel Time Skims

Free-flow travel time skims between zone pairs are developed as the last substep in the "Highway Network" module in the Florida Standard Urban Transportation Model Structure, including the updating of travel time skims with intrazonal and terminal times. Highway network characteristics are an input to this process. In addition to the highway network characteristics, other input files are generally used during network skimming. The first of these is the turn penalties file which contains a record of all prohibited turning movements in the network. Turning movements were reviewed to include any updated prohibited movements for year 2010 conditions during validation. The turn penalty file can also include time penalties; however, time penalties were not recommended in the model area as the highway assignment validated reasonably well without supplemental travel time factors. Also, a toll file is used in most Florida models to identify toll plaza characteristics. However, because no toll roads exist

in Alachua County, this file is not used in the Gainesville Urbanized Area Transportation Study 2010 model.

Intrazonal times represent the travel time it takes to travel within or across a zone. These times are calculated as one-half the average travel time from each zone to the two nearest adjacent zones. Terminal times represent the time required at either end of a trip to travel from an origin to a vehicle or from the vehicle to a final destination. More specifically, this accounts for the time necessary to walk to or from the vehicle used for any given trip. Terminal times are typically greatest in central business districts and lowest in residential areas. Table 4.1 lists the terminal times by area type used in the Gainesville Urbanized Area Transportation Study 2010 model.

Table 4.1 Terminal Times

Terminal Times*	Area Type	Area Type Descriptions
5	12	Urbanized Area (under 500,000) Primary City Central Business District
5	13	Other Urbanized Area Central Business District and Small City Downtown
5	14	Non Urbanized Area Small City Downtown
3	21	Central Business District Fringe Areas
3	22	Industrial
1	31	Residential Area of Urbanized Areas
1	32	Undeveloped Portions of Urbanized Areas
1	33	Transitioning Areas/Urban Areas over 5,000 Population
2	42	Other Outlying Business District
1	51	Developed Rural Areas/Small Cities under 5,000 Population
1	52	Undeveloped Rural Areas

*Terminal Times listed in whole minutes

Trip Distribution Module

The "DISTRIBUTION" module distributes trips between zones using a gravity model. The primary input data used for DISTRIBUTION are the friction factor (FF) file and a set of congested highway skims. These are used by the gravity model to measure the effects of spatial separation between zones for the purposes of trip distribution. It is generally assumed that productions are less likely to be linked to destinations with greater travel times if alternative destinations with lesser travel times and similar attractiveness are available. Friction factors from the Gainesville Urbanized Area Transportation Study 2007 model were used for the Gainesville Urbanized Area Transportation Study 2010 model without modification. Since no new household travel surveys were conducted since the 2007 model calibration and validation,

and the resulting trip distribution was reasonable, it was decided to maintain the existing friction factor set in the 2010 model.

Friction factors are used by the gravity model to link the trip productions and attractions generated by GENERATION. These trip interchanges denote person trips traveling from one zone in the model to another. Trips are distributed by the trip purposes found in the Gainesville Urbanized Area Transportation Study 2010 model. These person trips are later converted into vehicle trips during mode choice and then loaded onto networks during highway and transit assignment. The next subsection describes the checks, modifications, and adjustments made to trip distribution assumptions in order to verify and improve model validity.

4.2 Trip Distribution Model Development and Validation

Errors in the trip distribution phase can lead to significant problems in the execution of following steps in the model chain (i.e., mode choice and trip assignment). Consequently, efforts were taken to maximize the accuracy of the Gainesville Urbanized Area Transportation Study 2010 trip distribution module. These efforts included adjustments to network speeds and capacities and corrections of network link attributes.

Speeds and Capacities

The speed and capacity look up table is the same as the 2007 model; the main effort for validating the capacity was to update the number of lanes for the highway network. The Florida Department of Transportation Roadway Characteristics Inventory has been used as the primary source for updating the number of lanes to represent the 2010 conditions.

Penalties and Prohibitions

The TURN.pen file, formerly known as TCARDS, allows for the adjustment of travel times on specific links by either including a time penalty to pass from one link to another or by prohibiting the movement all together. Prohibitions are confined to ramps located along Interstate 75, mainly to guide trips to the correct ramps for each travel movement. No time penalties were added during the 2010 model validation effort. The TURN.pen file is listed in Appendix B.

Friction Factors

Friction factors are used in the gravity model to represent the effects of travel impedance. These factors define the measure of separation based on travel impedances between traffic analysis zones. The friction factors from the 2007 model were reviewed and no updates were necessary for the 2010 model validation. Analysis of the trip distribution summaries did not indicate a need for modification in order to improve trip distribution. Average trip lengths seemed reasonable, intrazonal percentages made sense, and aggregate trip distribution patterns looked logical. Furthermore, there are no updated household travel diary survey data for Alachua County to allow for calibration of new friction factors. A copy of the validated friction factor file (FF.dbf) is listed in Appendix C.

4.3 Trip Distribution Validation Results

Based on the Florida Standard Urban Transportation Model Structure standards, three gravity model checks were developed. They are average trip length by purpose, percentage of intrazonal trips and trip flow patterns/ trip length frequency distribution.

Average Trip Length by Purpose

Table 4.2 shows a comparison of average trip length statistics generated by the 2010, 2007, and 2000 Gainesville Urbanized Area Transportation Study models, and Florida Standard Urban Transportation Model Structure standards. Comparisons between the 2010 and 2007 Gainesville Urbanized Area Transportation Study models show a small trip length increase in home-based university, truck-taxi and Internal-External. All other categories of trips have shorter trip lengths than 2007. Overall, the trip lengths are very similar to the 2007 model. Although the average trip lengths are on the low side compared to the Florida Standard Urban Transportation Model Structure standards, this is to be expected given the relatively smaller region covered by the Gainesville Urbanized Area Transportation Study model.

Table 4.2 Average Trip Lengths (in Minutes)

Purpose	2010 Alachua County	2007 Alachua County	2000 Alachua County	FSUTMS*
Home-Based Work	14.67	14.73	13.92	15-28
Home-Based Shop	13.09	13.1	13.6	10-18
Home-Based Social/Recreation	12.49	12.55	11.97	11-19
Home-Based Other	13.24	13.37	12.79	10-20
Non-home-Based	10.51	10.79	9.05	10-18
Home-Based University	9.31	9.14	8.08	NA
UF Campus/Dorm	6.20	6.22	4.19	NA
Truck-Taxi	15.40	15.18	13.74	12-20
Internal-External	25.77	25.69	25.78	27-45

* Table F.1 - FSUTMS-Cube Framework Phase II Model Calibration and Validation Standards

Intrazonal Trip Distribution

Comparisons between the 2010 and 2007 Gainesville Urbanized Area Transportation Study models indicate that the percentage of intrazonal trips is similar for most trip purposes. These results are illustrated in Table 4.3.

Table 4.3 Intrazonal Trip Summary

	Alachua County 2010			Alachua County 2007			FSUTMS*
Purpose	Total Trips	Intrazonal Trips	Percent	Total Trips	Intrazonal Trips	Percent	
Home-Based Work	185,977	2,640	1.42%	183,288	2,783	1.52%	1-4%
Home-Based Shop	135,794	4,894	3.60%	132,443	5,585	4.22%	3-9%
Home-Based Social/Recreation	120,814	8,953	7.41%	119,642	9,302	7.77%	4-10%
Home-Based Other	270,787	10,457	3.86%	252,428	10,971	4.35%	3-7%
Non-home-Based	354,049	24,913	7.04%	329,119	23,675	7.19%	5-9%
Home-Based University	64,423	35	0.05%	75,940	39	0.05%	NA
UF Campus/ Dorm	22,767	1,336	5.87%	23,570	1,313	5.57%	NA
Truck-Taxi	84,055	1,290	1.53%	81,199	1,212	1.49%	NA
Internal-External	101,867	0	0.00%	114,055	0	0.00%	NA
Total	1,340,533	54,518	4.07%	1,311,684	54,880	4.18%	3-5%

* Table F.1 - FSUTMS-Cube Framework Phase II Model Calibration and Validation Standards

Trip Flow Patterns and Trip Length Frequency Distributions

The model area trip flow pattern analysis is another aggregate visualization check in the validation process. Traffic analysis zone-to-traffic analysis zone trip flows were conducted and checked with local knowledge to verify the reasonableness of trip distribution. In Figure 4.2, traffic analysis zone-to-traffic analysis zone daily total trip flows obtained from the model are represented by desire lines. Only daily trip flows that are greater than 20 trips are shown. The concentration of trip desires in the downtown area and general radial patterns make intuitive sense given the land use patterns of Alachua County. Figures 4.3 through 4.6 show the trip length distribution by purpose - the 2007 and 2010 trip length frequency distributions are found to be very similar.

In summary, the 2010 trip distribution validation results are consistent with the 2007 model and within acceptable Florida Standard Urban Transportation Model Structure standards.

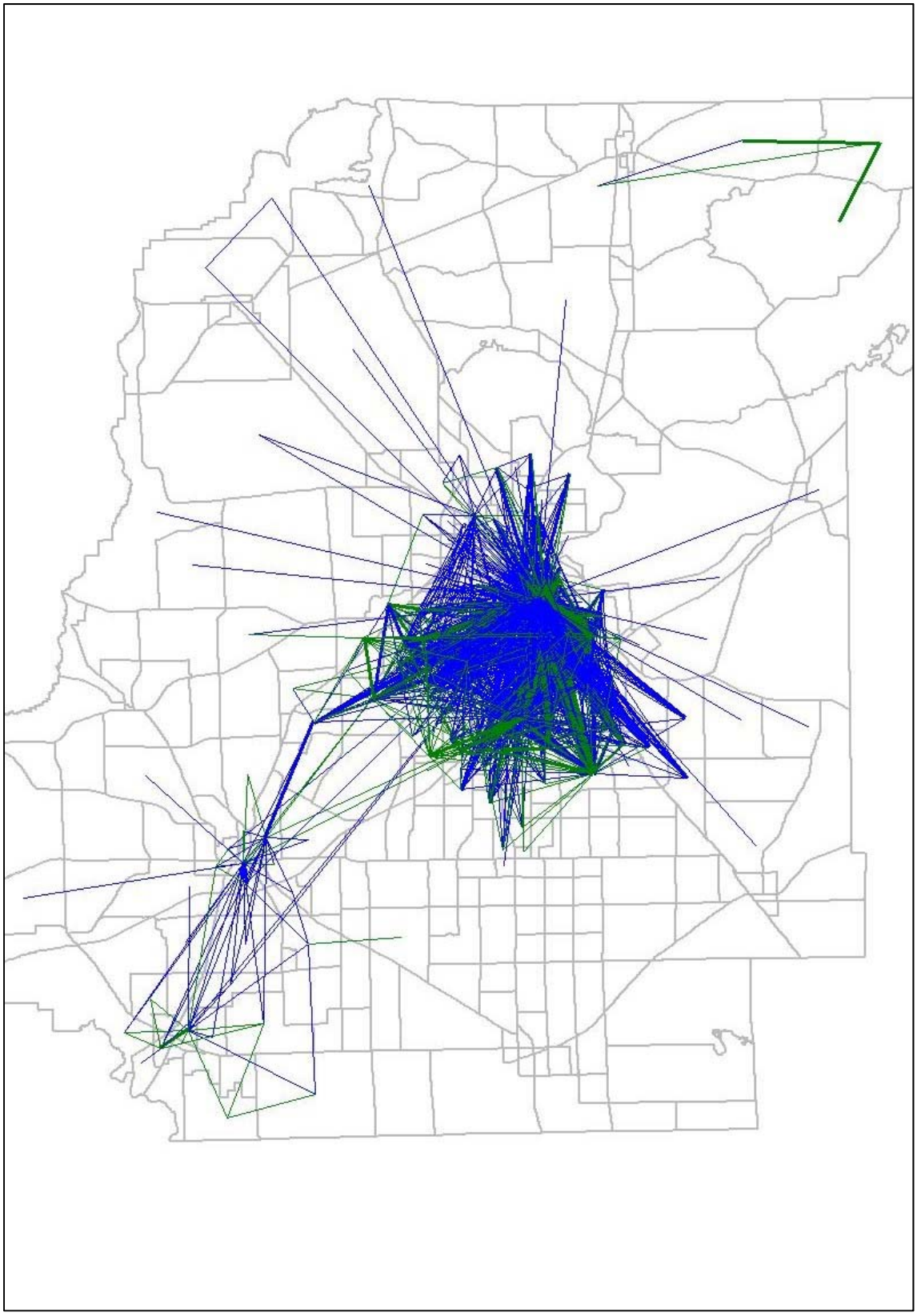


Figure 4.2 Desire Lines by Traffic Analysis Zone

Figure 4.3 Trip Length Frequency Distribution for Home-Based Work

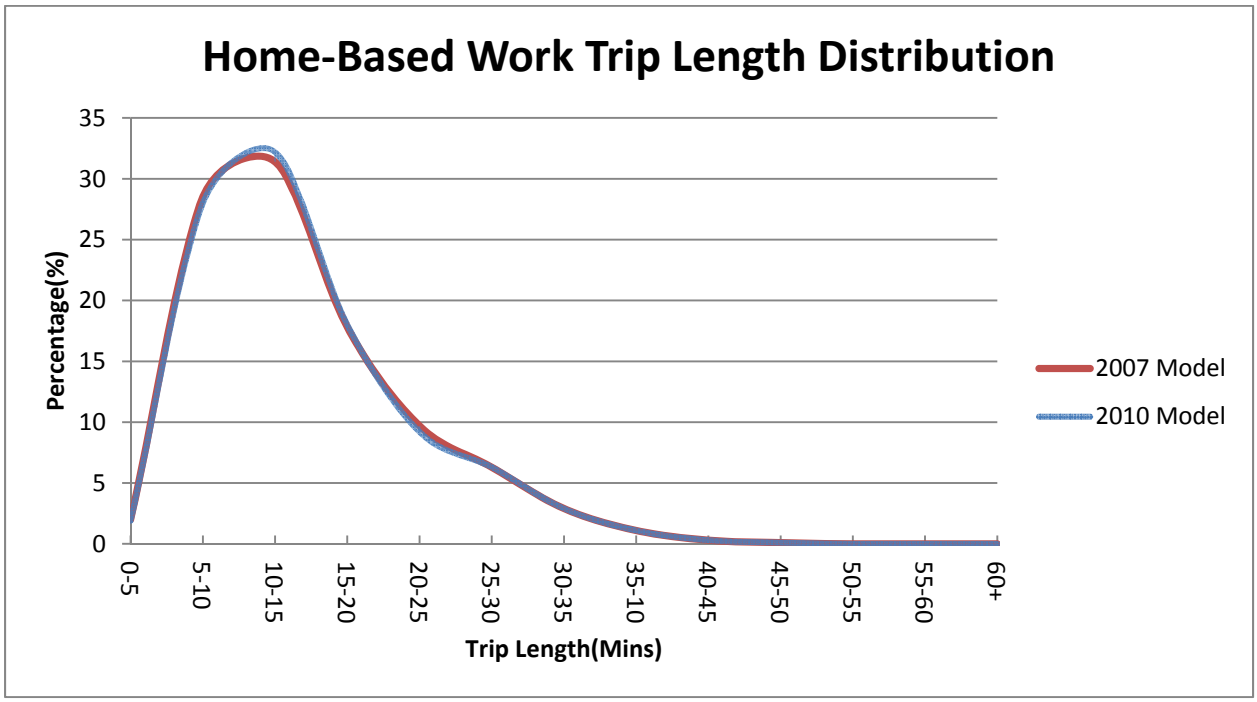


Figure 4.4 Trip Length Frequency Distribution for Home-Based Shopping

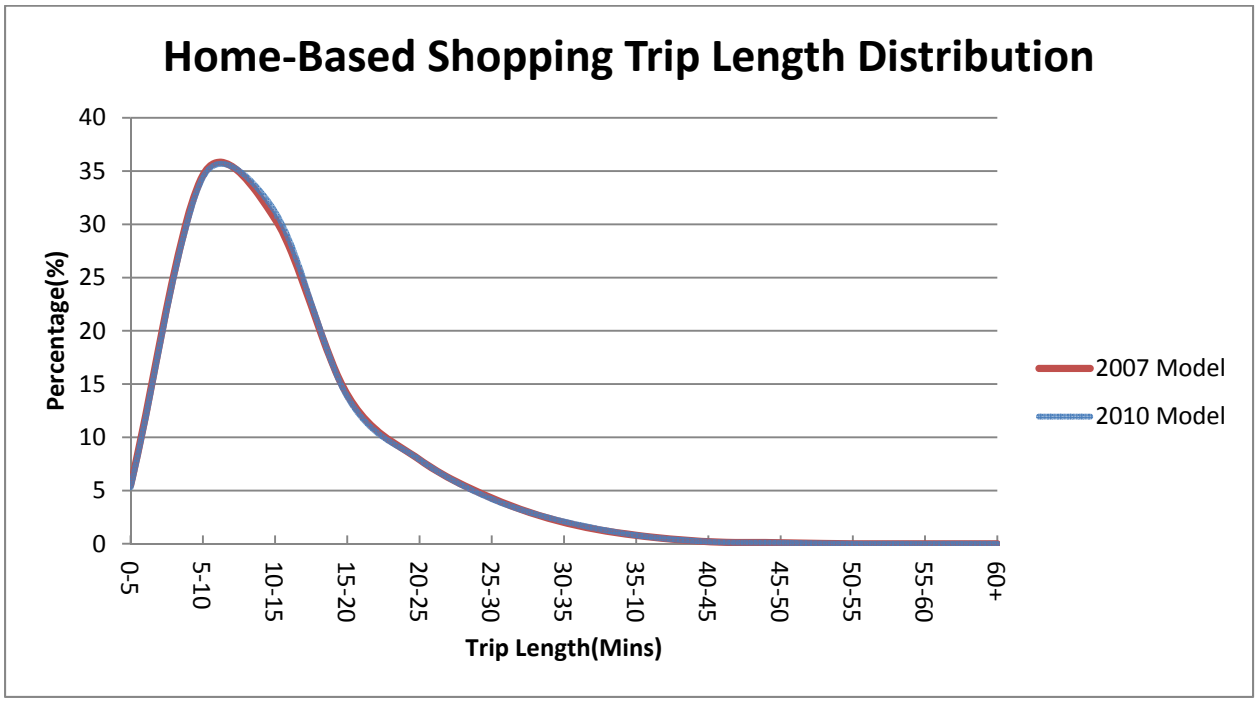


Figure 4.5 Trip Length Frequency Distribution for Home-Based Social/ Recreational

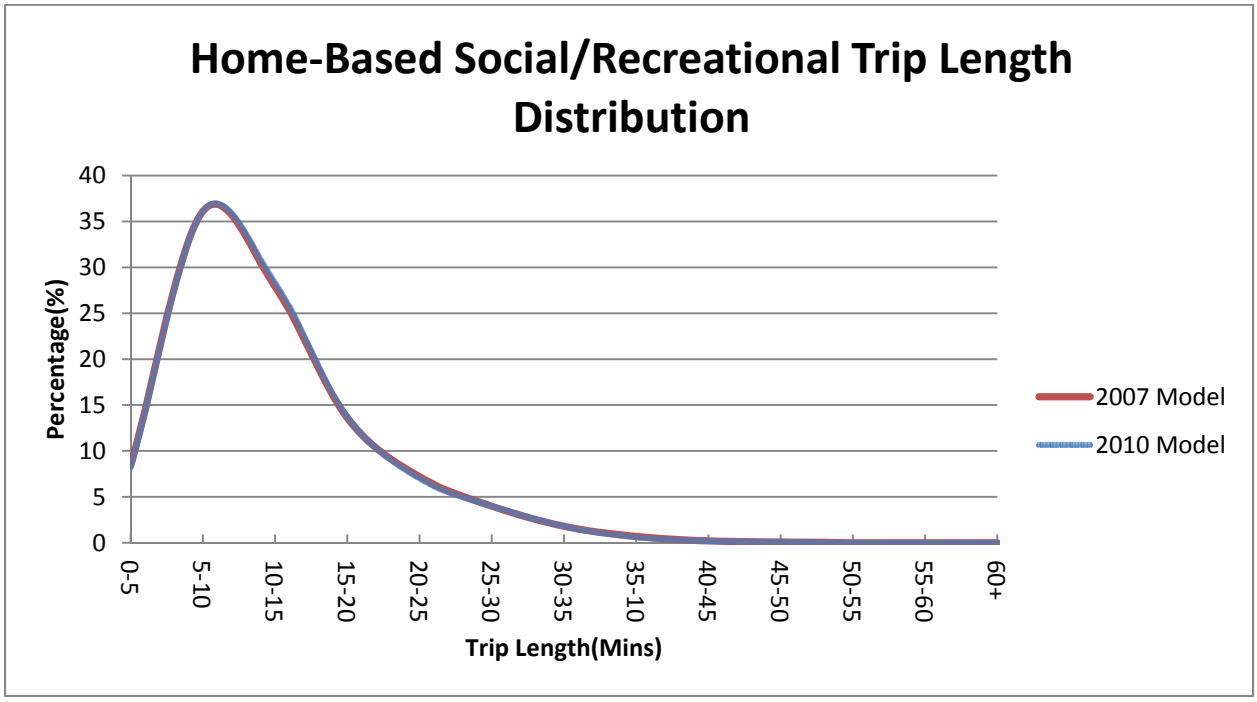
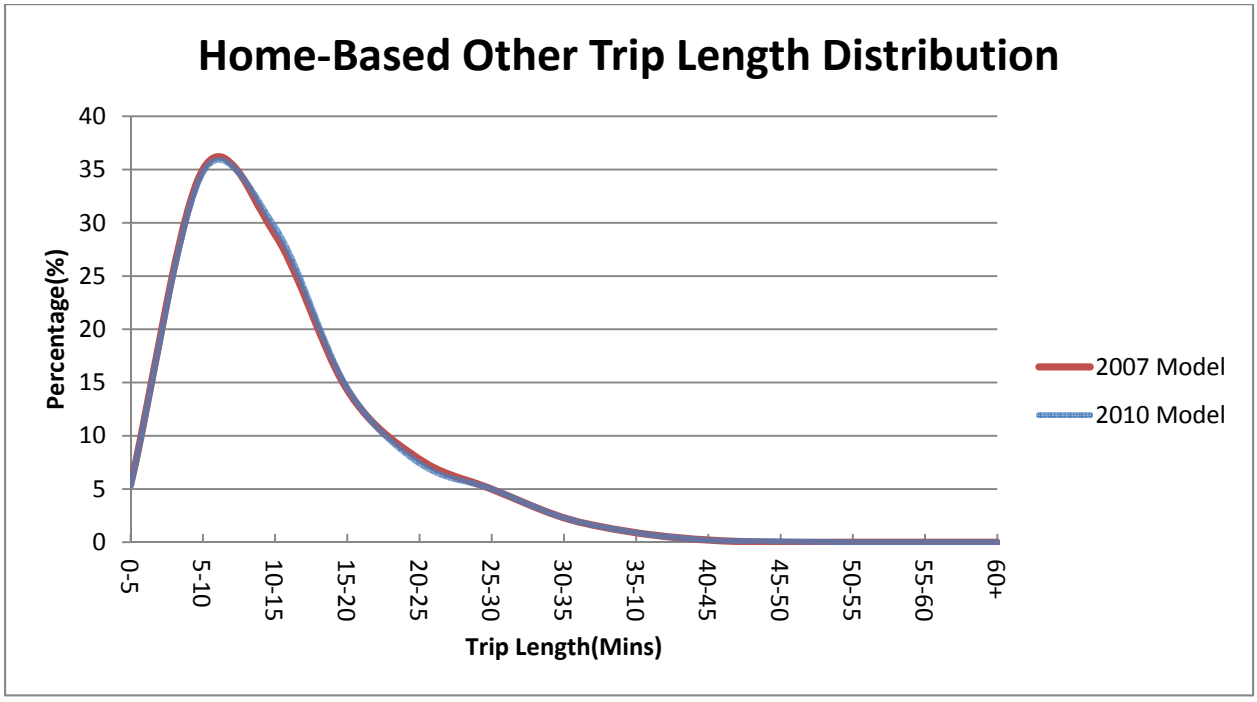


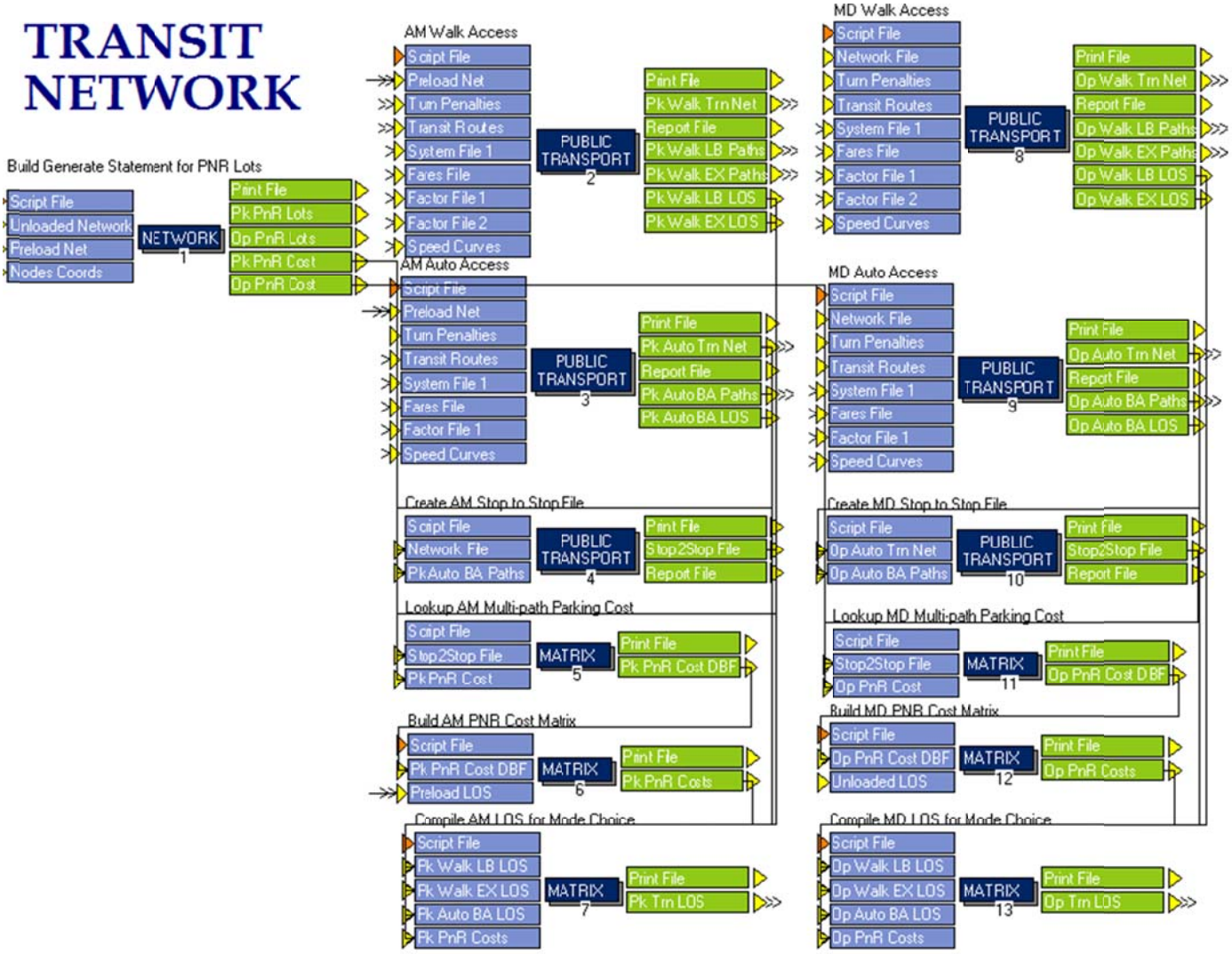
Figure 4.6 Trip Length Frequency Distribution for Home-Based Other



5 Transit Accessibility and Path-Building

Integral to the building of a transit network is the availability of access to transit. A critical component of transit access is identifying the zones that are within an acceptable walking distance to a transit stop. Walk access is generally provided from centroids to stops within a specified distance. Transit path-building involves the transit fares, transit routes and stops/stations. These inputs are used for each of the transit modes during peak and off-peak periods used in the model. The Alachua County 2010 model currently only has one transit mode, local bus, but has the capability of expansion to other transit modes in the future. Figure 5.1 shows the structure of transit network module.

Figure 5.1 Transit Network Module



5.1 Transit Access and Path-Building Module Structure

The Florida Standard Urban Transportation Model Structure transit network module is used to establish transit access and path-building. The module constructs separate peak-period (AM) and off-peak (MD) transit networks using congested highway networks as an input to produce transit vehicle travel times. Transit path-building involves the generation of transit path skim matrices, fares, and station-to-station interchanges.

Transit accessibility is represented by each zone's pedestrian environment variables (PEV) that are stored in the ZONEDATA file. The pedestrian environment variables define several factors that are essential to have sufficient accessibility to bus stops, such as sidewalk availability, ease of street crossing, non-motorized connections, and building setbacks. Each variable is given a score between 0 and 3 and the accumulated scores of the four pedestrian environment variables are saved as "SUM" in the ZONEDATA file, which ranges from 0 to 12. Future changes to the zonal transit accessibility will require modification of pedestrian environment variable scores as well as updating "SUM" values to get total pedestrian environment variable scores for each traffic analysis zone. Table 5.1 indicates what each pedestrian enhancement variable value represents. These variables and categories remain unchanged from the 2007 model.

Table 5.1 Pedestrian Environment Variables

Variables	PEV = 0	PEV = 1	PEV = 2	PEV = 3
Sidewalk Availability	No sidewalks	<10 percent have sidewalks	10 to 90 percent have sidewalks	>90 percent have sidewalks
Ease of Street Crossing	Crossing difficult	<10 percent have easy crossing	10 to 90 percent with easy crossing	>90 percent with easy crossing
Non-motorized Connections	No connections	<10 percent have connections	10 to 90 percent have connections	>90 percent have connections
Building Setbacks	All large setbacks	<10 percent have minimum setbacks	10 to 90 percent have minimum setbacks	>90 percent have minimum setbacks

5.2 Transit Access and Path-Building Model Development and Validation

Most of the effort in validating the transit accessibility and path-building focused on ensuring that the transit network was up to date and accurately reflected base year conditions. In addition, walk access links were checked in order to ensure adequate connectivity.

Transit Accessibility

The key effort in validating the transit network consisted of three parts. The first was to review the existing transit network and update it to year 2010 operating conditions. This required significant additions and rerouting of the transit lines. The second part was to check that there is no "Later Gator" bus route coded around the University of Florida campus since this may result in over assignment. Finally, pedestrian environment variables in the ZONEDATA file were reviewed and updated for each zone. However, because of limited data availability, the pedestrian environment variables are generally kept the same as 2007.

Transit Fare

The Gainesville Regional Transit System (RTS) transit fare was $1.00 during the year 2007, used for the Gainesville Urbanized Area Transportation Study base year 2007 model validation. This fare was increased to $1.50 in 2010, according to the Gainesville Regional Transit System. Details on how the bus fare was adjusted during validation are further explained in Transit Procedure and Assignment section. The fare has been set to $1.50 for base year 2010 in ALACHUA.FAR file. For the future year transit analysis, the bus fare factor (BUSSFAREFAC) value may need to be updated to represent fare increases beyond inflation.

Transit Routes

As validation efforts moved towards reasonable transit assignments, transit network rerouting, bus stop locations and local zonal access to bus stops were reviewed using the Gainesville Regional Transit System General Transit Feed Specification files. Headway data was also extracted from the Gainesville Regional Transit System General Transit Feed Specification files and the transit route file (troute10.lin) was updated. The transit route file had to be overlaid on the highway network when new bus locations were added due to the necessity of splitting highway links where a bus stop exists. The highway network was therefore updated at the same time as the transit route file was updated. "Later Gator" bus routes are not included in the 2010 Alachua County model as these are evening bus services specifically for University of Florida students and operate for only limited hours while the model is designed to estimate daily peak and off-peak transit ridership.

Transit Skimming Parameters

The path parameters used during transit skims were reviewed for reasonableness and consistency with mode choice coefficients. Consistency between skimming and mode choice is

an area that is considered by the Federal Transit Administration (FTA) when a model is used for New Starts or Small Starts purposes. A few skim parameters were identified (in the 2007 model) that were not consistent with mode choice. Auto driving time to park and ride lots had a perceived weight parameter of 1.0 in the 2007 model skim parameters while the ratio of out-of-vehicle travel time to in-vehicle travel time in mode choice is 2.0 for home-based work. Also, transfer waiting time had a perceived weight parameter of 1.4 in the 2007 model. Both of these skimming parameters were set to 2.0 in the 2010 model for consistency with mode choice.

5.3 Transit Access and Path-Building Model Validation Results

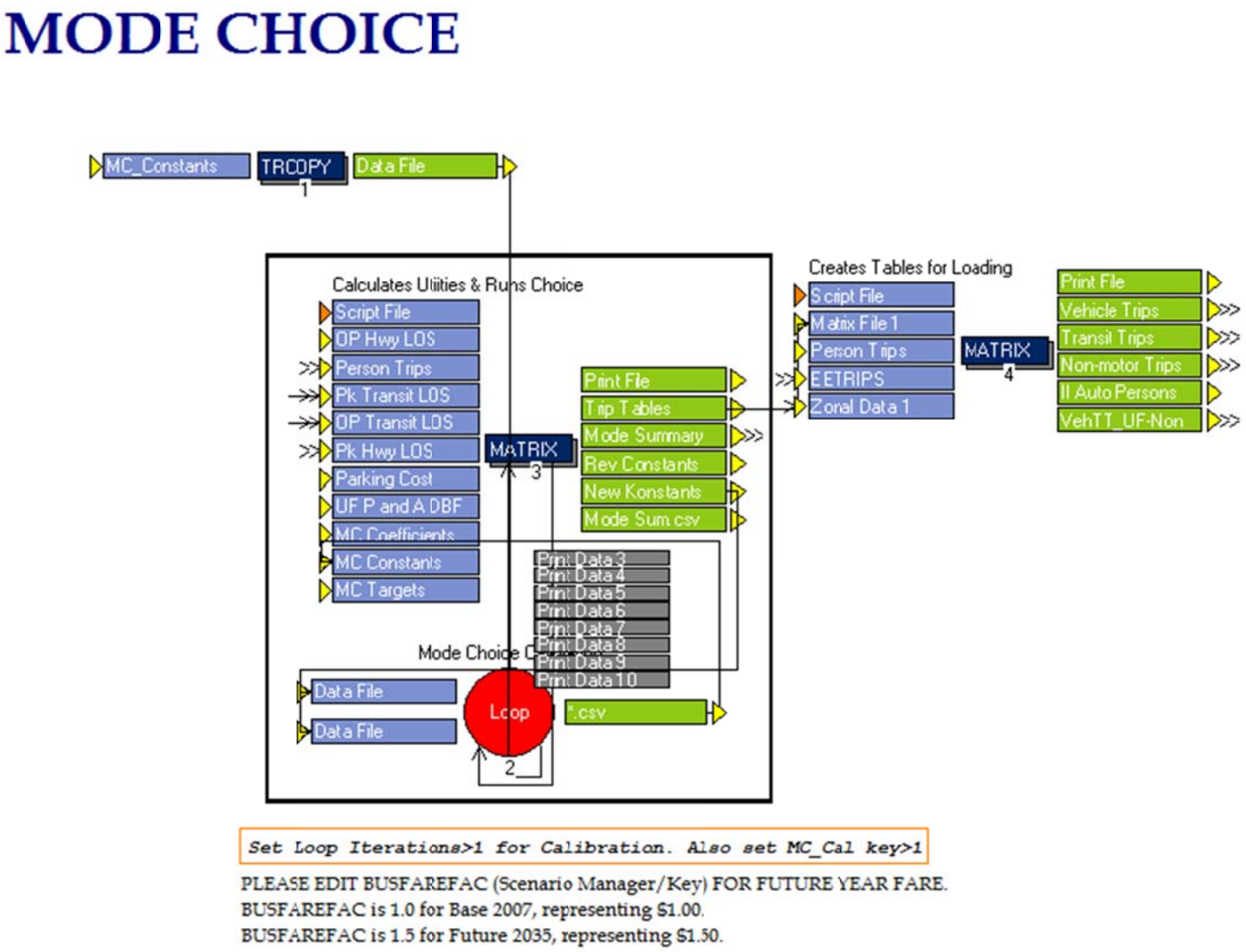
The Federal Transit Administration has noted that certain common practices in transit path building can have undesired impacts on ridership forecasts. Minimum and maximum values of time and distance used to determine valid transit paths and modal availability can have unexpected effects. Path building parameters and settings should remain the same for all steps of the model (skimming, assignment). All transit parameters in the model were reviewed for consistency across the model chain. The careful review of all transit parameters ensured reasonableness of transit access and path building.

Average weekday transit trips in the year 2010 computed from the data provided by the Gainesville Regional Transit System were 41,535. The model currently is estimating an average of 40,403 transit riders per day, which is only 2.7% lower than observed data and is well within the acceptable range of 3% - 9% from the Florida Standard Urban Transportation Structure standards. Additional details on transit assignment are provided in Section 8.0 of this report.

6 Mode Choice

Since Alachua County is the home of University of Florida and Santa Fe Colleges, like other college towns the transit system plays an important role in daily transportation and needs to be considered in modeling. The mode choice model used in the 2010 Alachua County model is a set of nested logit models that estimate modal shares among several categories of auto and transit modes. This section of the report describes the structure and validation of the mode choice model. Figure 6.1 shows the structure of this part of model.

Figure 6.1 Mode Choice Model Chain



6.1 Mode Choice Model Structure

The Florida Standard Urban Transportation Model Structure process makes use of a nested logit model for mode choice, except in the case of highway only models (i.e., those that do not include transit networks). The entire mode choice process is executed via Cube/Voyager scripting, using the MATRIX program.

One script, MCMAT00A.S, creates a trip table matrix set containing trips for all five purposes: home-based work (HBW), home-based other (HBO), non-home-based (NHB), home-based university (HBU) and University of Florida Campus/Dorm (DORM). The trip tables for each purpose are separated into 8 mode specific tables: auto drive-alone (DA), auto 2-person carpool (CP), auto 3+ person carpool (CX), walk to local bus (WB), walk to premium bus (WX), drive to transit (BA), walk (WK), and bike (BK). Transit skim data compiled in the transit network module and highway skims generated during trip distribution are inputs into the "MODE" module. The peak period utilizes the congested highway skims, whereas the off-peak period uses the free flow skims.

After running the mode choice model, the outputs are balanced into origin and destination trip tables. A separate script, MCMAT00C.S, combines trip purposes and outputs separate trip tables for the following modes and these trip tables are then used during the highway and transit assignment phases of the model:

1. Drive alone auto;
2. Carpool auto;
3. Light duty trucks;
4. Heavy duty trucks;
5. External-external trips;
6. Peak period transit;
7. Off-peak period transit;
8. Non-motorized travelers; and
9. Internal auto persons (combination of modes 1 and 2, above).

A few minor changes were made to fix the deficiencies embedded in the 2007 mode choice script. Since the unit of the fare cost is dollars while other costs (like parking) are using cents as the unit, fare cost needs to be multiplied 100 to become comparable to other costs. This was not correctly done for some of the trip purposes in the 2007 model. The scripts referenced above and others pertaining to Mode Choice can be found in Appendix D, along with the corresponding model flowchart for each step.

6.2 Development and Validation of Mode Choice Model

The mode choice model step for the Gainesville Urbanized Area Transportation Study 2010 model was developed from the Gainesville Urbanized Area Transportation Study 2007 model, with a few changes to mode choice scripting (MCMAT00A.S). The constants file (MCCONSTANTS.CSV) was modified with recalibration of the transit trips. Coefficients (MCCOEFFICIENTS.CSV) are kept the same as 2007 and are in a numeric range consistent with current Florida Standard Urban Transportation Model Structure validation standards. The mode choice coefficients were not revised given that a better source of data, such as a new household travel survey, is not available. All parameters are shown in Table 6.1.

Table 6.1 Mode Choice Coefficients for 2010 Model

Mode Choice Model Parameters	2010	FSUTMS
Home-Based Work IVTT	-0.025	-0.01 to -0.05
Home-Based Non-Work IVTT	-0.02	-0.007 to -0.033
Non-Home Based IVTT	-0.024	-0.01 to -0.05
University IVTT	-0.024	-0.02 to -0.03
Home-Based Work OVTT	-0.049	NA
Home-Based Non-Work OVTT	-0.048	NA
Non Home-Based OVTT	-0.07	NA
University OVTT	-0.048	NA
Home-Based Work OVTT/IVTT	2.0	1.5 to 3.0
Home-Based Non-Work OVTT/IVTT	2.4	2.0 to 6.0
Non Home-Based OVTT/IVTT	2.9	2.0 to 7.0
University OVTT/IVTT	2.0	2.0 to 3.0

*IVTT = in-vehicle travel time, OVTT = out-vehicle travel time

6.3 Mode Choice Model Results

Mode choice results were compared with statistics from Census American Community Survey data for the home-based work (HBW) trip purpose. With respect to transit mode split, the Gainesville Urbanized Area Transportation Study 2010 mode split percentages were smaller than the 2007 model for the home-based work purpose. The home-based work purpose showed 4.18 percent of all home-based work trips being transit as opposed to 4.39 percent for the 2007 model. The 2010 results are reasonable compared to the transit mode share estimate from the American Community Survey (refer to the end of Table 6.2). In total, 2.38 percent of all trips in the 2010 model were allocated to transit modes while 2.17 percent of all trips in the 2007 model were allocated to transit. Table 6.2 contains the Gainesville Urbanized Area Transportation Study 2010 model Mode Choice validation results.

Table 6.2 Mode Choice Validation Summary

	2010		2007		2000		FSUTMS*
	Trips	Percent of Trips	Trips	Percent of Trips	Trips	Percent of Trips	
Home-Based Work							
Drive Alone	145,470	78.25%	143,880	78.51%	122,692	81.72%	70-85%
Two Passengers	16,609	8.93%	15,951	8.70%	14,492	9.65%	9-16%
3+ Passengers	8,287	4.46%	8,019	4.38%	7,249	4.83%	2-6%
Total Transit	7,779	4.18%	8,043	4.39%	1,125	0.75%	0.5-10%
Walk	4,339	2.33%	4,098	2.24%	2,947	1.96%	NA
Bike	3,412	1.84%	3,278	1.79%	1,641	1.09%	NA
Total	185,896	100.00%	183,269	100.00%	150,146	100.00%	NA
Home-Based Other							
Drive Alone	204,045	38.71%	200,318	39.63%	167,037	38.10%	NA
Two Passengers	201,574	38.24%	191,683	37.92%	169,427	38.64%	NA
3+ Passengers	98,476	18.68%	90,914	17.99%	83,985	19.15%	NA
Total Transit	1,852	0.35%	2,943	0.58%	1,375	0.31%	NA
Walk	19,425	3.68%	17,952	3.55%	15,134	3.45%	NA
Bike	1,786	0.34%	1,631	0.32%	1,497	0.34%	NA
Total	527,158	100.00%	505,441	100.00%	438,455	100.00%	NA
Non Home-Based							
Drive Alone	172,087	48.61%	166,902	50.70%	129,768	45.29%	NA
Two Passengers	117,608	33.22%	106,625	32.39%	97,798	34.13%	NA
3+ Passengers	52,509	14.83%	45,341	13.77%	47,888	16.71%	NA
Total Transit	2,415	0.68%	2,587	0.79%	2,033	0.71%	NA
Walk	6,274	1.77%	5,105	1.55%	6,085	2.12%	NA
Bike	3,158	0.89%	2,640	0.80%	2,981	1.04%	NA
Total	354,051	100.00%	329,200	100.00%	286,553	100.00%	NA
Home-Based University							
Drive Alone	32,169	49.93%	34,900	45.96%	26,274	49.75%	NA
Two Passengers	3,915	6.08%	4,399	5.79%	3,098	5.87%	NA
3+ Passengers	1,960	3.04%	2,261	2.98%	1,555	2.94%	NA
Total Transit	13,478	20.92%	9,178	12.09%	11,303	21.40%	NA
Walk	6,811	10.57%	15,025	19.78%	5,546	10.50%	NA
Bike	6,090	9.45%	10,179	13.40%	5,032	9.53%	NA
Total	64,423	100.00%	75,942	100.00%	52,808	100.00%	NA
University of Florida Campus/Dorm							
Total Transit	1,947	8.55%	1,981	8.40%	6,624	25.00%	NA
Walk	15,180	66.68%	15,615	66.25%	12,810	48.36%	NA
Bike	5,641	24.78%	5,974	25.35%	7,057	26.64%	NA

	2010		2007		2000		FSUTMS*
	Trips	Percent of Trips	Trips	Percent of Trips	Trips	Percent of Trips	
Total	22,767	100.00%	23,570	100.00%	26,491	100.00%	NA
All Purposes							
Drive Alone	553,771	47.97%	546,000	47.80%	445,771	46.70%	35-50%
Two Passengers	339,706	29.43%	318,658	27.90%	284,815	29.84%	15-35%
3+ Passengers	161,232	13.97%	146,535	12.83%	140,677	14.74%	8-20%
Total Transit	27,471	2.38%	24,732	2.17%	22,460	2.35%	0.2-9%
Walk	52,029	4.51%	57,795	5.06%	42,522	4.46%	NA
Bike	20,087	1.74%	23,702	2.08%	18,208	1.91%	NA
Total	1,154,295	100.00%	1,142,154	100.00%	954,453	100.00%	NA

*FSUTMS = Florida Standard Urban Transportation Model Structure

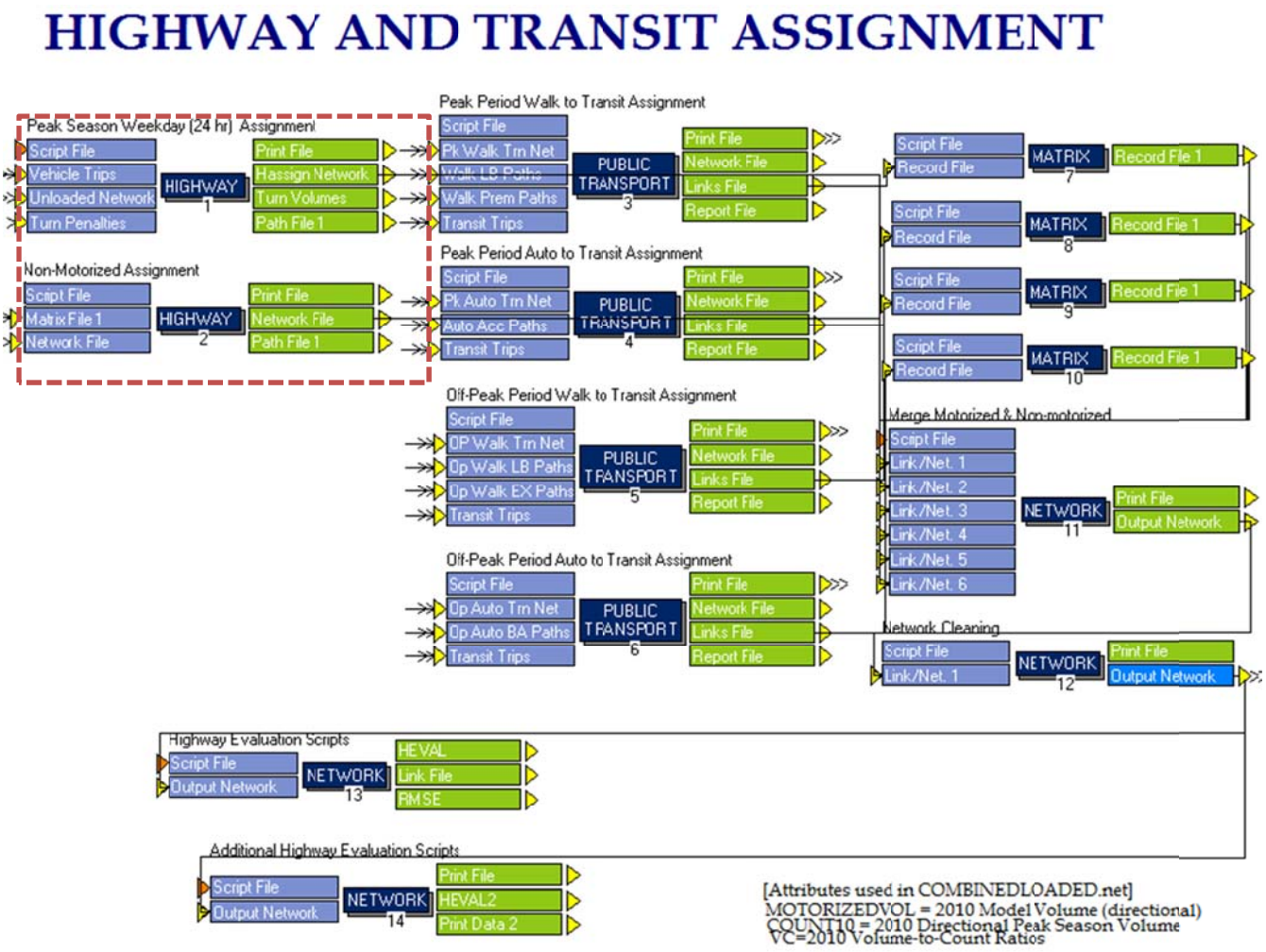
American Community Survey 5 Years 2006-2010

Classes	Home-Based Work Percent of Trips
Drive Alone	74.18%
Carpool	11.13%
Transit	3.43%
Walk	3.31%
Bicycle	3.24%

7 Highway Assignment

A proper validation of the highway assignment is critical to the meaningful use of travel demand models. The objective of the assignment module is to load trips to available paths to achieve system equilibrium. Highway trip assignment determines the shortest path between any given origin destination pair and loads the auto trips produced by the mode choice module onto those path links. The trips are loaded incrementally – once the first iteration is completed, link travel times are then recomputed, the new shortest paths are subsequently determined, and the next iteration is executed. This process proceeds through a series of iterative calculations until no one can shorten their travel time by changing routes. In another words, system equilibrium is achieved at the end of highway assignment. The red dotted line in Figure 7.1 shows the highway assignment model chain. Highway assignment is combined with transit assignment at this model. The details of transit assignment will be discussed in next chapter.

Figure 7.1 Highway Assignment Module



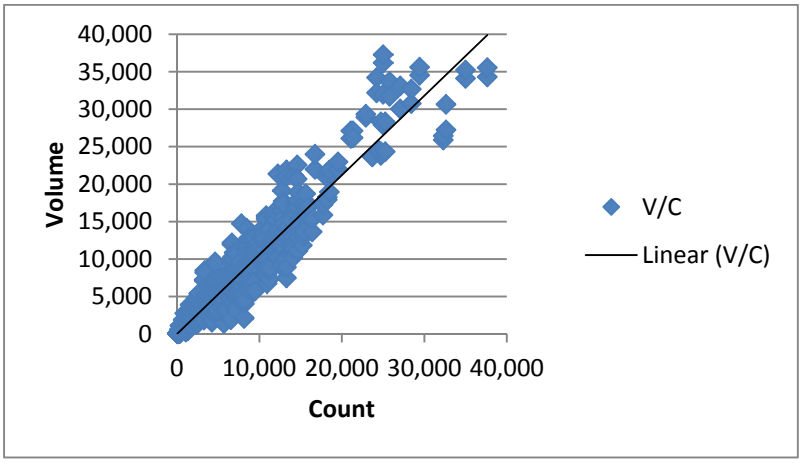
7.1 Highway Assignment Procedure

Auto trips are loaded onto the network by means of an iterative equilibrium highway load program based on an all or nothing assignment algorithm. In total, six model runs were executed in order to validate the Gainesville Urbanized Area Transportation Study 2010 model, excluding numerous test runs that were necessary for iterative adjustment and minor calibration. Adjustments were made to key elements of the modeling process to achieve satisfactory validation results. After each run, a summary of the results was compiled and analyzed in order to identify areas for improvement in the model and successful strategies toward validation enhancement. A number of key evaluation statistics, which are recommended by the *FSUTMS- Cube Framework Phase II: Model Calibration and Validation Standards Final Report*, were generated for model calibration and validation purposes. Model validation was accomplished by minimizing the difference between the model estimated volumes and observed traffic counts for the year 2010 on network segments for the entire study area.

7.2 Highway Assignment Validation Results

The evaluation of the highway assignment module is based on comparisons between observed traffic counts and model estimated volumes. Base year model estimated traffic volumes are compared to the 2010 traffic counts in different ways to determine whether the model projections are reasonable. Figure 7.2 shows a volume to count scatter plot for the overall model. The indicators that are available for determining the overall performance of the highway assignment model are volume to count ratios by area type/ facility type/ lane categories, screen line volume over count ratios, and root mean square error (RMSE). Each of the measures is discussed in the remainder of this section.

Figure 7.2 Volume to Count Scatter Plot



Assignment Performance by Area Type/Facility Type/Lanes Categories

Table 7.1 contains details of the volume-over-count ratios for each link group category by area type, facility type, and number of lanes. At the area-wide level, the 2010 base year model is overestimating volumes by 6 percent.

Screenline Performance

Analyzing volume-over-count ratios along screenlines allows for examining traffic flows across geographic subareas and corridors. Florida accuracy standards along screenlines have historically varied from +/-5 percent to +/-20 percent. There are 10 screenlines in the Alachua County 2010 model including an external cordon line measuring trips coming into and going out of the study area.

Table 7.2 shows volume to count ratios by screenline (note that double counting of trips was avoided in creating the summary). Figure 7.3 shows the locations of the screenlines. Screenline 9 does fall slightly outside of the FSUTMS standard. However, this validation effort was focused on the overall region wide calibration.

Table 7.1 Volume to Count Performance by Category

Category	2010	Florida Standard Urban Transportation Model Structure		Number of Links	
Facility Type		Acceptable	Preferable	Total	with Counts
Freeway	0.96	+-7%	+-6%	43	16
Divided Arterial	1.10	+-15%	+-10%	1,236	256

Undivided Arterial	1.08	+-15%	+-10%	706	127
Collectors	0.92	+-25%	+-20%	2,588	258
One-Way/Frontage	1.02	+-25%	+-20%	36	2
Area Type					
Central Business District	0.94	NA	NA	212	10
Central Business District Fringe	1.07	NA	NA	316	24
Residential	0.98	NA	NA	1,508	251
Other Business District	1.11	NA	NA	946	178
Rural	1.10	NA	NA	1,725	228
Number of Lanes					
One Lane	0.98	NA	NA	3,268	NA
Two Lanes	1.08	NA	NA	1,266	NA
Three Lanes	1.12	NA	NA	173	NA
Total	1.06	+-5%	NA	4,707	NA

Table 7.2 Volume to Count Performance by Screenline

	2010 Volumes Over Counts			Florida Department of Transportation Criteria*	
Screenline	Total Volume	Total Count	V/C Ratio		Screenline Description
1	28,625	35,471	0.81	+/-20%	Crossing I-75
2	60,132	55,596	1.09	+/-15%	Crossing East University of Florida Campus
3	62,717	60,417	1.03	+/-15%	Crossing State Road 121
4	26,236	29,600	0.89	+/-20%	East-West Cutline west of I-75
5	137,240	130,479	1.05	+/-10%	North-South Crossing State Road 222 (39th Avenue)
6	78,751	71,123	1.11	+/-10%	North-South Cutline in Northwest County/High Springs
7	3,236	2,938	1.10	+/-20%	La Crosse Area
8	25,877	22,905	1.13	+/-20%	East-West Crossing U.S. 301
9	60,631	73,050	0.83	+/-15%	Micanopy Area
10	217,669	217,690	1.00	+/-1%	External Cordon

*FSUTMS-Cube Framework Phase II: Model Calibration and Validation Standards Final Report

Percent Root Mean Square Error

Root Mean Square Error is among the most commonly reported statistics in model validation. Root Mean Square Error, a measure of dispersion, tends to normalize model error better than volume-over-count ratios that allow for high ratios to offset low ratios. Table 7.3 shows the Root Mean Square Error statistics by volume group. All categories met stablished accuracy standards.

Table 7.3 Root Mean Squared Error

Volume Range	2010 Model	Florida Standard Urban Transportation Model Structure	
		Acceptable	Preferable
1-5,000	47.1%	+/-100%	+/-45%
5,000-10,000	28.5%	+/-45%	+/-35%
10,000-20,000	23.4%	+/-30%	+/-25%
20,000-30,000	23.0%	+/-27%	+/-15%
30,000-40,000	11.7%	+/-25%	+/-15%
Average Total	31.3%	+/-45%	+/-35%

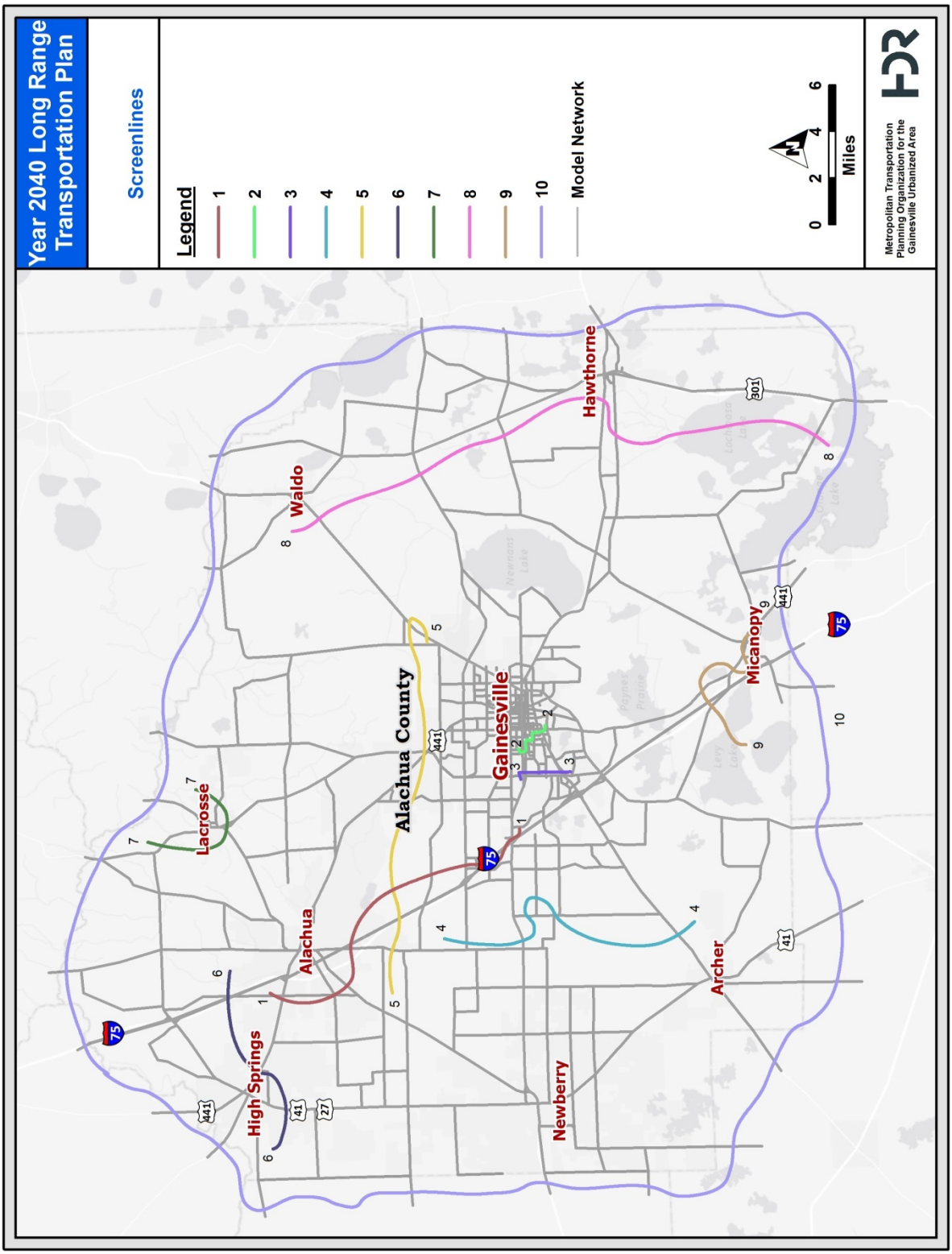


Figure 7.3 Gainesville Urbanized Area Transportation Study 2010 Model Screenlines

8 Transit Procedure and Assignment

The transit procedure in the Gainesville Urbanized Area Transportation Study 2010 model includes development of transit input data, building transit path, calculating the number of transit trips from the mode choice model, and loading the transit trips to the transit network. Each of these four aspects of the transit procedure is discussed in this document.

The development of the transit input data was discussed in Section 5. Information on routes, stop locations, service characteristics, and ridership was provided by Gainesville Regional Transit System staff. Detail transit network coding and review was conducted in order to ensure that the system representation in the model is accurate. The ridership data was utilized to assess the reasonableness of the model outputs.

A detailed review of all transit parameters including path building was conducted and documented. Transit levels of service are computed separately for peak hours and off-peak hours. During the process of distribution, the preloaded highway network with pre-assignment loads based on initial time skim is created. Then in the process of transit path creation, the preloaded network is used to calculate the time skim for transit during peak hours. Transit vehicle speed (link travel time) is determined as a function of the automobile speed on each link. The type of relationship used for each transit service type is identified based on area type and facility type of the link. These auto/transit speed relationships are used in a lookup function to assign speeds for transit paths. Then the transit travel time is calculated proportionally according to relative relationship between auto travel times. During this step, path files with shortest time and distance for peak and off-peak are also created which are later used at the transit assignment stage. Other variables, like headway, transit accessibility, waiting time and transit path building parameters are assigned to each route during this process as well.

The Gainesville Urbanized Area Transportation Study 2010 model uses a nested logit model approach for mode choice. Variables that are considered include in-vehicle transit time, out-of-vehicle transit time, cost, bike or walk to transit time, and pedestrian environment variables. The coefficients used in mode choice for these variables are shown in Table 8.1. For home-based work trips, the local bus fare is discounted to 25% since there is an employee pass program. This 25% factor was retained from the 2007 model, and was originally computed to match model computed home-based work ridership to observed ridership. Since the transit fare is covered by tuition fees of University of Florida students the local bus fare for home-based university and dorm-university walk to local transit is discounted to 10%. For home-based university walk and drive to premium transit the bus fare is free. The percentages of each

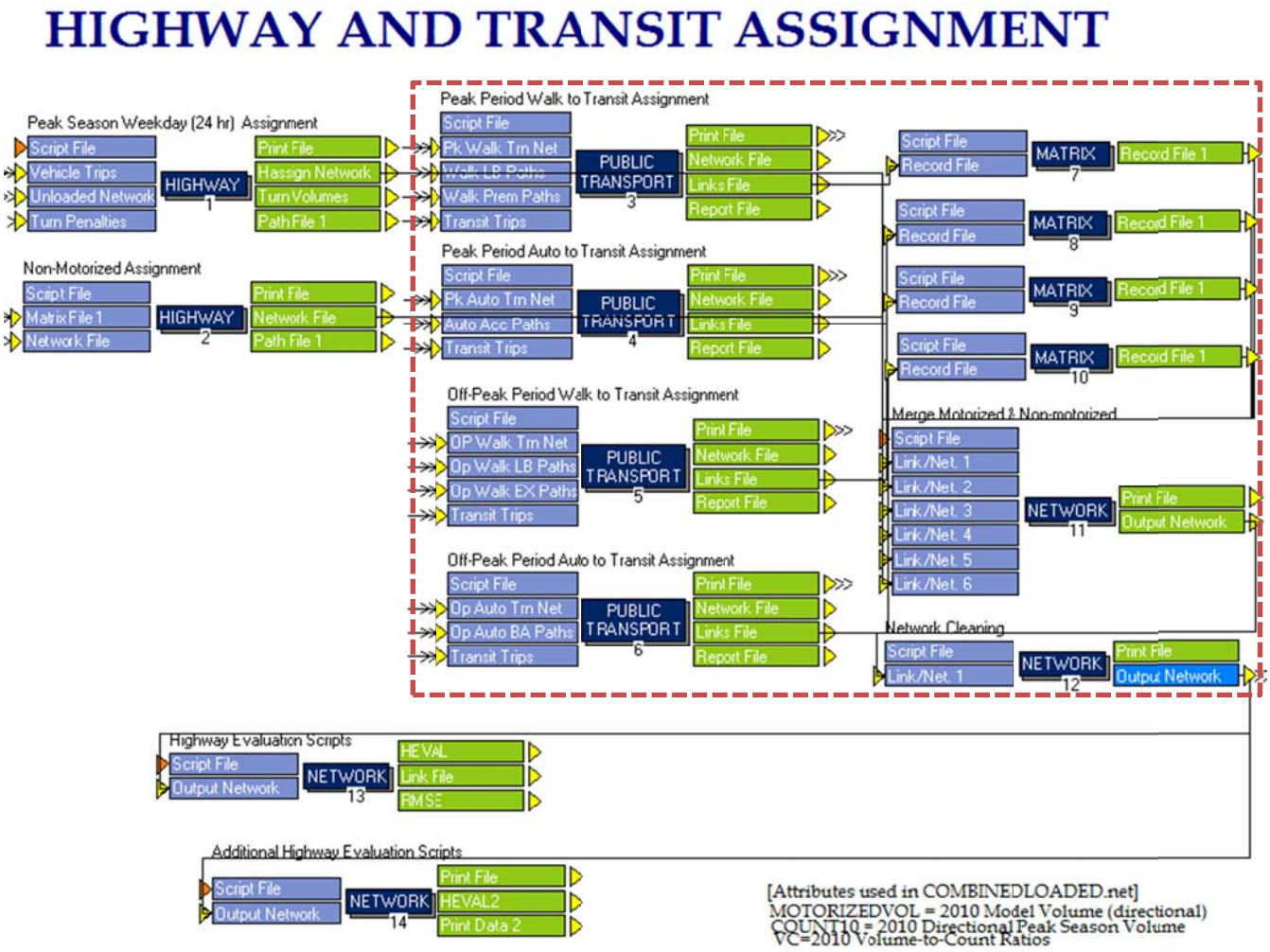
mode are calculated by using nested logit mode choice. The details of the mode choice model validation are discussed in Section 6.

Table 8.1 Mode Choice Coefficient for Transit Variables

Coefficient	Home-based Work	Home-based Other	Non home-based	University
civt - In-Vehicle Transit Time Coefficient	-0.025	-0.02	-0.024	-0.024
covt – Out-of-Vehicle Transit Time Coefficient	-0.049	-0.048	-0.07	-0.048
ccst - Cost Coefficient	-0.005	-0.011	-0.009	-0.011
cwt - Walk only Coefficient	-0.042	-0.083	-0.052	-0.083
cbt - Bike Coefficient	-0.109	-0.117	-0.096	-0.117
pti - Walk to Transit Pedestrian Enhancement Variable Coefficient	1.15	0.6	0.45	0.25
pwi - Walk Pedestrian Enhancement Variable Coefficient Origin	0.35	0.175	0.22	0.4
pwj - Walk Pedestrian Enhancement Variable Coefficient Destination	0.3	0.164	0.164	0.35
pbi - Bike Pedestrian Enhancement Variable Coefficient Origin	0.47	0.07	0.066	0.3
pbj - Bike Pedestrian Enhancement Variable Coefficient Destination	0.006	0	0.006	0.006

The last step in the process is to assign the transit trips to the routes. Separate loads are conducted by mode and period as allocated in the mode choice model. Home-based work trips are assigned to the peak period network while home-based other, non-home-based, home-based university, and dorm-university trips are assigned to the off-peak network. Within each period there are three transit mode choices available: walk to local bus, walk to express bus, and drive to best available transit. The transit assignment flow is relatively simple in this model. It loads the transit trips from mode choice onto the transit paths computed during path building. There are no parameters used in this procedure. The red dotted square in Figure 8.1 shows the transit assignment module.

Figure 8.1 Transit Assignment Module



8.1 Transit Assignment Validation Results

Not nearly as much effort is typically expended on transit assignment validation as is devoted to highway assignment validation, in part due to transit assignment not impacting roadway congestion or capacity, as well as a general lack of post-processing programs and scripts to summarize transit assignment accuracy. However, transit is a key component of the Gainesville Urbanized Area Transportation Study 2010 model and it is important to validate the transit assignment reasonably well at the system level at a minimum. The transit assignment step in the model chain loads person trips onto the transit network. Separate loadings are conducted by mode and period: home-based work trips are assigned to the peak period network while home-based other, non-home-based, home-based university, and dorm-university trips are assigned to the off-peak network.

Overall validation for transit assignment was based on an analysis of the transit ridership not only as a system but also on a route by route basis. Transit assignment loadings were compared to average weekday "unlinked" route ridership data provided by Gainesville Regional Transit System. Unlinked trips are equal to bus boardings and count all the times that a person boards a bus, both initially and during transfers.

Table 8.2 shows route level comparison of observed ridership and ridership estimated by the model. The 2010 Gainesville Regional Transit System weekday ridership was calculated using the average of the months when school is in session during 2010 (excluding summer months of June, July, and August). The average weekday ridership during the summer months is much lower than the rest of the year. Since the model forecasts include university trips, it is reasonable to use average weekday ridership from September to May for comparison purposes.

The Gainesville Urbanized Area Transportation Study 2010 model trips are the number of transit trips loaded to each route by the transit assignment module. System-wide model estimates of unlinked trips are very close to Gainesville Regional Transit System observed numbers. As shown on Table 8.2, the 2010 transit assignment model estimated 40,403 "unlinked" riders system wide, while the Gainesville Regional Transit System reported 41,535 average weekday ridership system wide for 2010 while school was in session.

At the system-wide level, ridership for the Gainesville Urbanized Area Transportation Study 2010 model differs by only 2.7 percent from data provided by Gainesville Regional Transit System. This is within the preferred 3-9 percent Florida Department of Transportation validation standard. On a route-by-route basis, the 2010 transit assignment model validates

well with 26 out of 36 bus routes performing within the preferred accuracy range, and 29 of 36 within the acceptable range. In general, regional models do not validate well on a route by route basis. More rigorous validation is conducted for specific transit studies (New Starts/ Small Starts projects for example) or other ridership forecasting tools are applied (for example, TBEST is typically applied for transit development plans). Nonetheless, the Gainesville Urbanized Area Transportation Study 2010 model performs well in transit assignment at the system-wide level and performs reasonably well on a route-by-route basis.

Appendix D contains the model script files and flowchart for transit assignment. These show the processes, input parameters, and output file locations.

Table 8.2 Year 2010 Transit Loading Estimates

Route	Route Description	2010 Gainesville Regional Transit System Weekday Ridership	Gainesville Urbanized Area Transportation Study 2010 Model	Percent Error	Acceptable	Preferable
1	Downtown to Butler Plaza via Archer Road	2,008	3,538	76%	65%	35%
2	Downtown to Health Department via SE 15th Street	369	26	-93%	150%	100%
5	Downtown to Oaks Mall via University Avenue	1,648	2,180	32%	100%	65%
6	Downtown to Gainesville Mall via 6th Street	391	241	-38%	150%	100%
7	Downtown to Eastwood Meadows	425	46	-89%	150%	100%
8	Shands to Northwood Village via NW 13th Street	1,199	1,794	50%	100%	65%
9	McCarty to Hunters Run	3,076	2,013	-35%	65%	35%
10	Downtown to Santa Fe via NW 16th Ave	386	114	-70%	150%	100%
11	Downtown to Eastwood Meadows via University Ave.	491	211	-57%	150%	100%
12	McCarty to Butler Plaza	3,189	1,855	-42%	65%	35%
13	Shands to Florida Works via SW 13th Street	1,800	977	-46%	100%	65%
15	Downtown to Gainesville Mall	1,072	487	-55%	100%	65%
16	Shands to Sugar Hill via SW 16th Avenue	833	467	-44%	150%	100%
17	Shands to Downtown	764	209	-73%	150%	100%
20	McCarty to Oaks Mall via SW 20th Avenue	4,528	3,193	-29%	65%	35%
21	McCarty to Cabana Beach	1,907	888	-53%	100%	65%
22	McCarty to SW 43rd St at SW 24th Avenue	333	472	42%	150%	100%
23	Oaks Mall to Santa Fe	183	65	-64%	150%	100%
24	Downtown to Job Corps via SR 24 (Waldo Road)	361	241	-33%	150%	100%
25	McCarty to Airport	55	528	857%	150%	100%
29	Beaty Towers to Cobblestone	159	568	256%	150%	100%
34	HUB to Lexington Crossing	2,050	1,384	-32%	65%	35%
35	McCarty to Homestead Apartments	2,949	4,124	40%	65%	35%
36	McCarty to Williston Plaza	584	1,898	225%	150%	100%
38	HUB to Gainesville Place	532	357	-33%	150%	100%
43	Downtown to Santa Fe via 43rd Street	801	2,246	180%	150%	100%

Route	Route Description	2010 Gainesville Regional Transit System Weekday Ridership	Gainesville Urbanized Area Transportation Study 2010 Model	Percent Error	Acceptable	Preferable
75	Oaks Mall to Butler Plaza via 75th Street	1,033	271	-74%	100%	65%
117	Park-N-Ride 2 (SW 34th Street)	681	1,191	75%	150%	100%
118	Park-N-Ride 1 (Harn Museum)	2,107	1,896	-10%	65%	35%
119	Family Housing	338	394	17%	150%	100%
120	West Circulator (Fraternity Row)	1,638	1,805	10%	100%	65%
121	Commuter Lot	1,096	1,095	0%	100%	65%
122	University of Florida North/South Circulator	150	421	181%	150%	100%
125	Lakeside	918	1,037	13%	150%	100%
126	University of Florida East/West Circulator	313	947	202%	150%	100%
127	East Circulator (Sorority Row)	1,167	1,224	5%	100%	65%
Total Unlinked Riders (Boardings)		41,535	40,403	-2.7%	9%	3%

9 Summary and Conclusions

The model validation phase of the Gainesville Urbanized Area Year 2040 Long Range Transportation Plan Update began with data development and review which was documented in Technical Reports 2 and 3. Data review, adjustment, and correction were an iterative process throughout the model validation effort, reflecting identification of data issues based on model results.

Once the input data were initially deemed sufficient to proceed, work continued on validating each component of the Gainesville Urbanized Area Transportation Study 2010 travel demand model. An activity log was created to record all the modifications made to the model and a validation spreadsheet was prepared and used to summarize each validation run and model performance against prior versions of the Gainesville Urbanized Area Transportation Study model as well as other comparable travel demand models. This updated validation worksheet incorporates the latest Florida Department of Transportation model validation accuracy standards and allows for a complete record of all model adjustments made during the validation effort and the resulting impacts. The highway side of the model validated reasonably well from the start, largely a reflection of the efforts put forth by the study team in data development, review, disaggregation, and refinement.

The Gainesville Urbanized Area Transportation Study 2010 base year model meets most established Florida Standard Urban Transportation Model Structure standards for model accuracy and reasonableness. The validated model will be used in subsequent phases of the Gainesville Urbanized Area Year 2040 Long Range Transportation Plan Update to develop and test transportation alternatives.

Appendix A: Socioeconomic Data Format

ZONEDATA{YEAR}.DBF

Notes: Please note that ZONEDATA{YEAR}.DBF is part of GIS TAZ shape database of ZONEDATA.SHP, together with ZONEDATA.SHX. When editing this ZoneData file, Cube or GIS software must be used.

Attribute List for Population and Household Data

TAZ_2010 – Traffic Analysis Zone (TAZ) number in the Gainesville MTPO 2010 model.
SFDU – Number of single-family dwellings units
SPOP – Population in single-family dwellings units
MFDU – Number of multifamily dwellings units (MFDUS)
MPOP – Population in MFDUS
TOTPOP10 – Total population for year 2010 (this attribute is not used by model scripts, instead SPOP and MPOP are used for base year and future year scenarios)
HMDU – Total hotel–motel units
HMPOP – Total population in occupied hotel-motel units

Attribute List for Employment Data

OIEMP – Other industrial employment
MFGEMP – Manufacturing industrial employment
COMEMP – Commercial employment
SERVEMP – Service employment
TOTEMP – Total employment
SCHENR – School enrollment by school location (this excludes any UF or Santa Fe College enrollment)

Attribute List for University of Florida Data

UF_EMP – Number of UF place-of-work employees by TAZ (this variable also is used to reallocate service employment on UF Campus)
UF_DORM_ST – Number of on-campus UF student residents
UF_PARKING – UF commuting parking spaces, excluding on-campus student long-term
CLASSROOMS – Number of UF classrooms (model scripts do not use this)
CLASSSQFT – Square feet of UF classrooms (model scripts do not use this)
SEATS – Number of UF classroom seats
UF-OC-ST – Number of UF off-campus students, estimated from student address records provided by UF
SUB_AREA – Name of city or incorporated area or Alachua if a zone is within the unincorporated area
UFZONES – Identifier that indicates that a zone is on UF Campus when the value is one

Attribute List for Transit PEV (Pedestrian Environment Variable) Data

SIDEWALK – Sidewalk availability (values vary from 0 to 3)
CROSSING – Ease of street crossing (values vary from 0 to 3)
NONMTR_CNN – Non-motorized connections (values vary from 0 to 3)
SETBACK – Building setbacks (values vary from 0 to 3)
SUM – Sum of four variable values above: SIDEWALK, CROSSING, NONMTR_CNN and SETBACK (SUM needs to be updated manually when any of four variables has been modified)
COMPOSIT – composite PEV value (model scripts do not use this)
SELECTZONE – Identifier that indicates that a zone is selected for select zone analysis when the value is one (the model will load selected trips that end at the selected zones, and it will be reported

in the attribute SELZONE_MOTOR in the final highway assignment output network, COMBINEDLOADED.NET)
HOTEL – Identifier used in the previous model (model scripts do not use this)

Attribute List for Parking Data (previously found in ZDATA2 file in 2000 model)
SHORTPARK – Short-term (3 hour) parking cost (cents)
LONGPARK – Long-term (8 hour) parking cost (cents)
STUDENTPAR – Student (8 hour) parking cost (cents) at UF

Attribute List for Population and Household Variable Data (previously found in ZDATA1 file in 2000 model)
SF_SEA – Percent SFDU not occupied by permanent residents
SF_0V – Percent households having no vehicles in SFDU occupied by permanent residents
SF_1V – Percent households having one vehicle in SFDU occupied by permanent residents
SF_2V – Percent households having two vehicles in SFDU occupied by permanent residents
SF_3V – Percent households having three or more vehicles in SFDU occupied by permanent residents
SF_VAC – Percent SFDU vacant
MF_SEA – Percent MFDU not occupied by permanent residents
MF_0V – Percent households having no vehicles in MFDU occupied by permanent residents
MF_1V – Percent households having one vehicle in MFDU occupied by permanent residents
MF_2V – Percent households having two vehicles in MFDU occupied by permanent residents
MF_3V – Percent households having three or more vehicles in MFDU occupied by permanent residents
MF_VAC – Percent MFDU vacant
HM_POC – Percent hotel-motel units occupied

Appendix B: Turn Penalties (TURN.PEN)

Origin Node A	Intersection Node B	Destination Node C	Penalty Set	Penalty Value*
1211	1207	1221	1	-1
1207	1211	1221	1	-1
1214	1211	1218	1	-1
1214	1211	1221	1	-1
1214	1218	1211	1	-1
1240	1239	1241	1	-1
1240	1241	1238	1	-1
1240	1241	1239	1	-1
1242	1241	1238	1	-1
1241	1242	1238	1	-1
1326	1320	1324	1	-1
1326	1324	1320	1	-1
1326	1324	1325	1	-1
1328	1324	1325	1	-1
1324	1328	1325	1	-1
1338	1333	1337	1	-1
1338	1337	1333	1	-1
1338	1337	1339	1	-1
1340	1337	1339	1	-1
1337	1340	1339	1	-1
1468	1467	1472	1	-1
1468	1467	1474	1	-1
1468	1467	5404	1	-1
1472	1467	1474	1	-1
1472	1467	5404	1	-1
1467	1472	1474	1	-1
1468	1472	1467	1	-1
1468	1472	1474	1	-1
1485	1484	1483	1	-1
1485	1484	1486	1	-1
1486	1484	1483	1	-1
1484	1486	1483	1	-1
1485	1486	1483	1	-1
1485	1486	1484	1	-1
1588	1581	1585	1	-1
1581	1588	1585	1	-1
1589	1588	1585	1	-1
1589	1588	1593	1	-1
1589	1593	1588	1	-1
1599	1597	1601	1	-1
1599	1601	1597	1	-1
1599	1601	1602	1	-1
1603	1601	1602	1	-1
1601	1603	1602	1	-1
1737	1733	1740	1	-1

Origin Node A	Intersection Node B	Destination Node C	Penalty Set	Penalty Value*
1737	1733	1744	1	-1
1740	1733	1744	1	-1
1733	1740	1744	1	-1
1737	1740	1733	1	-1
1737	1740	1744	1	-1
1752	1750	1749	1	-1
1752	1750	1757	1	-1
1757	1750	1749	1	-1
1750	1757	1749	1	-1
1752	1757	1749	1	-1
1752	1757	1750	1	-1
1828	1825	1830	1	-1
1828	1830	1825	1	-1
1828	1830	1829	1	-1
1831	1830	1829	1	-1
1831	1835	1829	1	-1
1842	1841	1846	1	-1
1842	1846	1841	1	-1
1842	1846	1843	1	-1
1858	1846	1843	1	-1
1846	1858	1843	1	-1
2842	2841	2844	1	-1
2842	2841	2846	1	-1
2844	2841	2846	1	-1
2841	2844	2846	1	-1
2842	2844	2841	1	-1
2842	2844	2846	1	-1
2858	2856	2855	1	-1
2858	2856	2859	1	-1
2859	2856	2855	1	-1
2856	2859	2857	1	-1
2858	2859	2856	1	-1
2858	2859	2857	1	-1
1472	5356	5409	1	-1

*Penalty value of -1 indicates a movement that is prohibited

Appendix C: Friction Factors

TIME	HBWFF	HBSHFF	HBSRFF	HBOFF	NHBFF	TK4FF	TKSGLFF	TKTRLRFF	SOVIEFF	HOVIEFF	TKLTIEFF	TKHTIEFF	HBUFF	HDORMUFF
1	25208	126687	126687	126687	198262	9231	9048	9704	222	222	222	222	126687	126687
2	21983	47324	47324	47324	71259	8521	8187	9418	333	333	333	333	47324	47324
3	19282	25585	25585	25585	37571	7866	7408	9139	444	444	444	444	25585	25585
4	16953	16092	16092	16092	23174	7261	6703	8869	555	555	555	555	16092	16092
5	14924	10997	10997	10997	15577	6703	6065	8607	666	666	666	666	10997	10997
6	13149	7919	7919	7919	11056	6188	5488	8353	777	777	777	777	7919	7919
7	11591	5913	5913	5913	8147	5712	4966	8106	888	888	888	888	5913	5913
8	10222	4534	4534	4534	6170	5273	4493	7866	1333	1333	1333	1333	4534	4534
9	9018	3548	3548	3548	4773	4868	4066	7634	1666	1666	1666	1666	3548	3548
10	7957	2820	2820	2820	3753	4493	3679	7408	3333	3333	3333	3333	2820	2820
11	7023	2271	2271	2271	2991	4148	3329	7189	6666	6666	6666	6666	2271	2271
12	6199	1849	1849	1849	2410	3829	3012	6977	7777	7777	7777	7777	1849	1849
13	5473	1519	1519	1519	1960	3535	2725	6771	8888	8888	8888	8888	1519	1519
14	4833	1257	1257	1257	1607	3263	2466	6570	9999	9999	9999	9999	1257	1257
15	4267	1047	1047	1047	1326	3012	2231	6376	9999	9999	9999	9999	1047	1047
16	3769	877	877	877	1101	2780	2019	6188	9999	9999	9999	9999	877	877
17	3328	739	739	739	919	2567	1827	6005	9999	9999	9999	9999	739	739
18	2940	625	625	625	771	2369	1653	5827	9999	9999	9999	9999	625	625
19	2597	531	531	531	649	2187	1496	5655	9999	9999	9999	9999	531	531
20	2294	452	452	452	548	2019	1353	5488	6666	6666	6666	6666	452	452
21	2026	387	387	387	465	1864	1225	5326	3333	3333	3333	3333	387	387
22	1790	331	331	331	395	1720	1108	5169	1111	1111	1111	1111	331	331
23	1582	285	285	285	337	1588	1003	5016	444	444	444	444	285	285
24	1397	246	246	246	288	1466	907	4868	222	222	222	222	246	246
25	1235	212	212	212	247	1353	821	4724	111	111	111	111	212	212
26	1091	184	184	184	212	1249	743	4584	66	66	66	66	184	184
27	964	159	159	159	183	1153	672	4449	22	22	22	22	159	159
28	852	138	138	138	157	1065	608	4317	16	16	16	16	138	138

TIME	HBWFF	HBSHFF	HBSRFF	HBOFF	NHBFF	TK4FF	TKSGLFF	TKTRLRFF	SOVIEFF	HOVIEFF	TKLTIEFF	TKHTIEFF	HBUFF	HDORMUFF
29	753	120	120	120	136	983	550	4190	13	13	13	13	120	120
30	665	105	105	105	118	907	498	4066	11	11	11	11	105	105
31	588	92	92	92	102	837	450	3946	16	16	16	16	92	92
32	519	80	80	80	88	773	408	3829	3	3	3	3	80	80
33	459	70	70	70	77	714	369	3716	1	1	1	1	70	70
34	406	61	61	61	67	659	334	3606	1	1	1	1	61	61
35	358	54	54	54	58	608	302	3499	1	1	1	1	54	54
36	317	47	47	47	51	561	273	3396	1	1	1	1	47	47
37	280	41	41	41	44	518	247	3296	1	1	1	1	41	41
38	247	36	36	36	39	478	224	3198	1	1	1	1	36	36
39	219	32	32	32	34	442	202	3104	1	1	1	1	32	32
40	193	28	28	28	29	408	183	3012	1	1	1	1	28	28
41	171	25	25	25	26	376	166	2923	1	1	1	1	25	25
42	151	22	22	22	23	347	150	2837	1	1	1	1	22	22
43	133	19	19	19	20	321	136	2753	1	1	1	1	19	19
44	118	17	17	17	17	296	123	2671	1	1	1	1	17	17
45	104	15	15	15	15	273	111	2592	1	1	1	1	15	15
46	92	13	13	13	13	252	101	2516	1	1	1	1	13	13
47	81	12	12	12	12	233	91	2441	1	1	1	1	12	12
48	72	11	11	11	10	215	82	2369	1	1	1	1	11	11
49	64	9	9	9	9	198	74	2299	1	1	1	1	9	9
50	56	8	8	8	8	183	67	2231	1	1	1	1	8	8
51	50	7	7	7	7	169	61	2165	1	1	1	1	7	7
52	44	7	7	7	6	156	55	2101	1	1	1	1	7	7
53	39	6	6	6	6	144	50	2039	1	1	1	1	6	6
54	34	5	5	5	5	133	45	1979	1	1	1	1	5	5
55	30	5	5	5	4	123	41	1920	1	1	1	1	5	5
56	27	4	4	4	4	113	37	1864	1	1	1	1	4	4

TIME	HBWFF	HBSHFF	HBSRFF	HBOFF	NHBFF	TK4FF	TKSGLFF	TKTRLRFF	SOVIEFF	HOVIEFF	TKLTIEFF	TKHTIEFF	HBUFF	HDORMUFF
57	24	4	4	4	3	105	33	1809	1	1	1	1	4	4
58	21	3	3	3	3	97	30	1755	1	1	1	1	3	3
59	19	3	3	3	3	89	27	1703	1	1	1	1	3	3
60	16	3	3	3	2	82	25	1653	1	1	1	1	3	3
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0

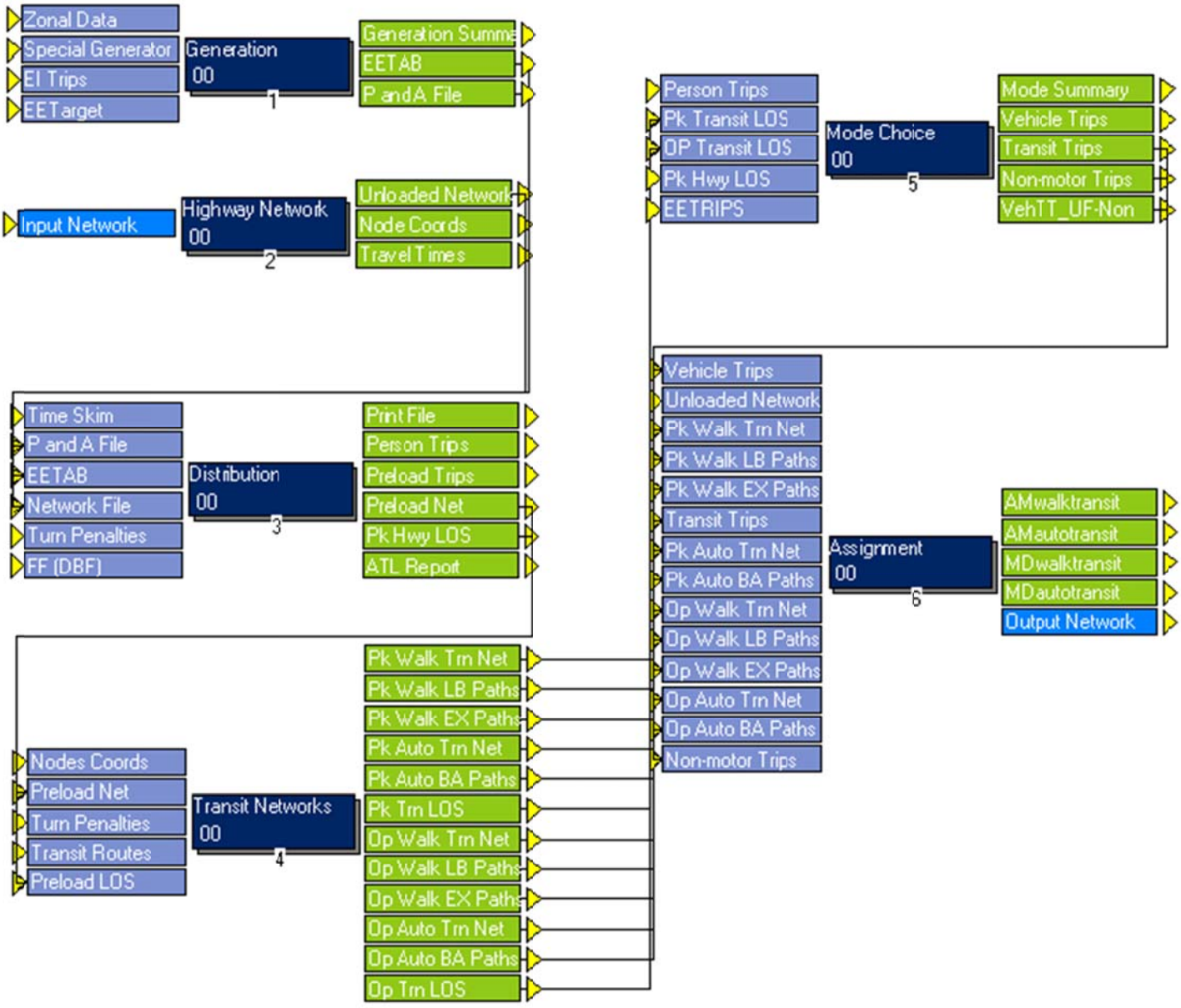
Appendix D: Model Flowchart, Scripts and File Locations

Gainesville 2010 Base Year Model Structure

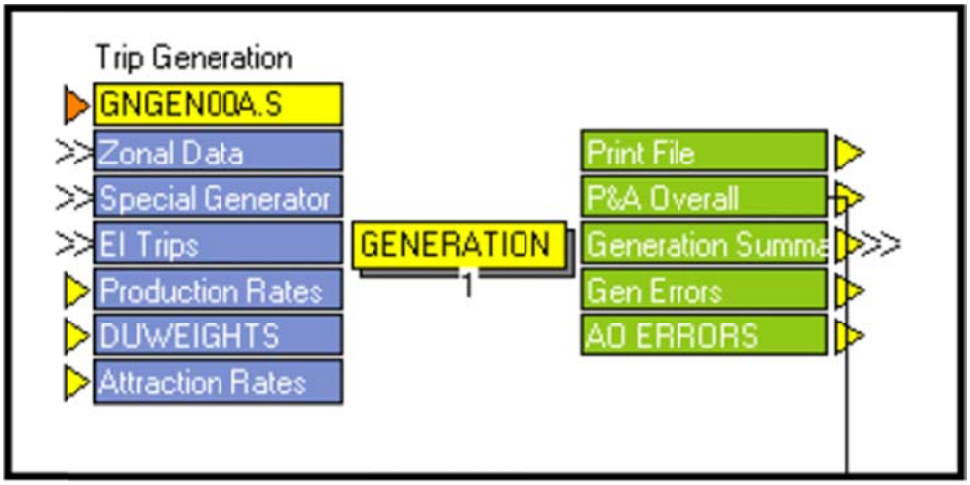
Model Step	File Name	File Format/Extension	File Type	Folder Location	Initial Source
Trip Generation	ATTRRATES	DBF	Parameters	\Parameters	Olympus
	DUWEIGHTS	DBF	Parameters	\Parameters	Census 2000
	EETARGETS	DBF	Input	\Base\Input	FTI
	EETRIPS	DBF	Input	\Base\Input	FTI
	INTEXT	DBF	Input	\Base\Input	I-75 Master Plan
	PRODRATES	DBF	Parameters	\Parameters	Gainesville 2007
	SPECGEN	DBF	Input	\Base\Input	I-75 Master Plan
	UFData	DBF	Input	\Base\Input	Gainesville 2007
	ZONEDATA	DBF	Input	\Base\Input	MTPO Staff
Highway Network	HNET	NET	Input	\Base\Input	FDOT road characters inventory
	VFACTORS	CSV	Parameters	\Parameters	Olympus
	SPDCAP	DBF	Parameters	\Parameters	Olympus
	TURN	PEN	Input	\Base\Input	Gainesville 2007
Trip Distribution	FF	DBF	Parameters	\Parameters	Gainesville 2007
Transit Network	AMPNR	DBF	Parameters	\Parameters	Gainesville 2007
	TFACWKLB	FAC	Parameters	\Parameters	Gainesville 2007
	TFACWKPR	FAC	Parameters	\Parameters	Gainesville 2007
	TFACPNR	FAC	Parameters	\Parameters	Gainesville 2007
	TFARES	FAR	Input	\Base\Input	Gainesville 2007
	TRANSPD	DBF	Parameters	\Parameters	Olympus
	TROUTE	LIN	Input	\Base\Input	Gainesville 2007
	TSYS	PTS	Parameters	\Parameters	Gainesville 2007

Gainesville/Alachua County Model

Validated to base year 2010 by HDR, Inc.



Trip Generation



GNGEN00A.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=GENERATION PRNFILE="{SCENARIO_DIR}\output\GNGEN00A.PRN" MSG='Trip Generation'
FILEI LOOKUPI[3] = "{CATALOG_DIR}\parameters\ARATES.DBF"
FILEI LOOKUPI[2] = "{CATALOG_DIR}\parameters\DUWEIGHTS.DBF"
FILEO PRINTO[3] = "{SCENARIO_DIR}\output\AO_ERRORS.PRN"
FILEI LOOKUPI[1] = "{CATALOG_DIR}\parameters\GRATES.dbf"
FILEO PRINTO[2] = "{SCENARIO_DIR}\output\LUERRORS.PRN"
FILEO PRINTO[1] = "{SCENARIO_DIR}\output\GEN_SUM.PRN"
FILEO PAO[1] = "{SCENARIO_DIR}\output\PANDA_TEM.DBF",
 LIST=Z,P[1],P[2],P[3],P[4],P[5],P[6],P[7],P[8],P[9],P[10],P[11],P[12],
        A[1],A[2],A[3],A[4],A[5],A[6],A[7],A[8],A[9],A[10],A[11],A[12],DBF=T
FILEI ZDATI[3] = "{SCENARIO_DIR}\input\EITRIPS_{Year}{alt}.DBF"
FILEI ZDATI[2] = "{SCENARIO_DIR}\input\SPGEN_{Year}{alt}.DBF"
FILEI ZDATI[1] = "{SCENARIO_DIR}\input\ZoneData{YEAR}.dbf",
Z=TAZ_20{year}

; =============================================================
; OVERALL PROGRAM CONTROLS
PARAMETERS ZONES={ZONESA}, ZONEMSG=100
ARRAY CAR=4 CELL=999 CELLT=999 SPFRAC=12
LOOKUP LOOKUPI=1,
       NAME=PRATE, ;TRIP PRODUCTION RATES
         LOOKUP[1]=PAD, RESULT=RATEHBW,
         LOOKUP[2]=PAD, RESULT=RATEHBSH,
         LOOKUP[3]=PAD, RESULT=RATEHBSR,
         LOOKUP[4]=PAD, RESULT=RATEHBO,
       FAIL[1]=0,FAIL[2]=0,FAIL[3]=0, INTERPOLATE=N

LOOKUP LOOKUPI=2,
       NAME=DUWEIGHT,
         LOOKUP[1]=SIZERANGE, RESULT=PCT1PER, ; %1 PERSON
         LOOKUP[2]=SIZERANGE, RESULT=PCT2PER, ; %2 PERSON
         LOOKUP[3]=SIZERANGE, RESULT=PCT3PER, ; %3 PERSON
         LOOKUP[4]=SIZERANGE, RESULT=PCT4PER, ; %4 PERSON
         LOOKUP[5]=SIZERANGE, RESULT=PCT5PER, ; %5+PERSON
       INTERPOLATE=N, LIST=N

LOOKUP LOOKUPI=3,
       NAME=ARATE, ;TRIP ATTRACTION RATES
       LOOKUP[1]=PURPOSE, RESULT=ARATEOIE,
       LOOKUP[2]=PURPOSE, RESULT=ARATEMFG,
       LOOKUP[3]=PURPOSE, RESULT=ARATECOM,
       LOOKUP[4]=PURPOSE, RESULT=ARATESVC,
```

```
       LOOKUP[5]=PURPOSE, RESULT=ARATETOTE,
       LOOKUP[6]=PURPOSE, RESULT=ARATEDUS,
       LOOKUP[7]=PURPOSE, RESULT=ARATESCH,
     FAIL[1]=0,FAIL[2]=0,FAIL[3]=0, INTERPOLATE=N, LIST=N


PROCESS PHASE=ILOOP
; ================================================================
; This is the main program loop to calculate initial production
; and attraction values for each zone for each trip purpose
; ================================================================
LOOP HHTYPE=1,3 ; ESTABLISH VARIABLES FOR EACH HOUSEHOLD CLASS
IF (HHTYPE=1) ; SINGLE-FAMILY
   UNITS=   ZI.1.SFDU
   ;VACRATE= ZI.1.SF_SEA
   VACRATE= ZI.1.SF_SEA+ZI.1.SF_VAC
   PERMVACRATE= ZI.1.SF_VAC
   POP=     ZI.1.SPOP
   CAR[1]=ZI.1.SF_0V/100, CAR[2]=ZI.1.SF_1V/100, CAR[3]=ZI.1.SF_2V/100, CAR[4]=ZI.1.SF_3V/100
ELSEIF (HHTYPE=2); MULTI-FAMILY
   UNITS=   ZI.1.MFDU
   ;VACRATE= ZI.1.MF_SEA
   VACRATE= ZI.1.MF_SEA+ZI.1.MF_VAC
   PERMVACRATE= ZI.1.MF_VAC
   POP=     ZI.1.MFPOP
   CAR[1]=ZI.1.MF_0V/100, CAR[2]=ZI.1.MF_1V/100, CAR[3]=ZI.1.MF_2V/100, CAR[4]=ZI.1.MF_3V/100
ELSEIF (HHTYPE=3) ; HOTEL/MOTEL
   UNITS=   ZI.1.HMDU
   VACRATE= 100-ZI.1.HM_POC
   PERMVACRATE= 100-ZI.1.HM_POC
   POP=     ZI.1.HMPOP
   CAR[1]=0, CAR[2]=1.0, CAR[3]=0, CAR[4]=0
ENDIF

; ================================================================
; From here down, the same equations get applied to each
; household size, auto ownership and dwelling unit type.
; Since it is being run in the HHTYPE loop, the same equations
; will be applied and running totals by zone will be accumulated.
; ================================================================
VAC=UNITS*(VACRATE/100), OCC=UNITS-VAC, GENVAC=UNITS*(PERMVACRATE/100), GENOCC=UNITS-GENVAC

IF (HHTYPE<>3) TOCC=TOCC+OCC ;Keep track of total permenantly occupied DUs
TGOCC=TGOCC+GENOCC ;Keep track of total occupied DUs

IF (OCC>0)
   POPDU=POP/OCC
ELSE
   POPDU=0
ENDIF

IF (POPDU<>0) PDUCNT=PDUCNT+1      ;Keep track of total zones with pop/du ratios
IF (POPDU<>0) PDUTOT=PDUTOT+POPDU  ;total pop/du ratios

IF (POPDU<=1.12) RANGE=1
IF (POPDU>1.12)  RANGE=2
IF (POPDU>1.37)  RANGE=3
IF (POPDU>1.62)  RANGE=4
IF (POPDU>1.87)  RANGE=5
IF (POPDU>2.12)  RANGE=6
IF (POPDU>2.37)  RANGE=7
IF (POPDU>2.62)  RANGE=8
IF (POPDU>2.87)  RANGE=9
IF (POPDU>3.12)  RANGE=10
IF (POPDU>3.37)  RANGE=11
IF (POPDU>3.62)  RANGE=12
IF (POPDU>3.87)  RANGE=13
IF (POPDU>4.12)  RANGE=14
IF (POPDU>4.37)  RANGE=15
IF (POPDU>4.62)  RANGE=16
IF (POPDU>5.99)  RANGE=17
```

```
if (POPDU<1&OCC>0) PRINT LIST="POP/DU ERROR, HHTYPE=",HHTYPE(1.0)," Population=",POP(4.0C),"
Occupied Units=",occ(4.0c)," TAZ=",TAZ_2010(4.0c) printo=2
  LOOP PR=1,5
   LOOP AU=1,4
         CL=100*PR+10*(AU-1)+HHTYPE
         CELL[CL]=GENOCC*DUWEIGHT(PR,RANGE)*CAR[AU]
         CELLT[CL]=CELLT[CL]+CELL[CL]
         LOOP PURP=1,4
            PRODRATE=PRATE(PURP,CL)
            P[PURP]=P[PURP]+PRATE(PURP,CL)*CELL[CL]
         ENDLOOP
   ENDLOOP
  ENDLOOP
ENDLOOP ; ON HHTYPE

;=============================================================================
;pre-process prior to attractions calculation
;minor employment adjustment using UF_EMP Data
;(1) Subtract UF employment from service employment if UF<Service
 COMEMP=ZI.1.COMEMP
 SERVEMP=ZI.1.SERVEMP
IF(ZI.1.SERVEMP>ZI.1.UF_EMP)
 SERVEMP=ZI.1.SERVEMP-ZI.1.UF_EMP
 IF(ZI.1.UF_EMP>0)
  PRINT LIST='EMPLOYMENT ZONE', I
 ENDIF
 IF(ZI.1.UF_PARKING>0)
  PRINT LIST='PARKING    ZONE', I
 ENDIF
ELSE
;(2) Take the remaining UF service employment from commercial if UF>Service
 COMEMP=ZI.1.COMEMP-ZI.1.UF_EMP+ZI.1.SERVEMP
 SERVEMP =  0
  IF (COMEMP<0)
  COMEMP=0
  ENDIF
ENDIF
;(3) Compute total UF parking and employment
; replaced hard-coded zone number below
UF_EMP1=0
UF_PRK1=0
LOOP II=1,{ZONESA}
 UF_EMP1=UF_EMP1+ZI.1.UF_EMP[II]
 UF_PRK1=UF_PRK1+ZI.1.UF_PARKING[II]
ENDLOOP
PRINT LIST=UF_EMP1, '   ', UF_PRK1
;(4) Allocate UF employment to parking TAZs based on proportion of parking spaces
 SERVEMP= ZI.1.SERVEMP[I] + UF_EMP1*(ZI.1.UF_PARKING[I]/UF_PRK1)
 TOTALEMP=ZI.1.MFGEMP+ZI.1.OIEMP+COMEMP+SERVEMP
;=============================================================================


; ================================================================
; Now process the trip purposes that are attraction-based
; ================================================================
; PURPOSE 1 = HBW
; PURPOSE 2 = HBSH
; PURPOSE 3 = HBSR
; PURPOSE 4 = HBO
; PURPOSE 5 = NHB
; PURPOSE 6 = 4 Tire Truck
; PURPOSE 7 = Single-Unit Truck
; PURPOSE 8 = Tractor-trailer

TOTALDUS=ZI.1.SFDU+ZI.1.MFDU

LOOP WPURP=1,8
   A[WPURP]=ARATE(1,WPURP)*ZI.1.MFGEMP+
            ARATE(2,WPURP)*ZI.1.OIEMP+
            ARATE(3,WPURP)*COMEMP+
            ARATE(4,WPURP)*SERVEMP+
```

```
            ARATE(5,WPURP)*TOTALEMP+
            ARATE(6,WPURP)*TOTALDUS+
            ARATE(7,WPURP)*ZI.1.SCHENR
ENDLOOP
P[5]=A[5]
P[6]=A[6]
P[7]=A[7]
P[8]=A[8]

; ....................................................................
; For the next four purposes,
; Attractions are a function of the total attractions to a zone.
; Since totals aren't known until we finish the initial calculations,
; attractions for these purposes will be initially calculated in the
; ADJUST PHASE.
; ....................................................................
; PURPOSE 9 = SOV EI
; PURPOSE 10 = HOV EI
; PURPOSE 11 = LDTK EI
; PURPOSE 12 = HDTK EI

; SOV EI
P[9]=ZI.3.TRIPS*(ZI.3.LOVPCT/100)
; HOV EI
P[10]=ZI.3.TRIPS*(ZI.3.HOVPCT/100)
; LDTK EI
P[11]=ZI.3.TRIPS*(ZI.3.LDTPCT/100)
; HDTK EI
P[12]=ZI.3.TRIPS*(ZI.3.HDTPCT/100)


; ================================================================
; NOW PROCESS SPECIAL GENERATORS
;
SPFRAC[1]=ZI.2.HBWP/100
SPFRAC[2]=ZI.2.HBSHP/100
SPFRAC[3]=ZI.2.HBSRP/100
SPFRAC[4]=ZI.2.HBOP/100
SPFRAC[5]=ZI.2.NHBP/100
SPFRAC[6]=ZI.2.TRK4P/100
SPFRAC[7]=ZI.2.TRKSUNITP/100
SPFRAC[8]=ZI.2.TRKCOMBOP/100
SPFRAC[9]=ZI.2.EILOVP/100
SPFRAC[10]=ZI.2.EIHOVP/100
SPFRAC[11]=ZI.2.EILDTP/100
SPFRAC[12]=ZI.2.EIHDTP/100

LOOP PRP=1,12
    IF (ZI.2.PROD='Y','y')
       IF (ZI.2.FUNCTIONP='+') P[PRP]=P[PRP]+VALUEP*SPFRAC[PRP]
       IF (ZI.2.FUNCTIONP='-') P[PRP]=P[PRP]-VALUEP*SPFRAC[PRP]
    ENDIF
ENDLOOP

SPFRAC[1]=ZI.2.HBWA/100
SPFRAC[2]=ZI.2.HBSHA/100
SPFRAC[3]=ZI.2.HBSRA/100
SPFRAC[4]=ZI.2.HBOA/100
SPFRAC[5]=ZI.2.NHBA/100
SPFRAC[6]=ZI.2.TRK4A/100
SPFRAC[7]=ZI.2.TRKSUNITA/100
SPFRAC[8]=ZI.2.TRKCOMBOA/100
SPFRAC[9]=ZI.2.EILOVA/100
SPFRAC[10]=ZI.2.EIHOVA/100
SPFRAC[11]=ZI.2.EILDTA/100
SPFRAC[12]=ZI.2.EIHDTA/100

LOOP PRP=1,12
    IF (ZI.2.ATTR='Y','y')
       IF (ZI.2.FUNCTIONA='+') A[PRP]=A[PRP]+VALUEA*SPFRAC[PRP]
       IF (ZI.2.FUNCTIONA='-') A[PRP]=A[PRP]-VALUEA*SPFRAC[PRP]
```

```
    ENDIF
ENDLOOP

;*****************************************************************************************************
********
;This portion of the script checks to see if any zones with populations are lacking values for
percent
;automobile ownership.  If so, the model crashes and reports the problem zones so that the user
can correct
;the problem.  All zones with populations should have values for percent automobile ownership or
the model
;will not generate Home-Based trips for those zones.

IF (I=1)
  PRINT LIST='\nAUTO OWNERSHIP ERRORS WHERE POPULATION EXISTS BUT AUTO OWNERSHIP DOES NOT',
PRINTO=3
  PRINT LIST='\nCHECK LISTED ZONES IN ZONEDATA{Year} FILES FOR AUTO OWNERSHIP PERCENTAGES!!!',
PRINTO=3
  PRINT LIST='\n', PRINTO=3
  SFAOERROR=0
  MFAOERROR=0
ENDIF
     SFAO=zi.1.SF_0V+zi.1.SF_1V+zi.1.SF_2V+zi.1.SF_3V
     MFAO=zi.1.MF_0V+zi.1.MF_1V+zi.1.MF_2V+zi.1.MF_3V

     IF ((zi.1.SPOP<>0 & SFAO=0)|(zi.1.MFPOP<>0 & MFAO=0))
        PRINT LIST='\n', PRINTO=3
     ENDIF

     IF (zi.1.SPOP<>0 & SFAO=0)
        SFAOERROR=SFAOERROR+1
        PRINT LIST='\nAUTO OWNERSHIP = 0 BUT SF POPULATION > 0 ERROR FOR ZONE=',I(5.0),PRINTO=3
     ELSE
     ENDIF
     IF (zi.1.MFPOP<>0 & MFAO=0)
        MFAOERROR=MFAOERROR+1
        PRINT LIST='\nAUTO OWNERSHIP = 0 BUT MF POPULATION > 0 ERROR FOR ZONE=',I(5.0),PRINTO=3
     ELSE
     ENDIF

IF (I={ZONESA})
  PRINT LIST='\n************Error Report Summary*************',
             '\nTOTAL AUTO OWNERSHIP ERRORS FOR SINGLE FAMILY=',SFAOERROR(8.0C),
             '\nTOTAL AUTO OWNERSHIP ERRORS FOR MULTI FAMILY= ',MFAOERROR(8.0C), printo=3
SFAOERROR=0
MFAOERROR=0 ;set both to 0 in order to sucess executive by Mia

IF (SFAOERROR=0 & MFAOERROR=0)  PRINT LIST='\n',
                                '\nTHERE ARE NO AUTO OWNERSHIP = 0 BUT POPULATION > 0 ERRORS',
PRINTO=3

  if (SFAOERROR>1) abort
  if (MFAOERROR>1) abort

ENDIF

;*****************************************************************************************************
********

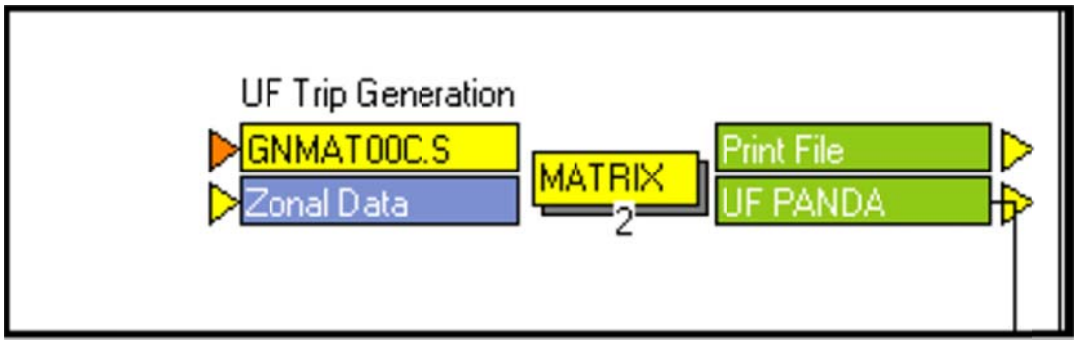
; ================================================================
ENDPROCESS
PROCESS PHASE=ADJUST
LOOP PURP=1,12
 IF (PURP=1) PRINT LIST="TRIP PRODUCTION AND ATTRACTION REPORT BY PURPOSE", PRINTO=1
 PRINT LIST="  Purpose=",PURP(2.0),"  Productions=",P[PURP][0](12.0C)," Unbalanced
Attractions=",A[PURP][0](12.0C), PRINTO=1
ENDLOOP
 PRINT LIST=" ", PRINTO=1
; . . . . . .
. . . . . .
; Balancing attractions as similarly done in Olympus model.
```

```
BALANCE A2P=1-4
; . . . . . .
. . . . . .
 TOTSTDATTR=A[1][0]+A[2][0]+A[3][0]+A[4][0]+A[5][0]
A[9]=P[9][0]*(A[1]+A[2]+A[3]+A[4]+A[5])/TOTSTDATTR
A[10]=P[10][0]*(A[1]+A[2]+A[3]+A[4]+A[5])/TOTSTDATTR
A[11]=P[11][0]*(A[7]/A[7][0])
A[12]=P[12][0]*(A[8]/A[8][0])
BALANCE A2P=9-12
LOOP PURP=1,12
 PRINT LIST="  Purpose=",PURP(2.0),"  Productions=",P[PURP][0](12.0C),"   Balanced
Attractions=",A[PURP][0](12.0C), PRINTO=1
ENDLOOP

PTOTAL=P[1][0]+P[2][0]+P[3][0]+P[4][0]+P[5][0]+P[6][0]+P[7][0]+P[8][0]+P[9][0]+P[10][0]+P[11][0]+
P[12][0]

ATOTAL=A[1][0]+A[2][0]+A[3][0]+A[4][0]+A[5][0]+A[6][0]+A[7][0]+A[8][0]+A[9][0]+A[10][0]+A[11][0]+
A[12][0]
PRINT LIST="  Total","       Productions=",PTOTAL(12.0C),"
Attractions=",ATOTAL(12.0C), PRINTO=1
PRINT LIST=" ", PRINTO=1
  POPTOT=ZI.1.SPOP[0]+ZI.1.MFPOP[0]
  ALLPOP=POPTOT+ZI.1.HMPOP[0]
  PDUAVG=(POPTOT/TOCC)
  ALPDAG=(ALLPOP/TGOCC)
  TOTSRV=ZI.1.SERVEMP[0]
  TOTCOM=ZI.1.COMEMP[0]
  TOTMFG=ZI.1.MFGEMP[0]
  TOTIND=ZI.1.OIEMP[0]
  TOTEMP=ZI.1.TOTEMP[0]
  EMPPOP=TOTEMP/POPTOT
  SRVRTE=TOTSRV/TOTEMP
  COMRTE=TOTCOM/TOTEMP
  MFGRTE=TOTMFG/TOTEMP
  INDRTE=TOTIND/TOTEMP
  IITRIP=P[1][0]+P[2][0]+P[3][0]+P[4][0]+P[5][0]+P[6][0]+P[7][0]+P[8][0]
  ITPPRM=IITRIP/TOCC
  ITPTOC=IITRIP/TGOCC
  ITPEMP=IITRIP/TOTEMP
  ITPPOP= IITRIP/POPTOT
 PRINT LIST="  Permanent Population =                                    ",POPTOT(12.0C), PRINTO=1
PRINT LIST="  Total Population =                                       ",ALLPOP(12.0C), PRINTO=1
PRINT LIST="  Permanently Occupied Dwelling Units =                    ",TOCC(12.0C), PRINTO=1
PRINT LIST="  Transient and Permently Occupied Dwelling Units =        ",TGOCC(12.0C), PRINTO=1
PRINT LIST="  Total Service Employment =                               ",TOTSRV(12.0C), PRINTO=1
PRINT LIST="  Total Commercial Employment =                            ",TOTCOM(12.0C), PRINTO=1
PRINT LIST="  Total Manufacturing Employment =                         ",TOTMFG(12.0C), PRINTO=1
PRINT LIST="  Total Other Industrial Employment =                      ",TOTIND(12.0C), PRINTO=1
PRINT LIST="  Total Employment =                                       ",TOTEMP(12.0C), PRINTO=1
PRINT LIST="  Permanent Population per Permenantly Occupied Dwelling Unit =  ",PDUAVG(5.2C),
PRINTO=1
PRINT LIST="  Total Population per Total Occupied Dwelling Unit =            ",ALPDAG(5.3C),
PRINTO=1
PRINT LIST="  Total Employment per Permanent Population =                    ",EMPPOP(5.3C),
PRINTO=1
PRINT LIST="  Service to Total Employment =                                  ",SRVRTE(5.3C),
PRINTO=1
PRINT LIST="  Commercial to Total Employment =                               ",COMRTE(5.3C),
PRINTO=1
PRINT LIST="  Manufacturing to Total Employment =                            ",MFGRTE(5.3C),
PRINTO=1
PRINT LIST="  Other Industrial to Total Employment =                         ",INDRTE(5.3C),
PRINTO=1
PRINT LIST="  Internal Person Trips per Permanently Occupied Dwelling Unit = ",ITPPRM(5.3C),
PRINTO=1
PRINT LIST="  Internal Person Trips per Total Occupied Dwelling Units =      ",ITPTOC(5.3C),
PRINTO=1
PRINT LIST="  Internal Person Trips per Employee =                           ",ITPEMP(5.3C),
PRINTO=1
```

```
PRINT LIST="  Internal Person Trips per Person =                              ",ITPPOP(5.3C),
PRINTO=1
ENDPROCESS
ENDRUN
```

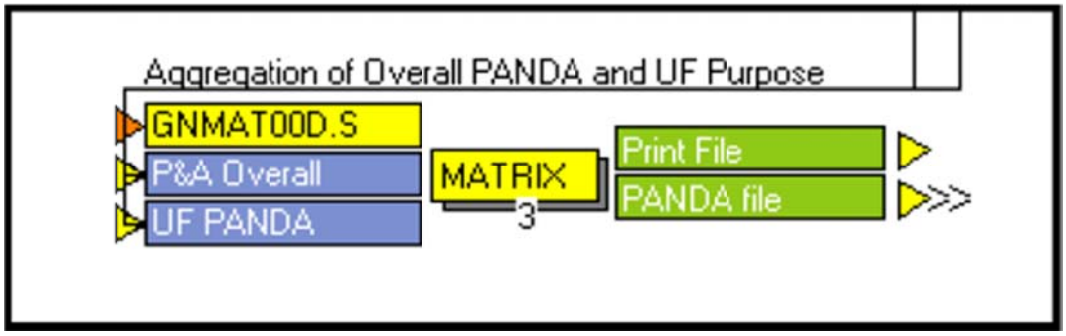


GNMAT00C.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\UFGEN.prn" MSG='UF Trip Generation'
FILEI ZDATI[1] = "{SCENARIO_DIR}\input\ZoneData{YEAR}.DBF",
Z=TAZ_20{year}
FILEO RECO[1] = "{SCENARIO_DIR}\output\UFPANDA.dbf",
               FIELDS=Z,HBUP,HBUA,HDORMUP,HDORMUA,STUPCT,nocarpct,wcarpct
;FILEO PRINTO[1] = "{SCENARIO_DIR}\output\GEN_SUM.PRN"
PAR ZONES={ZONESA}

; Trip rates from HH survey
; Off-campus student trips
RO.HBUP = {RATE_HBUP}*ZI.1.UF_OC_ST*{HBO-TF}      ; home-based university PRODS from off-campus
(students)
RO.HBUA = {RATE_HBUA}*ZI.1.UF_PARKING*{HBO-TF}    ; home-based university ATTRS from off-campus
(parking spaces)
; Campus housing student trips
RO.HDORMUP = {RATE_HDORMUP} *ZI.1.UF_DORM_ST*{HBO-TF} ; home-based university PRODS from Campus
housing (students)
RO.HDORMUA = {RATE_HDORMUA} *ZI.1.SEATS*{HBO-TF}     ; home-based university ATTRS from classroom
seats
ufpop = ZI.1.UF_OC_ST + ZI.1.UF_DORM_ST ; UF pop is equal to number of off-campus students plus
dorm students
sfpop = ZI.1.SPOP
mfpop = ZI.1.MFPOP
tpop=sfpop+mfpop
sf0 = 0.01*ZI.1.SF_0V
mf0 = 0.01*ZI.1.MF_0V

;Student market share
if (tpop>0)
  RO.STUPCT=ufpop/tpop
  t0=(sf0*sfpop + mf0*mfpop)/tpop
else
  RO.STUPCT=0.0
  t0=0.0
endif
if (STUPCT>1.0) STUPCT=1.0    ; make sure fraction students not greater than 1.0
nocarpct= t0*(1.0-STUPCT)     ; fraction without autos
wcarpct = 1.0-nocarpct-STUPCT ; fraction with autos
WRITE RECO=1
ENDRUN
```



GNMAT00D.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\GNMAT00B.PRN" MSG='Aggregation of Overall PANDA and
UF Purpose'
FILEI ZDATI[2] = "{SCENARIO_DIR}\output\UFPANDA.dbf"
FILEI ZDATI[1] = "{SCENARIO_DIR}\output\PANDA_TEM.DBF"

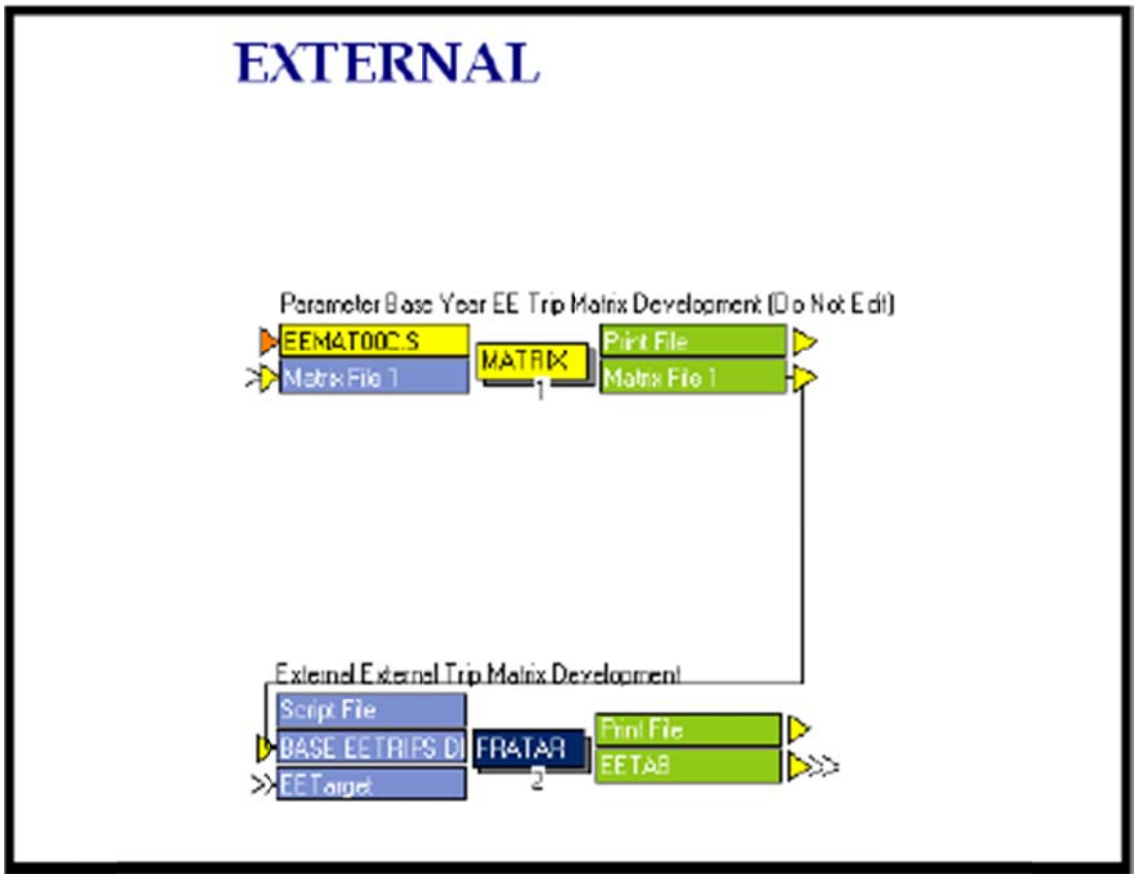
FILEO RECO[1] = "{SCENARIO_DIR}\output\PANDA.DBF",
 FIELDS=Z,HBWP,HBWA,HBSHP,HBSHA,HBSRP,HBSRA,HBOP,HBOA,NHBP,NHBA,TK4P,TK4A,

SGLUNITP,SGLUNITA,TRKTRLRP,TRKTRLRA,SOVIEP,SOVIEA,HOVIEP,HOVIEA,LDTKIEP,LDTKIEA,HDTKIEP,HDTKIEA,
          HBUP,HBUA,HDORMUP,HDORMUA

PAR ZONES={ZONESA}

RO.HBWP=ZI.1.P1
RO.HBSHP=ZI.1.P2
RO.HBSRP=ZI.1.P3
RO.HBOP=ZI.1.P4
RO.NHBP=ZI.1.P5
RO.TK4P=ZI.1.P6
RO.SGLUNITP=ZI.1.P7
RO.TRKTRLRP=ZI.1.P8
RO.SOVIEP=ZI.1.P9
RO.HOVIEP=ZI.1.P10
RO.LDTKIEP=ZI.1.P11
RO.HDTKIEP=ZI.1.P12
RO.HBWA=ZI.1.A1
RO.HBSHA=ZI.1.A2
RO.HBSRA=ZI.1.A3
RO.HBOA=ZI.1.A4
RO.NHBA=ZI.1.A5
RO.TK4A=ZI.1.A6
RO.SGLUNITA=ZI.1.A7
RO.TRKTRLRA=ZI.1.A8
RO.SOVIEA=ZI.1.A9
RO.HOVIEA=ZI.1.A10
RO.LDTKIEA=ZI.1.A11
RO.HDTKIEA=ZI.1.A12
RO.HBUP=ZI.2.hbup
RO.HBUA=ZI.2.hbua
RO.HDORMUP=ZI.2.hdormup
RO.HDORMUA=ZI.2.hdormua
WRITE RECO=1

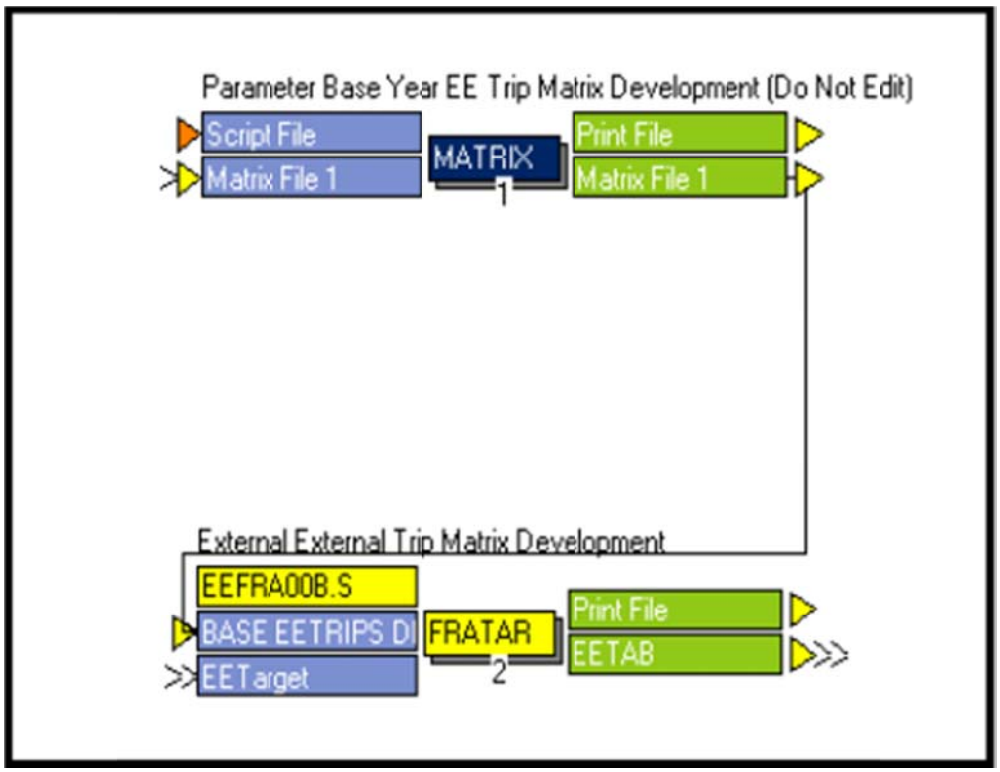
ENDRUN
```



EEMAT00C.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\EEMAT00c.PRN" MSG='Parameter Base Year EE Trip
Matrix Development (Do Not Edit)'
FILEO MATO[1] = "{CATALOG_DIR}\PARAMETERS\BASEYEAR_EETRIPS_DIST.MAT",
MO=1
FILEI MATI[1] = "{CATALOG_DIR}\PARAMETERS\BASEYEAR_EETRIPS_IJ.DBF",
 pattern=ijm:v, fields=orz,dsz,0,autotrips

PAR zones={ZONESA}
mw[1]=mi.1.1
ENDRUN
```



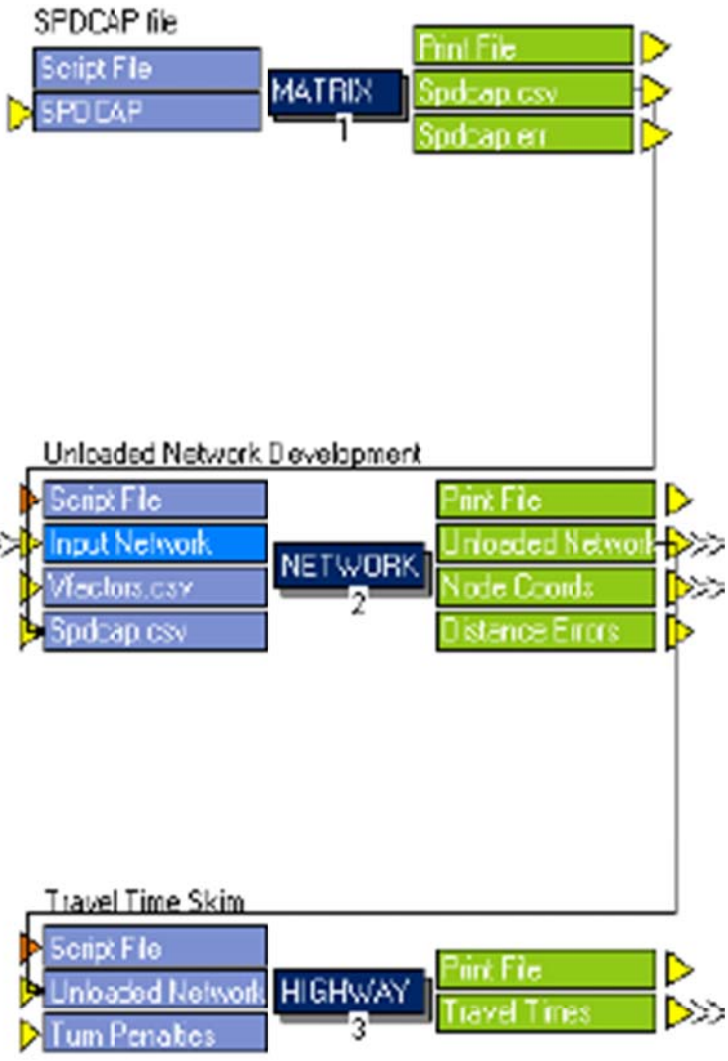
EEFRA00B.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=FRATAR PRNFILE="{SCENARIO_DIR}\output\EEFRA00A.PRN" MSG='External External Trip Matrix
Development'
FILEI MATI[1] = "{CATALOG_DIR}\PARAMETERS\BASEYEAR_EETRIPS_DIST.MAT"
FILEO MATO[1] = "{SCENARIO_DIR}\output\EETAB.MAT",
MO=1, name=EETRIPS
FILEI ZDATI[1] = "{SCENARIO_DIR}\INPUT\eeTARGET20{YEAR}.dbf"
MAXITERS=99
SETPA P[1]=ZI.1.EEO, A[1]=ZI.1.EED MW[1]=MI.1.1
ACOMP=1,PCOMP=1
MARGINS=1

ENDRUN
```

Highway Network Step

HIGHWAY NETWORK



HIGHWAY NETWORK

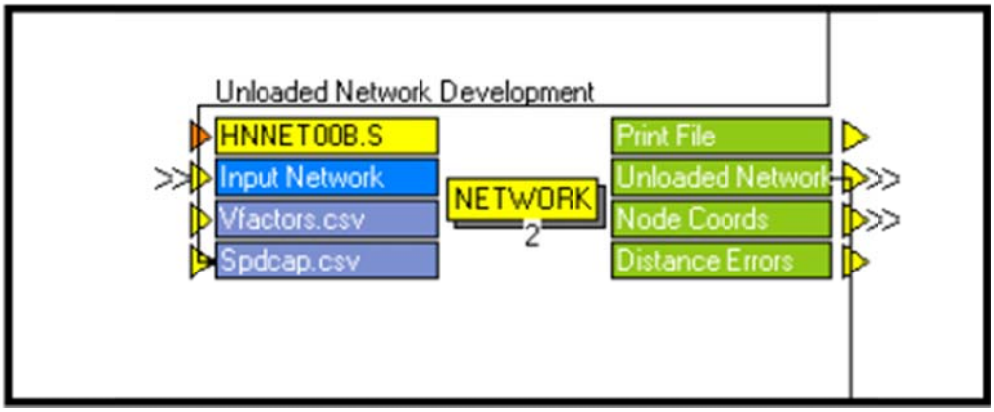
HNMAT00B.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\Output\SPDCAP.OUT" MSG='SPDCAP file'
FILEO PRINTO[2] = "{SCENARIO_DIR}\OUTPUT\SPDCAP.ERR"
FILEO PRINTO[1] = "{SCENARIO_DIR}\output\SPDCAP.CSV"
FILEI RECI = "{CATALOG_DIR}\PARAMETERS\SPDCAP.DBF"

ARRAY SPDLOOKUP=999999 CAPLOOKUP=999999
    _LATVAL=RI.LOW_ATYPE
    _HATVAL=RI.HIGH_ATYPE
    _LFTVAL=RI.LOW_FTYPE
    _HFTVAL=RI.HIGH_FTYPE
    _LLNVAL=RI.LOW_LANES
    _HLNVAL=RI.HIGH_LANES
    _CAPVAL=RI.CAPACITY
    _SPDVAL=RI.SPEED
    _CAPFUNC=RI.CAP_OPERAN
    _SPDFUNC=RI.SPEED_OPER
; PLACE INITIAL CAPACITIES & SPEEDS INTO AN ARRAY
IF (_CAPFUNC=' ')
    LOOP ATYPE=_LATVAL,_HATVAL
      LOOP FTYPE=_LFTVAL,_HFTVAL
        LOOP LANES=_LLNVAL,_HLNVAL
        INDEXVAL=ATYPE*10000+FTYPE*100+LANES
        CAPLOOKUP[INDEXVAL]=_CAPVAL
        ENDLOOP
      ENDLOOP
    ENDLOOP
ENDIF
IF (_SPDFUNC=' ')
    LOOP ATYPE=_LATVAL,_HATVAL
      LOOP FTYPE=_LFTVAL,_HFTVAL
        LOOP LANES=_LLNVAL,_HLNVAL
        INDEXVAL=ATYPE*10000+FTYPE*100+LANES
        SPDLOOKUP[INDEXVAL]=_SPDVAL
        ENDLOOP
      ENDLOOP
    ENDLOOP
ENDIF
IF (_CAPFUNC='*')
    LOOP ATYPE=_LATVAL,_HATVAL
      LOOP FTYPE=_LFTVAL,_HFTVAL
        LOOP LANES=_LLNVAL,_HLNVAL
        INDEXVAL=ATYPE*10000+FTYPE*100+LANES
        CAPLOOKUP[INDEXVAL]=CAPLOOKUP[INDEXVAL]*_CAPVAL
        ENDLOOP
      ENDLOOP
    ENDLOOP
ENDIF
IF (_SPDFUNC='*'|_SPDFUNC='+'|_SPDFUNC='-')
    LOOP ATYPE=_LATVAL,_HATVAL
      LOOP FTYPE=_LFTVAL,_HFTVAL
        LOOP LANES=_LLNVAL,_HLNVAL
```

```
        INDEXVAL=ATYPE*10000+FTYPE*100+LANES
        IF (_SPDFUNC='*') SPDLOOKUP[INDEXVAL]=SPDLOOKUP[INDEXVAL]*_SPDVAL
        IF (_SPDFUNC='+') SPDLOOKUP[INDEXVAL]=SPDLOOKUP[INDEXVAL]+_SPDVAL
        IF (_SPDFUNC='-') SPDLOOKUP[INDEXVAL]=SPDLOOKUP[INDEXVAL]-_SPDVAL
        ENDLOOP
      ENDLOOP
    ENDLOOP
ENDIF


IF (I=0)
  PRINT LIST='SPEED OR CAPACITY ERRORS WHERE THE SPDCAP RESULT IS LESS THAN ZERO', PRINTO=2
  LOOP IVAL=1,999999
     IF (CAPLOOKUP[IVAL]>0|SPDLOOKUP[IVAL]>0)   PRINT CSV=T,
LIST=IVAL(6.0),CAPLOOKUP[IVAL],SPDLOOKUP[IVAL],PRINTO=1
     IF (CAPLOOKUP[IVAL]<0)
        CAPERRCNT=CAPERRCNT+1
        PRINT CSV=T, LIST='SPDCAP ERROR FOR ATFTLN=',IVAL(6.0),'
CAPACITY=',CAPLOOKUP[IVAL](9.2),PRINTO=2
     ENDIF
     IF (SPDLOOKUP[IVAL]<0)
        SPDERRCNT=SPDERRCNT+1
        PRINT CSV=T, LIST='SPDCAP ERROR FOR ATFTLN=',IVAL(6.0),'
SPEED=',SPDLOOKUP[IVAL](9.2),PRINTO=2
     ENDIF
  ENDLOOP
  PRINT LIST='\n************Error Report Summary*************',
             '\nTOTAL LESS THAN ZERO CAPACITY ERRORS=',CAPERRCNT(8.0C),
             '\nTOTAL LESS THAN ZERO SPEED ERRORS   =',SPDERRCNT(8.0C), printo=2
ENDIF
ENDRUN
```



HNNET00B.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=NETWORK PRNFILE="{SCENARIO_DIR}\Output\HNNET00A.PRN" MSG='Unloaded Network Development'
FILEI LOOKUPI[1] = "{CATALOG_DIR}\parameters\VFACTORS.CSV"
FILEO PRINTO[2] = "{SCENARIO_DIR}\OUTPUT\NETERRORS.PRN"
FILEI LINKI[1] = "{SCENARIO_DIR}\INPUT\HNET20{YEAR}.NET"
FILEI LOOKUPI[2] = "{SCENARIO_DIR}\output\SPDCAP.CSV"
FILEO PRINTO[1] = "{SCENARIO_DIR}\OUTPUT\NODECOOR.CSV"
FILEO NETO = "{SCENARIO_DIR}\OUTPUT\UNLOADED.NET",
 EXCLUDE=LINKCNT


PAR  LIST_ERRS=0 MAX_IP_ERRS=10000
ARRAY _ATCNT=99,_FTCNT=99
LOOKUP, NAME=VFACTORS,
    LOOKUP[1]=1, RESULT=2,
    LOOKUP[2]=1, RESULT=3,
```

```
    LOOKUP[3]=1, RESULT=4,
    LOOKUP[4]=1, RESULT=5,
    INTERPOLATE=N, LOOKUPI=1
LOOKUP, NAME=SPDCAP,
    LOOKUP[1]=1, RESULT=2,
    LOOKUP[2]=1, RESULT=3,
    INTERPOLATE=N, LOOKUPI=2

PROCESS  PHASE=INPUT
;Use this phase to modify data as it is read, such as recoding node numbers.
ENDPROCESS

PROCESS  PHASE=NODEMERGE
   print csv=t list=N(6.0),X,Y, PRINTO=1
ENDPROCESS


PROCESS  PHASE=LINKMERGE

COMP FTYPE=LI.1.FTYPE
COMP FTYPE1=INT(LI.1.FTYPE/10)
COMP ATYPE=LI.1.ATYPE
COMP ATYPE1=INT(LI.1.ATYPE/10)
COMP LANES=LI.1.LANES


IF (DISTANCE<=0)

  DISTANCE=SQRT((A.X-B.X)^2+(A.Y-B.Y)^2)/{UNITS}
endif

 _MYDIST=SQRT((A.X-B.X)^2+(A.Y-B.Y)^2)/{UNITS}
 _err=(_MYDIST-DISTANCE)/DISTANCE
if(_err >0.01) print list=A,B,_MYDIST(8.4),DISTANCE(8.4) PRINTO=2


; PUT VFACTORS ON NETWORK
  linkcnt=1
  UROADFACTOR=VFACTORS(1,FTYPE)
  CONFAC=VFACTORS(2,FTYPE)
  BPRCOEFFICIENT=VFACTORS(3,FTYPE)
  BPREXPONENT=VFACTORS(4,FTYPE)
; PUT SPEEDS AND CAPACITIES ON NETWORK
  _INDEXVAL=10000*ATYPE+100*FTYPE+Lanes
  CAPACITY=SPDCAP(1,_INDEXVAL)*Lanes

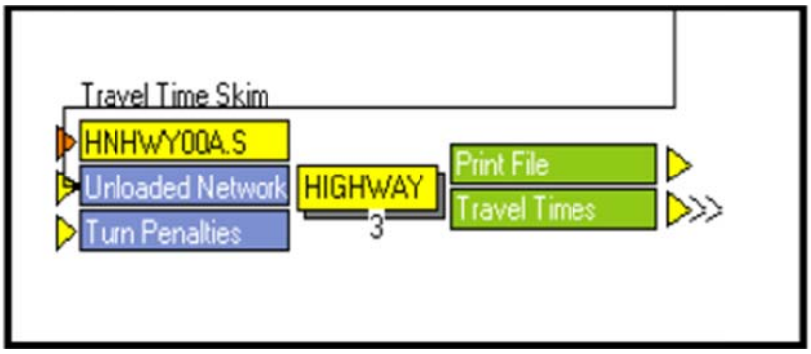
  IF (CAPACITY=0)
     DAILYCAP=999999
  ELSE
      DAILYCAP=(CAPACITY/CONFAC)*UROADFACTOR
  ENDIF


  SPEED=SPDCAP(2,_INDEXVAL)
  IF (SPEED!=0)
    TIME=60*DISTANCE/SPEED
  ENDIF
  if (time<0.01) time=0.01
; PUT WALKTIME ON NETWORK
  WALKTIME=DISTANCE/2.5*60
  _ATCNT[ATYPE]=_ATCNT[ATYPE]+1
  _FTCNT[FTYPE]=_FTCNT[FTYPE]+1
; Put Bike Speed and Time on network
  _spd_red=0
  _ln_red=0
    if (SPEED>12)
       _spd_red=(SPEED-12)/18
    endif
    if (Lanes=2)
       _ln_red=1
    endif
```

```
    if (Lanes>=2)
       _ln_red=2
    endif
    BK_SPD=12 - _spd_red - _ln_red
    if (BK_LNS=1,3) BK_SPD=12
    if (BK_LNS=2) BK_SPD=MAX(BK_SPD,11)
    if (FTYPE1==5) BK_SPD=12
    BK_TIME=60*DISTANCE/BK_SPD

If (FTYPE1==0) DELETE
ENDPROCESS
PROCESS  PHASE=SUMMARY
; Use this phase for combining and reporting of working variables.

ENDPROCESS
ENDRUN
```



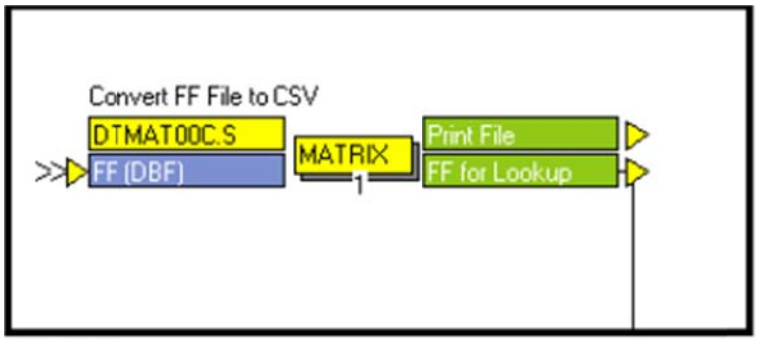
HNHWY00A.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=HIGHWAY PRNFILE="{SCENARIO_DIR}\Output\HNHWY00A.PRN" MSG='Travel Time Skim'
FILEI NETI = "{SCENARIO_DIR}\OUTPUT\UNLOADED.NET"
FILEO MATO[1] = "{SCENARIO_DIR}\OUTPUT\FHSKIMS.{ALT}{YEAR}.MAT",
 MO=1-2,10,99,3 NAME=TIME,DISTANCE,TERMINALTIME,WALKDISTANCE,BIKETIME, DEC=4*3
FILEI TURNPENI = "{SCENARIO_DIR}\INPUT\TCARDS.PEN"
ARRAY TERM=59 TERMTIME={ZONESA}
PAR ZONEMSG=100
TERM[1]={TERM10}
TERM[2]={TERM20}
TERM[3]={TERM30}
TERM[4]={TERM40}
TERM[5]={TERM50}

PROCESS PHASE=LINKREAD
   IF (A=1-{ZONESA}) TERMTIME[A]=TERM[LI.ATYPE1]
   IF (LI.FTYPE=10-19,49,70-99) ADDTOGROUP=1 ; no walk on freeways, etc.
ENDPROCESS

PROCESS PHASE=ILOOP
  PATHLOAD PATH=LI.TIME,
      MW[1]=PATHTRACE(LI.TIME,1),NOACCESS=99999,
      MW[2]=PATHTRACE(LI.DISTANCE),NOACCESS=99999, PENI=1
  PATHLOAD PATH=LI.BK_TIME,EXCLUDEGROUP=1,
      MW[3]=PATHTRACE(LI.BK_TIME),NOACCESS=99999
  MW[1][I]=LOWEST(1,2)/4 ; INTRAZONAL TIME = 1/2 THE AVERAGE OF THE TWO NEAREST ZONES
  MW[2][I]=LOWEST(2,2)/4 ; INTRAZONAL DISTANCE = 1/2 THE AVERAGE OF THE TWO NEAREST ZONES
  MW[3][I]=LOWEST(3,2)/4 ; INTRAZONAL BIKE TIME = 1/2 THE AVERAGE OF THE TWO NEAREST ZONES
  MW[10]=TERMTIME[I]+TERMTIME[J] ; BUILDS TERMINAL TIME MATRIX
  PATHLOAD PATH=LI.DISTANCE, MW[99]=PATHTRACE(LI.DISTANCE), EXCLUDEGROUP=1
  MW[99][I]=ROWMIN(99)/2
ENDPROCESS
PROCESS PHASE=ADJUST
ENDPROCESS
ENDRUN
```

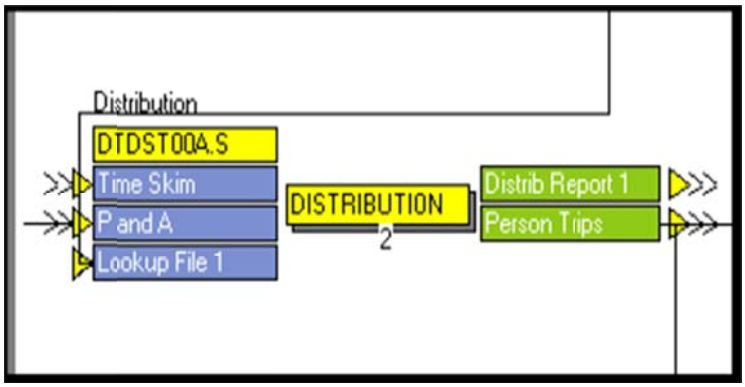
Trip Distribution Step



DTMAT00C.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\Output\DTMAT00A.PRN" MSG='Convert FF File to CSV'
FILEO PRINTO[1] = "{SCENARIO_DIR}\OUTPUT\FF.CSV"
FILEI RECI = "{CATALOG_DIR}\PARAMETERS\FF.DBF"

print csv=t,
list=ri.time,ri.hbwff,ri.hbshff,ri.hbsrff,ri.hboff,ri.nhbff,ri.tk4ff,ri.tksglff,ri.tktrlrff,
                ri.sovieff,ri.hovieff,ri.tkltieff,ri.tkhtieff,ri.hbuff,ri.hdormuff, printo=1
ENDRUN
```



DTDST00A.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=DISTRIBUTION PRNFILE="{SCENARIO_DIR}\output\DISTRIB.PRN" MSG='Distribution'
FILEO MATO[1] = "{SCENARIO_DIR}\Output\PTRIPS.MAT",
 MO=1-14,
NAME=HBW,HBSH,HBSR,HBO,NHB,TRUCK4,TRUCKSU,TRUCKTRLR,SOVIE,HOVIE,TRUCKLDIE,TRUCKHDIE,HBU,HDORMU
FILEI ZDATI[1] = "{SCENARIO_DIR}\output\PANDA.DBF"
FILEI MATI[1] = "{SCENARIO_DIR}\OUTPUT\FHSKIMS.{ALT}{YEAR}.MAT"
FILEI LOOKUPI[1] = "{SCENARIO_DIR}\OUTPUT\FF.CSV"

PAR ZONEMSG=100,  MAXRMSE=.001, MAXITERS=50

setpa p[1]=hbwp,a[1]=hbwa
setpa p[2]=hbshp,a[2]=hbsha
setpa p[3]=hbsrp,a[3]=hbsra
setpa p[4]=hbop,a[4]=hboa
setpa p[5]=nhbp,a[5]=nhba
setpa p[6]=tk4p,a[6]=tk4a
setpa p[7]=sglunitp,a[7]=sglunita
setpa p[8]=trktrlrp,a[8]=trktrlra
setpa p[9]=soviep,a[9]=soviea
setpa p[10]=hoviep,a[10]=hoviea
```

```
setpa p[11]=ldtkiep,a[11]=ldtkiea
setpa p[12]=hdtkiep,a[12]=hdtkiea
setpa p[13]=hbup,a[13]=hbua
setpa p[14]=hdormup,a[14]=hdormua

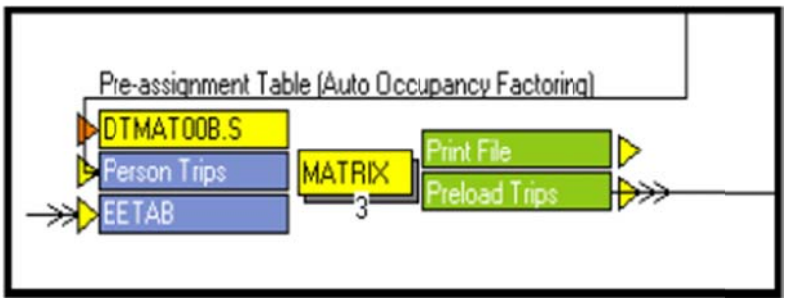
MW[50]=MI.1.TIME+MI.1.TERMINALTIME

LOOKUP, NAME=FF,
   LOOKUP[1]=1, RESULT=2,
   LOOKUP[2]=1, RESULT=3,
   LOOKUP[3]=1, RESULT=4,
   LOOKUP[4]=1, RESULT=5,
   LOOKUP[5]=1, RESULT=6,
   LOOKUP[6]=1, RESULT=7,
   LOOKUP[7]=1, RESULT=8,
   LOOKUP[8]=1, RESULT=9,
   LOOKUP[9]=1, RESULT=10,
   LOOKUP[10]=1, RESULT=11,
   LOOKUP[11]=1, RESULT=12,
   LOOKUP[12]=1, RESULT=13,
   LOOKUP[13]=1, RESULT=14,
   LOOKUP[14]=1, RESULT=15,
   INTERPOLATE=Y, lookupi=1

GRAVITY LOS=MW[50], PURPOSE=1, FFACTORS=FF ; HBW
GRAVITY LOS=MW[50], PURPOSE=2, FFACTORS=FF ; HBSH
GRAVITY LOS=MW[50], PURPOSE=3, FFACTORS=FF ; HBSR
GRAVITY LOS=MW[50], PURPOSE=4, FFACTORS=FF ; HBO
GRAVITY LOS=MW[50], PURPOSE=5, FFACTORS=FF ; NHB
GRAVITY LOS=MW[50], PURPOSE=6, FFACTORS=FF ; TK4
GRAVITY LOS=MW[50], PURPOSE=7, FFACTORS=FF ; SGLUNIT
GRAVITY LOS=MW[50], PURPOSE=8, FFACTORS=FF ; TRKTLR
GRAVITY LOS=MW[50], PURPOSE=9, FFACTORS=FF ; SOVIE
GRAVITY LOS=MW[50], PURPOSE=10, FFACTORS=FF ; HOVIE
GRAVITY LOS=MW[50], PURPOSE=11, FFACTORS=FF ; LDTKIE
GRAVITY LOS=MW[50], PURPOSE=12, FFACTORS=FF ; HDTKIE
GRAVITY LOS=MW[50], PURPOSE=13, FFACTORS=FF ; HBU
GRAVITY LOS=MW[50], PURPOSE=14, FFACTORS=FF ; HDORMU


FREQUENCY BASEMW=50,VALUEMW= 1,RANGE=0-60-5.0, TITLE='HBW TLFD'
FREQUENCY BASEMW=50,VALUEMW= 2,RANGE=0-60-5.0, TITLE='HBSH TLFD'
FREQUENCY BASEMW=50,VALUEMW= 3,RANGE=0-60-5.0, TITLE='HBSR TLFD'
FREQUENCY BASEMW=50,VALUEMW= 4,RANGE=0-60-5.0, TITLE='HBO TLFD'
FREQUENCY BASEMW=50,VALUEMW= 5,RANGE=0-60-5.0, TITLE='NHB TLFD'
FREQUENCY BASEMW=50,VALUEMW= 6,RANGE=0-60-5.0, TITLE='TK4 TLFD'
FREQUENCY BASEMW=50,VALUEMW= 7,RANGE=0-60-5.0, TITLE='SGLUNIT TLFD'
FREQUENCY BASEMW=50,VALUEMW= 8,RANGE=0-60-5.0, TITLE='TRKTLR TLFD'
FREQUENCY BASEMW=50,VALUEMW= 9,RANGE=0-60-5.0, TITLE='SOVIE TLFD'
FREQUENCY BASEMW=50,VALUEMW=10,RANGE=0-60-5.0, TITLE='HOVIE TLFD'
FREQUENCY BASEMW=50,VALUEMW=11,RANGE=0-60-5.0, TITLE='LDTKIE TLFD'
FREQUENCY BASEMW=50,VALUEMW=12,RANGE=0-60-5.0, TITLE='HDTKIE TLFD'
FREQUENCY BASEMW=50,VALUEMW=13,RANGE=0-60-5.0, TITLE='HBU TLFD'
FREQUENCY BASEMW=50,VALUEMW=14,RANGE=0-60-5.0, TITLE='HDORMU TLFD'

ENDRUN
```

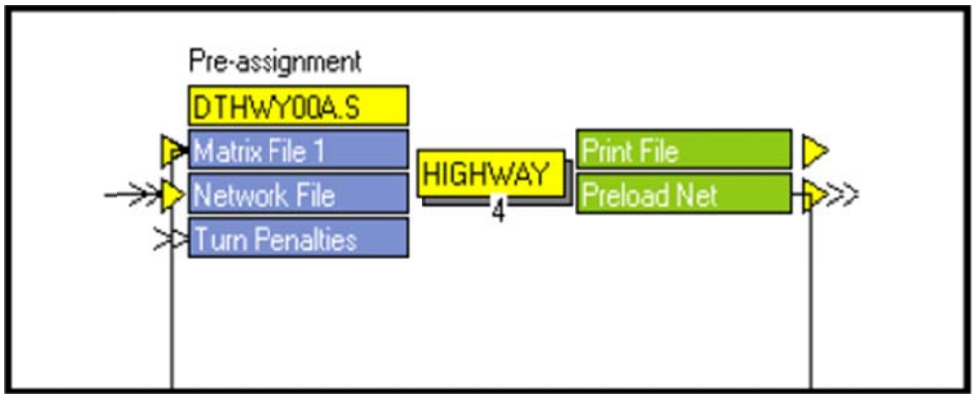


DTMAT00B.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\Output\DTMAT00B.PRN" MSG='Pre-assignment Table (Auto
Occupancy Factoring)'
FILEI MATI[2] = "{SCENARIO_DIR}\output\EETAB.MAT"
FILEI MATI[1] = "{SCENARIO_DIR}\Output\PTRIPS.MAT"
FILEO MATO[1] = "{SCENARIO_DIR}\output\HTTAB.TEM.MAT",
 MO=1, NAME=PRELOADVEH

; The MATRIX module does not have any explicit phases.  The module does run within an implied
ILOOP
; where I is the origin zones.  All user statements in the module are processed once for each
origin.
; Matrix computation (MW[#]=) are solved for all values of J for each I.  Thus for a given origin
zone I
; the values for all destination zones J are automatically computed.  The user can control the
computations
; at each J by using a JLOOP.
PAR ZONEMSG=100
MW[1]=(MI.1.1+MI.1.1.T)*0.5*{AOFAC1}+
(MI.1.2+MI.1.2.T)*0.5*{AOFAC2}+
(MI.1.3+MI.1.3.T)*0.5*{AOFAC3}+
(MI.1.4+MI.1.4.T)*0.5*{AOFAC4}+
(MI.1.5+MI.1.5.T)*0.5*{AOFAC1}+
(MI.1.6+MI.1.6.T)*0.5+
(MI.1.7+MI.1.7.T)*0.5+
(MI.1.8+MI.1.8.T)*0.5+
(MI.1.9+MI.1.9.T)*0.5+
(MI.1.10+MI.1.10.T)*0.5+
(MI.1.11+MI.1.11.T)*0.5+
(MI.1.12+MI.1.12.T)*0.5+
 mi.2.EETRIPS+
(MI.1.13+MI.1.13.T)*0.5*{AOFACU}  ; HBU
;(MI.1.14+MI.1.14.T)*0.5   ; HDORMU - don't include here because these are mostly not auto.

ENDRUN
```



DTHWY00A.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=HIGHWAY PRNFILE="{SCENARIO_DIR}\Output\DTHWY00A.PRN" MSG='Pre-assignment'
FILEI NETI = "{SCENARIO_DIR}\OUTPUT\UNLOADED.NET"
FILEO NETO = "{SCENARIO_DIR}\OUTPUT\PRELOAD.NET"
FILEI TURNPENI = "{SCENARIO_DIR}\input\TCARDS.PEN"
FILEI MATI[1] = "{SCENARIO_DIR}\output\HTTAB.TEM.MAT"

PAR ZONEMSG=100,  MAXITERS=50
```

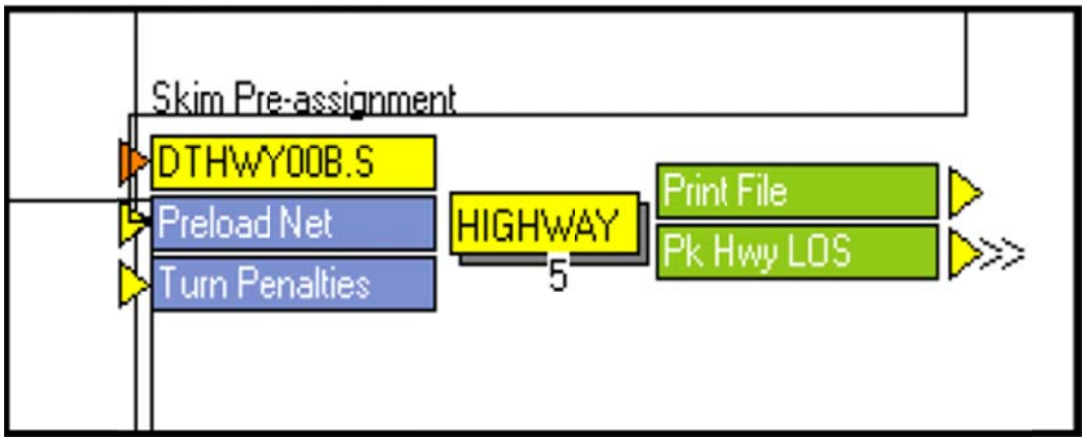
```
PROCESS PHASE=LINKREAD
; USE THE USER SUPPLIED ALPHA AND BETA FOR THE BPR CURVE
  IF (LI.BPRCOEFFICIENT=0)
     LW.BPRCOEFFICIENT=0.15
  ELSE
     LW.BPRCOEFFICIENT=LI.BPRCOEFFICIENT
  ENDIF
  IF (LI.BPREXPONENT=0)
     LW.BPREXPONENT=4.0
  ELSE
     LW.BPREXPONENT=LI.BPREXPONENT
  ENDIF
  IF (LI.CAPACITY=0)
     LW.DAILYCAP=999999
  ELSE
      LW.DAILYCAP=(LI.CAPACITY/li.confac)*li.uroadfactor
  ENDIF
  IF (LI.TIME=0)
     LW.FFTIME=0.00001
  ELSE
     LW.FFTIME=LI.TIME
  ENDIF
C=LW.DAILYCAP
T0=LW.FFTIME
IF (LI.FTYPE=49) ADDTOGROUP=1

ENDPROCESS

PROCESS PHASE=ILOOP
  MW[1]=MI.1.PRELOADVEH
  PATHLOAD PATH=TIME, VOL[1]=MW[1],EXCLUDEGROUP=1,PENI=1
ENDPROCESS

PROCESS PHASE=ADJUST
  FUNCTION   TC[1]=T0*(1+LW.BPRCOEFFICIENT*(V/C)^LW.BPREXPONENT) ; congested time equation, no
toll model in place
ENDPROCESS

ENDRUN
```

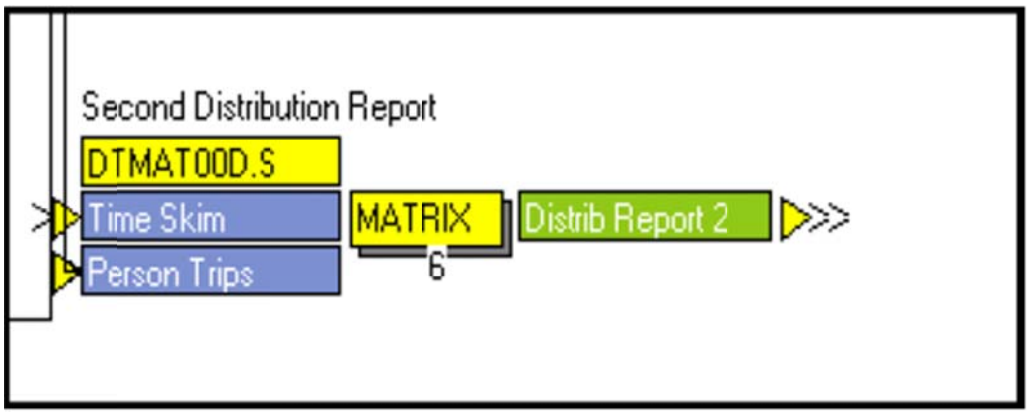


DTHWY00B.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=HIGHWAY PRNFILE="{SCENARIO_DIR}\Output\DTHWY00B.PRN" MSG='Skim Pre-assignment'
FILEI NETI = "{SCENARIO_DIR}\OUTPUT\PRELOAD.NET"
FILEO MATO[1] = "{SCENARIO_DIR}\OUTPUT\RHSKIMS.MAT",
 MO=1-2,10, NAME=TIME,DISTANCE,TERMINALTIME
FILEI TURNPENI = "{SCENARIO_DIR}\input\TCARDS.PEN"
ARRAY TERM=59 TERMTIME={ZONESA}
PAR ZONEMSG=100
TERM[1]={TERM10}
```

```
TERM[2]={TERM20}
TERM[3]={TERM30}
TERM[4]={TERM40}
TERM[5]={TERM50}
PROCESS PHASE=LINKREAD
   IF (A=1-{ZONESA}) TERMTIME[A]=TERM[LI.ATYPE1] ; BUILDS TERMINAL TIME ARRAY (KDK fixed again)
ENDPROCESS
PROCESS PHASE=ILOOP
  PATHLOAD PATH=LI.TIME,
      MW[1]=PATHTRACE(LI.TIME_1,1),NOACCESS=99999,
      MW[2]=PATHTRACE(LI.DISTANCE),NOACCESS=99999, PENI=1
  MW[1][I]=LOWEST(1,2)/4 ; INTRAZONAL TIME = 1/2 THE AVERAGE OF THE TWO NEAREST ZONES
  MW[2][I]=LOWEST(2,2)/4 ; INTRAZONAL DISTANCE = 1/2 THE AVERAGE OF THE TWO NEAREST ZONES
  MW[10]=TERMTIME[I]+TERMTIME[J] ; BUILDS TERMINAL TIME MATRIX
ENDPROCESS

PROCESS PHASE=ADJUST
ENDPROCESS
ENDRUN
```



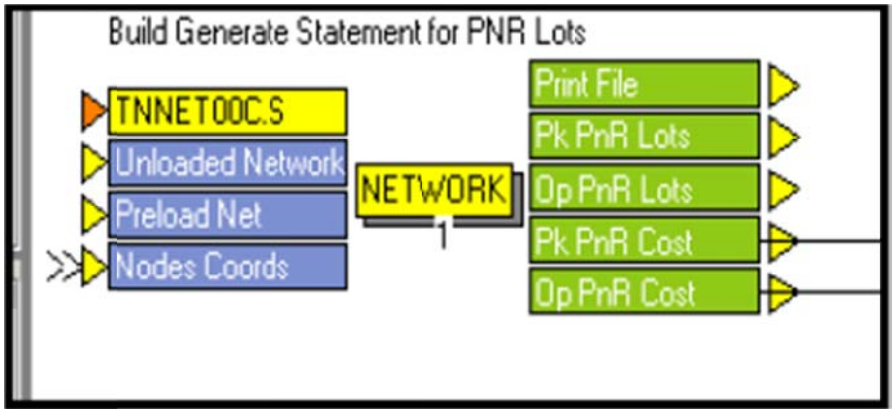
DTMAT00D.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\DISTRIB2.PRN" MSG='Second Distribution Report'
FILEI MATI[2] = "{SCENARIO_DIR}\Output\PTRIPS.MAT"
FILEI MATI[1] = "{SCENARIO_DIR}\OUTPUT\FHSKIMS.{ALT}{YEAR}.MAT"

MW[50]=MI.1.TIME+MI.1.TERMINALTIME
MW[1] = MW[50]*MI.2.HBW
MW[2] = MW[50]*MI.2.HBSH
MW[3] = MW[50]*MI.2.HBSR
MW[4] = MW[50]*MI.2.HBO
MW[5] = MW[50]*MI.2.NHB
MW[6] = MW[50]*MI.2.TRUCK4
MW[7] = MW[50]*MI.2.TRUCKSU
MW[8] = MW[50]*MI.2.TRUCKTRLR
MW[9] = MW[50]*MI.2.SOVIE
MW[10]= MW[50]*MI.2.HOVIE
MW[11]= MW[50]*MI.2.TRUCKLDIE
MW[12]= MW[50]*MI.2.TRUCKHDIE
MW[13]= MW[50]*MI.2.HBU
MW[14]= MW[50]*MI.2.HDORMU

ENDRUN
```

Transit Network Step



TNNET00C.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=NETWORK PRNFILE="{SCENARIO_DIR}\output\TNNET00A.PRN" MSG='Build Generate Statement for
PNR Lots'
FILEI LOOKUPI[1] = "{SCENARIO_DIR}\output\NODECOOR.csv"
FILEI LINKI[2] = "{SCENARIO_DIR}\output\PRELOAD.NET"
FILEI LINKI[1] = "{SCENARIO_DIR}\output\UNLOADED.NET"
FILEO PRINTO[4] = "{SCENARIO_DIR}\output\OPPNRCOST.CSV"
FILEO PRINTO[3] = "{SCENARIO_DIR}\output\PKPNRCOST.CSV"
FILEO PRINTO[2] = "{SCENARIO_DIR}\output\MD_STATDATA.CSV"
FILEO PRINTO[1] = "{SCENARIO_DIR}\output\AM_STATDATA.CSV"
ARRAY STATSTOP=99999 STATNUMB=99999, statspaces=99999, PNRTERM=99999, KNRTERM=99999, nrz=99999

; add in nearest centroid lookup for auto cost to stations HWYOPCOST

PROCESS PHASE=NODEMERGE
; put nodes, x and y coordinates into memory for lookup nearest TAZ question
lookup lookupi=1,name=netcoord, lookup[1]=1, result=2, lookup[2]=1, result=3, fail=0

; extract am station info from network for later calculations
IF (AMUSEFLAG=1)

workstat=N
workstatx=netcoord(1,workstat,0)
workstaty=netcoord(2,workstat,0)
mindist=999.99
loop _ww=1,{ZONESA}
  zx=netcoord(1,_ww,0)
  zy=netcoord(2,_ww,0)
  if (_ww!=workstat) dist=sqrt((workstatx-zx)^2+(workstaty-zy)^2)/{units}
  if (dist<mindist) mindist=dist, nearestzone=_ww
endloop

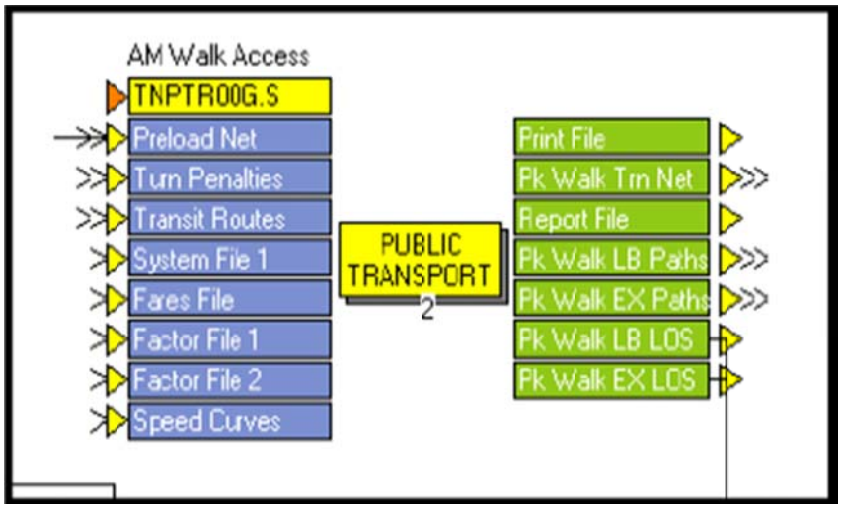
 PRINT form=5.0,list="GENERATE,COST=(li.distance),MINCOST=12*1.0,MAXCOST=12*",pnrsvcarea(5.2L),
       ",EXTRACTCOST=(li.TIME_1),LIST=F,DIRECTION=1,NTLEGMODE=2,FROMNODE=1-
{ZONESA},TONODE=",N,PRINTO=1
 PRINT CSV=T, LIST=N(6.0),AMPNRCOST,NEARESTZONE(6.0) PRINTO=3
endif
; extract md station info from network for later calculations
IF (MDUSEFLAG=1)

workstat=N
workstatx=netcoord(1,workstat,0)
workstaty=netcoord(2,workstat,0)
mindist=999.99
loop _ww=1,{ZONESA}
  zx=netcoord(1,_ww,0)
  zy=netcoord(2,_ww,0)
  if (_ww!=workstat) dist=sqrt((workstatx-zx)^2+(workstaty-zy)^2)/{units}
```

```
  if (dist<mindist) mindist=dist, nearestzone=_ww
endloop


 PRINT form=5.0,list="GENERATE,COST=(li.distance),MINCOST=12*1.0,MAXCOST=12*",pnrsvcarea(5.2L),
        ",EXTRACTCOST=(li.TIME),LIST=F,DIRECTION=1,NTLEGMODE=2,FROMNODE=1-
{ZONESA},TONODE=",N,PRINTO=2
 PRINT CSV=T, LIST=N(6.0),MDPNRCOST,NEARESTZONE(6.0) PRINTO=4
endif

ENDPROCESS
ENDRUN
```



TNPTR00G.S

```
; Script for program PUBLIC TRANSPORT in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNPTR00C.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=PUBLIC TRANSPORT PRNFILE="{SCENARIO_DIR}\output\TNPTR00D.PRN" MSG='AM Walk Access'
FILEI NETI = "{SCENARIO_DIR}\OUTPUT\PRELOAD.NET"
FILEI LINEI[1] = "{SCENARIO_DIR}\input\troute20{YEAR}.lin"
FILEI TURNPENI = "{SCENARIO_DIR}\input\TCARDS.PEN"
FILEI LOOKUPI[1] = "{CATALOG_DIR}\PARAMETERS\SPDCRV.CSV"
FILEO MATO[2] = "{SCENARIO_DIR}\output\WALKPREMAM.MAT",
 MO=1-11, NAME=TIME1M,TIME2M,TIME3M,TIME4M,TIME6M,TIME8M,IWAIT,XWAIT,IVTT,OVTT,FARE
FILEO MATO[1] = "{SCENARIO_DIR}\output\WALKAM.MAT",
 MO=1-11, NAME=TIME1M,TIME2M,TIME3M,TIME4M,TIME6M,TIME8M,IWAIT,XWAIT,IVTT,OVTT,FARE
FILEO REPORTO = "{SCENARIO_DIR}\output\TNPTR00C.PRN"
FILEI FACTORI[2] = "{CATALOG_DIR}\Parameters\ALACHUAWKPREM.FAC"
FILEI FACTORI[1] = "{CATALOG_DIR}\PARAMETERS\ALACHUAWLB.FAC"
FILEI FAREI = "{CATALOG_DIR}\parameters\ALACHUA.FAR"
FILEO ROUTEO[2] = "{SCENARIO_DIR}\output\WALKPREMAM.RTE",
 REPORTI=1-{zonesa}, REPORTJ={cbdzone}
FILEO ROUTEO[1] = "{SCENARIO_DIR}\output\WALKLBAM.RTE",
 REPORTI=1-{zonesa}, REPORTJ={cbdzone}
FILEI SYSTEMI = "{CATALOG_DIR}\PARAMETERS\ALACHUA.PTS"
FILEO NETO = "{SCENARIO_DIR}\output\TNETWALKAM.NET"
PARAMETERS TRANTIME=(LI.TIME_1*1.5), ;GENERIC TRANSIT VS. AUTO RUN TIME
           TRANTIME[4]=LW.LBTIME,    ; MODE SPECIFIC TRANSIT VS. AUTO RUN TIME
           TRANTIME[6]=LW.EBTIME,    ; CREATED THROUGH A LOOKUP FUNCTION
           TRANTIME[8]=LW.RLTIME,
           FARE=F, USERCLASSES=1-2,  HDWAYPERIOD=1  MAPSCALE={UNITS}

REPORT LINES=T

;PROCESS PHASE=NODEREAD
; loops over all nodes computes node based scalar and array variables (Optional)
```

```
;ENDPROCESS
;
PROCESS PHASE=LINKREAD
   LW.WALKTIME=60*LI.DISTANCE/{walkspeed}
   IF (LI.TIME_1>0) LW.SPEED=60*LI.DISTANCE/LI.TIME_1
   LOOKUP, NAME=CURVES, LOOKUP[1]=1, RESULT=2, LOOKUP[2]=1, RESULT=3, LOOKUP[3]=1, RESULT=4,
           INTERPOLATE=Y, LOOKUPI=1
   IF (LI.FTYPE=10-19,80-99) ; FREE FLOW CONDITIONS FOR ALL
       LW.LBCURVE=1,LW.EBCURVE=1,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=10-19) ; BUSSES HITTING RESISTANCE, RAIL NO CONFLICTS (GRADE
SEP)
       LW.LBCURVE=2,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=20-29) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=3,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=30-39) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=3,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=40-49) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=2,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=50-59) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=2,LW.EBCURVE=1,LW.RLCURVE=1
   ENDIF
       LW.LBSPEED=CURVES(LW.LBCURVE,LW.SPEED)
       LW.EBSPEED=CURVES(LW.EBCURVE,LW.SPEED)
       LW.RLSPEED=CURVES(LW.RLCURVE,LW.SPEED)
       LW.LBTIME=60*LI.DISTANCE/LW.LBSPEED
       LW.EBTIME=60*LI.DISTANCE/LW.EBSPEED
       LW.RLTIME=60*LI.DISTANCE/LW.RLSPEED
       TRANTIME[4]=LW.LBTIME
       TRANTIME[6]=LW.EBTIME
       TRANTIME[8]=LW.RLTIME

ENDPROCESS

PROCESS PHASE=DATAPREP
; WALK ACCESS
  GENERATE, COST=(LW.WALKTIME),MAXCOST=103*24.0,LIST=T,NTLEGMODE = 1,
            DIRECTION=1, FROMNODE=1-{zonesa}, TONODE=1000-99999
; WALK EGRESS
  GENERATE, COST=(LW.WALKTIME),MAXCOST=103*24.0,LIST=T,NTLEGMODE=101,
            DIRECTION=2, FROMNODE=1-{zonesa}, TONODE=1000-99999
; WALK CONNECTORS
  GENERATE, COST=(LW.WALKTIME),MAXCOST=103*12,LIST=T,NTLEGMODE = 3,DIRECTION=3,
            FROMNODE=1000-99999, TONODE=1000-99999


ENDPROCESS

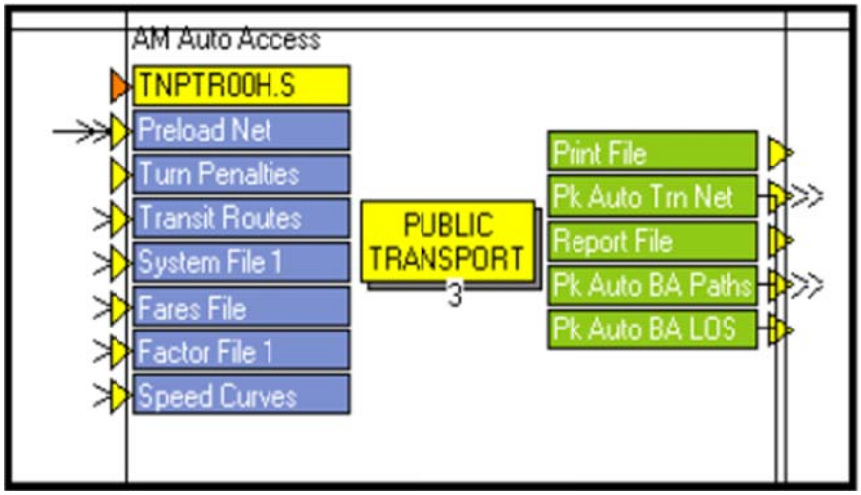
PROCESS PHASE=SKIMIJ
  MW[1]=TIMEA(0,1,101)
  MW[2]=TIMEA(0,2,102)
  MW[3]=TIMEA(0,3)
  MW[4]=TIMEA(0,4)
  MW[5]=TIMEA(0,6)
  MW[6]=TIMEA(0,8)
  MW[7]=IWAITA(0)
  MW[8]=XWAITA(0)
  MW[9]=TIMEA(0,TMODES)
  MW[10]=TIMEA(0,NTMODES)
  MW[11]=FAREA(0,ALLMODES)


;VARIOUS THINGS THAT CAN BE SKIMMED
/*
  COMPCOST(RouteSet)       Skims Composite Costs
  ValOfChoice(RouteSet)    Skims Value of Choice
  IWAITA(RouteSet)         Skims Initial Wait Times Actual
  XWAITA(RouteSet)         Skims Transfer Wait Times Actual
  IWAITP(RouteSet)         Skims Initial Wait Times Perceived
  XWAITP(RouteSet)         Skims Initial Transfer Times Perceived
  TIMEA(RouteSet, Mode)    Skims Travel Time Actual
  TIMEP(RouteSet, Mode)    Skims Travel Time Perceived
```

```
  XFERPENA(RouteSet, Mode) Skims Transfer Penalty Actual
  XFERPENP(RouteSet, Mode) Skims Transfer Penalty Actual
  DIST(RouteSet, Mode)     Skims Distance
  BRDINGS(RouteSet, Mode)  Skims Number of Boardings (xfers+1)
  BESTJRNY                 Skims Best Journey Times
  FAREA(RouteSet, Mode)    Skims Fares in Monetary units
  FAREP(RouteSet, Mode)    Skims Fares in Generalized Time units
*/

ENDPROCESS

ENDRUN
```



TNPTR00H.S

```
; Script for program PUBLIC TRANSPORT in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNPTR00D.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=PUBLIC TRANSPORT PRNFILE="{SCENARIO_DIR}\output\TNPTR00G.PRN" MSG='AM Auto Access'
FILEI NETI = "{SCENARIO_DIR}\OUTPUT\PRELOAD.NET"
FILEI LOOKUPI[1] = "{CATALOG_DIR}\PARAMETERS\SPDCRV.CSV"
FILEI TURNPENI = "{SCENARIO_DIR}\input\TCARDS.PEN"
FILEO REPORTO = "{SCENARIO_DIR}\output\TNPTR00F.PRN"
FILEO MATO[1] = "{SCENARIO_DIR}\output\AUTOAM.MAT",
 MO=1-11, NAME=TIME1M,TIME2M,TIME3M,TIME4M,TIME6M,TIME8M,IWAIT,XWAIT,IVTT,OVTT,FARE
FILEI FACTORI[1] = "{CATALOG_DIR}\PARAMETERS\ALACHUAPNR.FAC"
FILEI FAREI = "{CATALOG_DIR}\parameters\ALACHUA.FAR"
FILEO ROUTEO[1] = "{SCENARIO_DIR}\output\AUTOALLAM.RTE",
 REPORTI=1-{zonesa}, REPORTJ={cbdzone}
FILEI SYSTEMI = "{CATALOG_DIR}\PARAMETERS\ALACHUA.PTS"
FILEO NETO = "{SCENARIO_DIR}\output\TNETAUTOAM.NET"
FILEI LINEI[1] = "{SCENARIO_DIR}\input\troute20{YEAR}.lin"
PARAMETERS TRANTIME=(LI.TIME_1*1.5), ;GENERIC TRANSIT VS. AUTO RUN TIME
           TRANTIME[4]=LW.LBTIME,    ; MODE SPECIFIC TRANSIT VS. AUTO RUN TIME
           TRANTIME[6]=LW.EBTIME,    ; CREATED THROUGH A LOOKUP FUNCTION
           TRANTIME[8]=LW.RLTIME,
           FARE=F, USERCLASSES=1,    MAPSCALE={UNITS}

           HDWAYPERIOD=1

REPORT LINES=T

;PROCESS PHASE=NODEREAD
; loops over all nodes computes node based scalar and array variables (Optional)


;ENDPROCESS
;
PROCESS PHASE=LINKREAD
```

```
   LW.WALKTIME=60*LI.DISTANCE/{walkspeed}
   IF (LI.TIME_1>0) LW.SPEED=60*LI.DISTANCE/LI.TIME_1
   LOOKUP, NAME=CURVES, LOOKUP[1]=1, RESULT=2, LOOKUP[2]=1, RESULT=3, LOOKUP[3]=1, RESULT=4,
           INTERPOLATE=Y, LOOKUPI=1
   IF (LI.FTYPE=10-19,80-99) ; FREE FLOW CONDITIONS FOR ALL
       LW.LBCURVE=1,LW.EBCURVE=1,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=10-19) ; BUSSES HITTING RESISTANCE, RAIL NO CONFLICTS (GRADE
SEP)
       LW.LBCURVE=2,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=20-29) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=3,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=30-39) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=3,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=40-49) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=2,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=50-59) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=2,LW.EBCURVE=1,LW.RLCURVE=1
   ENDIF
       LW.LBSPEED=CURVES(LW.LBCURVE,LW.SPEED)
       LW.EBSPEED=CURVES(LW.EBCURVE,LW.SPEED)
       LW.RLSPEED=CURVES(LW.RLCURVE,LW.SPEED)
       LW.LBTIME=60*LI.DISTANCE/LW.LBSPEED
       LW.EBTIME=60*LI.DISTANCE/LW.EBSPEED
       LW.RLTIME=60*LI.DISTANCE/LW.RLSPEED
       TRANTIME[4]=LW.LBTIME
       TRANTIME[6]=LW.EBTIME
       TRANTIME[8]=LW.RLTIME

ENDPROCESS

PROCESS PHASE=DATAPREP
; AUTO ACCESS
READ,
 FILE = "{SCENARIO_DIR}\OUTPUT\AM_STATDATA.CSV"
; WALK EGRESS
  GENERATE, COST=(LW.WALKTIME),MAXCOST=103*24.0,LIST=T,NTLEGMODE=101,
            DIRECTION=2, FROMNODE=1-{zonesa}, TONODE=1000-99999
; WALK CONNECTORS
  GENERATE, COST=(LW.WALKTIME),MAXCOST=103*12,LIST=T,NTLEGMODE = 3,DIRECTION=3,
            FROMNODE=1000-99999, TONODE=1000-99999


ENDPROCESS

;PROCESS PHASE=MATI
; manipulates input and work matrices prior to processing each Origin zone, I (Optional)


;ENDPROCESS

;PROCESS PHASE=SELECTIJ
; allows finer selection of zone pairs, IJ, for Route Evaluation, and the setting
; or revising of trips for Loading (Optional)


;ENDPROCESS

PROCESS PHASE=SKIMIJ
  MW[1]=TIMEA(0,1,101)
  MW[2]=TIMEA(0,2,102)
  MW[3]=TIMEA(0,3)
  MW[4]=TIMEA(0,4)
  MW[5]=TIMEA(0,6)
  MW[6]=TIMEA(0,8)
  MW[7]=IWAITA(0)
  MW[8]=XWAITA(0)
  MW[9]=TIMEA(0,TMODES)
  MW[10]=TIMEA(0,NTMODES)
  MW[11]=FAREA(0,ALLMODES)
```

```
;VARIOUS THINGS THAT CAN BE SKIMMED
/*
  COMPCOST(RouteSet)       Skims Composite Costs
  ValOfChoice(RouteSet)    Skims Value of Choice
  IWAITA(RouteSet)         Skims Initial Wait Times Actual
  XWAITA(RouteSet)         Skims Transfer Wait Times Actual
  IWAITP(RouteSet)         Skims Initial Wait Times Perceived
  XWAITP(RouteSet)         Skims Initial Transfer Times Perceived
  TIMEA(RouteSet, Mode)    Skims Travel Time Actual
  TIMEP(RouteSet, Mode)    Skims Travel Time Perceived
  XFERPENA(RouteSet, Mode) Skims Transfer Penalty Actual
  XFERPENP(RouteSet, Mode) Skims Transfer Penalty Actual
  DIST(RouteSet, Mode)     Skims Distance
  BRDINGS(RouteSet, Mode)  Skims Number of Boardings (xfers+1)
  BESTJRNY                 Skims Best Journey Times
  FAREA(RouteSet, Mode)    Skims Fares in Monetary units
  FAREP(RouteSet, Mode)    Skims Fares in Generalized Time units

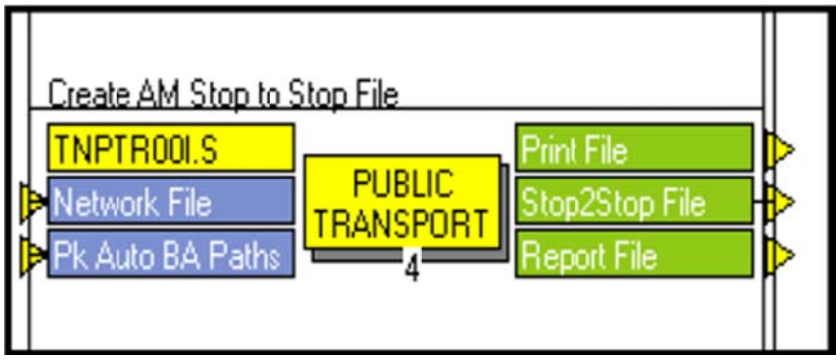
*/

ENDPROCESS

;PROCESS PHASE=MATO
; allows processing of work matrices prior to them being written to the MATO files
; at the end of each Origin zone (Optional)


;ENDPROCESS

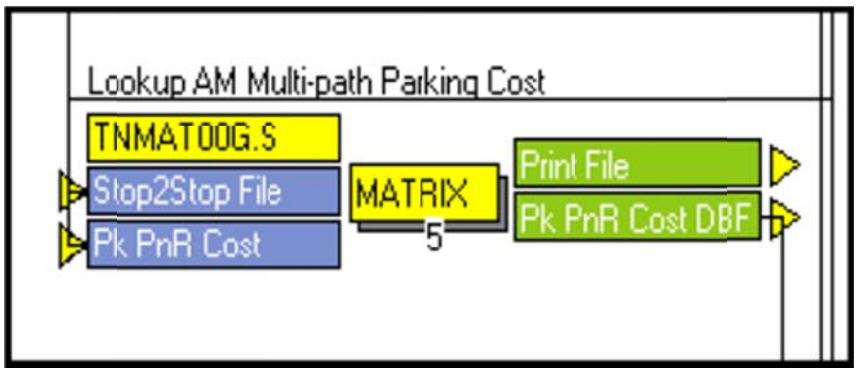
ENDRUN
```



TNPTR00I.S

```
; Script for program PUBLIC TRANSPORT in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNPTR00E.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=PUBLIC TRANSPORT PRNFILE="{SCENARIO_DIR}\output\TNPTR00I.PRN" MSG='Create AM Stop to Stop
File'
FILEO REPORTO = "{SCENARIO_DIR}\output\TNPTR00J.PRN"
FILEO STOP2STOPO = "{SCENARIO_DIR}\output\AMPNR.DBF",
 ACCUMULATE=FIRSTLAST, NODES=1-99999
FILEI NETI = "{SCENARIO_DIR}\output\TNETAUTOAM.NET"
FILEI ROUTEI[1] = "{SCENARIO_DIR}\output\AUTOALLAM.RTE"
PARAMETERS HDWAYPERIOD=1,
           TRIPSIJ[1]=100,
           NOROUTEERRS=999999999

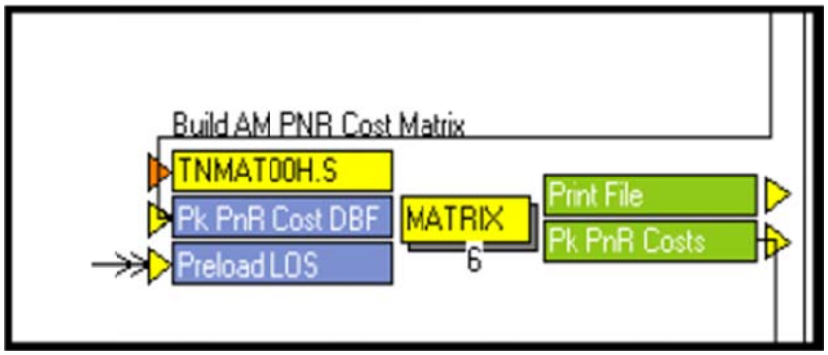
ENDRUN
```



TNMAT00G.S

```
; Script for program MATRIX in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNMAT00E.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\TNMAT00E.PRN" MSG='Lookup AM Multi-path Parking
Cost'
FILEO RECO[1] = "{SCENARIO_DIR}\output\AMPCOST.DBF",
 FIELDS=ORZ,DSZ,MA,MEANCOST,MB,STNZONE,MC,CNT
FILEI RECI = "{SCENARIO_DIR}\output\AMPNR.DBF"
FILEI LOOKUPI[1] = "{SCENARIO_DIR}\output\PKPNRCOST.CSV"

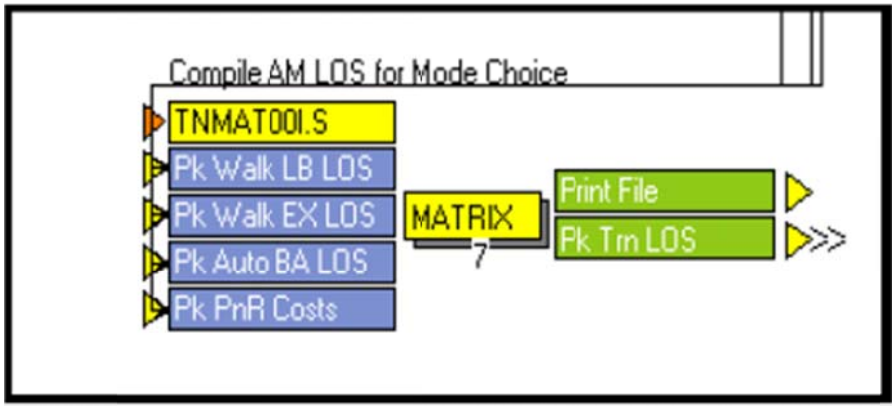
LOOKUP, NAME=STATIONS, LOOKUP[1]=1, RESULT=2, LOOKUP[2]=1, RESULT=3, INTERPOLATE=F, FAIL[1]=0,
FAIL[2]=0, LOOKUPI=1
  RO.ORZ=RI.I
  RO.DSZ=RI.J
  statnode=ri.fromnode
  RO.MA=1
  RO.MB=2
  RO.MC=3
  RO.CNT=1
  PCOST=STATIONS(1,statnode)
  RO.STNZONE=STATIONS(2,STATNODE)
  meancost=PCOST*ri.vol/100
WRITE RECO=1
ENDRUN
```



TNMAT00H.S

```
; Script for program MATRIX in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNMAT00C.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\TNMAT00C.PRN" MSG='Build AM PNR Cost Matrix'
FILEI MATI[2] = "{SCENARIO_DIR}\OUTPUT\RHSKIMS.MAT"
FILEI MATI[1] = "{SCENARIO_DIR}\output\AMPCOST.DBF",
PATTERN=IJ:MV, FIELDS=ORZ,DSZ,MA,MEANCOST,MB,STNZONE,MC,CNT
FILEO MATO[1] = "{SCENARIO_DIR}\output\PKPNRCOST.MAT",
 MO=1-4,13,14 NAME=PKPNRCOST,STNZONE,STNTIME,STNDIST,FREQUENCY,TERMTIME
```

```
PAR ZONEMSG=100 ZONES={ZONESA}
MW[1]=MI.1.1 ; PNR COST
MW[2]=MI.1.2 ; STNZONE
MW[13]=MI.1.3 ; FREQENCY COUNT
MW[14]=MI.2.TERMINALTIME
MW[10]=MI.2.TIME
MW[11]=MI.2.DISTANCE
jloop
  IF (MW[13]>0)
     MW[2]=MW[2]/MW[13]
     STNZONE=MW[2]
     TIME=MW[10]
     DISTANCE=MW[11]
     MW[3]=TIME, MW[4]=DISTANCE
  ENDIF
endjloop
ENDRUN
```



TNMAT00I.S

```
; Script for program MATRIX in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNMAT00A.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\TNMAT00A.PRN" MSG='Compile AM LOS for Mode Choice'
FILEI MATI[4] = "{SCENARIO_DIR}\output\PKPNRCOST.MAT"
FILEO MATO[1] = "{SCENARIO_DIR}\output\PEAK TRN LOS.MAT",
MO=1-5,11-15,21-25,
NAME=PKWKTIMELB,PKWTTIMELB,PKIVTIMELB,PKPKCOSTLB,PKOPCOSTLB,
PKWKTIMEEX,PKWTTIMEEX,PKIVTIMEEX,PKPKCOSTEX,PKOPCOSTEX,
PKWKTIMEBA,PKWTTIMEBA,PKIVTIMEBA,PKPKCOSTBA,PKOPCOSTBA dec=15*d
FILEI MATI[3] = "{SCENARIO_DIR}\output\AUTOAM.MAT"
FILEI MATI[2] = "{SCENARIO_DIR}\output\WALKPREMAM.MAT"
FILEI MATI[1] = "{SCENARIO_DIR}\output\WALKAM.MAT"

par zonemsg=100

JLOOP

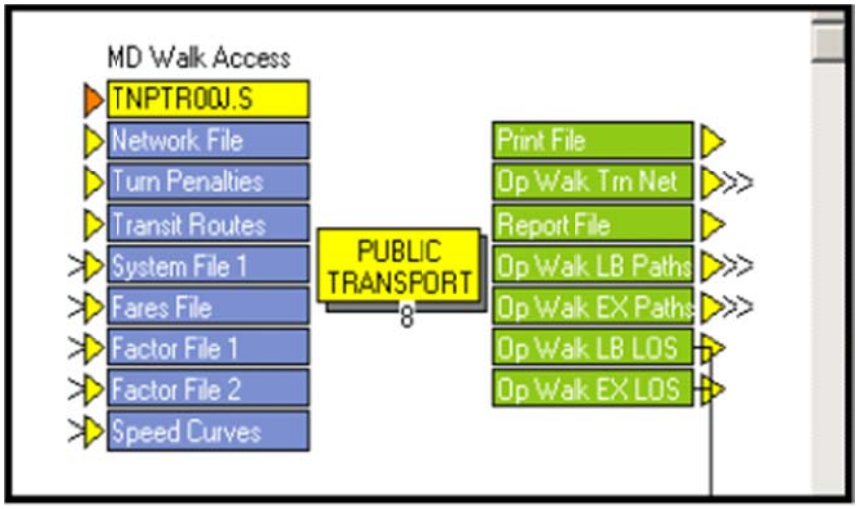
; FIRST PROCESS THE WALK TO LOCAL BUS

IF (MI.1.TIME6M=0&MI.1.TIME8M=0)
   MW[001]=mi.1.ovtt+mi.4.termtime
   MW[002]=mi.1.iwait+mi.1.xwait
   MW[003]=mi.1.ivtt
   MW[004]=0 ; no parking cost for walk modes
   MW[005]=mi.1.fare
ELSE
   MW[013]=999999
ENDIF

; NEXT PROCESS WALK TO EXPRESS SERVICE
```

```
IF (MI.1.TIME6M>0|MI.1.TIME8M>0)
   MW[011]=mi.2.ovtt+mi.4.termtime
   MW[012]=mi.2.iwait+mi.2.xwait
   MW[013]=mi.2.ivtt
   MW[014]=0 ; no parking cost for walk modes
   MW[015]=mi.1.fare
ELSE
   MW[013]=999999
ENDIF

; NEXT PROCESS DRIVE TO BEST AVAILABLE
IF (mi.3.ivtt>0)
   MW[021]=mi.3.ovtt+mi.4.termtime
   MW[022]=mi.3.iwait+mi.3.xwait
   MW[023]=mi.3.ivtt+mi.4.stntime
   MW[024]=mi.4.pkpnrcost+(mi.4.stndist*{hwyopcost})
   MW[025]=mi.3.fare
ELSE
   MW[023]=999999
ENDIF
ENDJLOOP
ENDRUN
```



TNPTR00J.S

```
; Script for program PUBLIC TRANSPORT in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNPTR00A.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=PUBLIC TRANSPORT PRNFILE="{SCENARIO_DIR}\output\TNPTR00B.PRN" MSG='MD Walk Access'
FILEI NETI = "{SCENARIO_DIR}\output\UNLOADED.NET"
FILEI LOOKUPI[1] = "{CATALOG_DIR}\Parameters\SPDCRV.CSV"
FILEO MATO[2] = "{SCENARIO_DIR}\output\WALKPREMMD.MAT",
 MO=1-11, NAME=TIME1M,TIME2M,TIME3M,TIME4M,TIME6M,TIME8M,IWAIT,XWAIT,IVTT,OVTT,FARE
FILEO MATO[1] = "{SCENARIO_DIR}\output\WALKMD.MAT",
 MO=1-11, NAME=TIME1M,TIME2M,TIME3M,TIME4M,TIME6M,TIME8M,IWAIT,XWAIT,IVTT,OVTT,FARE
FILEI FACTORI[2] = "{CATALOG_DIR}\Parameters\ALACHUAWKPREM.FAC"
FILEI FACTORI[1] = "{CATALOG_DIR}\Parameters\ALACHUAWLB.FAC"
FILEI FAREI = "{CATALOG_DIR}\parameters\ALACHUA.FAR"
FILEO ROUTEO[2] = "{SCENARIO_DIR}\output\WALKPREMMD.RTE",
 REPORTI=1-{zonesa}, REPORTJ={cbdzone}
FILEO ROUTEO[1] = "{SCENARIO_DIR}\output\WALKLBMD.RTE",
 REPORTI=1-{zonesa}, REPORTJ={cbdzone}
FILEI SYSTEMI = "{CATALOG_DIR}\Parameters\ALACHUA.PTS"
FILEO REPORTO = "{SCENARIO_DIR}\output\TNPTR00A.PRN"
FILEO NETO = "{SCENARIO_DIR}\output\TNETWALKMD.NET"
FILEI LINEI[1] = "{SCENARIO_DIR}\input\troute20{YEAR}.lin"
FILEI TURNPENI = "{SCENARIO_DIR}\input\TCARDS.PEN"
PARAMETERS TRANTIME=(LI.TIME*1.5), ;GENERIC TRANSIT VS. AUTO RUN TIME
           TRANTIME[4]=LW.LBTIME,    ; MODE SPECIFIC TRANSIT VS. AUTO RUN TIME
```

```
           TRANTIME[6]=LW.EBTIME,     ; CREATED THROUGH A LOOKUP FUNCTION
           TRANTIME[8]=LW.RLTIME,
           FARE=F, USERCLASSES=1-2,  HDWAYPERIOD=2   MAPSCALE={UNITS}


REPORT LINES=T

;PROCESS PHASE=NODEREAD
; loops over all nodes computes node based scalar and array variables (Optional)


;ENDPROCESS
;
PROCESS PHASE=LINKREAD
   LW.WALKTIME=60*LI.DISTANCE/{walkspeed}
   IF (LI.TIME>0) LW.SPEED=60*LI.DISTANCE/LI.TIME
   LOOKUP, NAME=CURVES, LOOKUP[1]=1, RESULT=2, LOOKUP[2]=1, RESULT=3, LOOKUP[3]=1, RESULT=4,
           INTERPOLATE=Y, LOOKUPI=1
   IF (LI.FTYPE=10-19,80-99) ; FREE FLOW CONDITIONS FOR ALL
       LW.LBCURVE=1,LW.EBCURVE=1,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=10-19) ; BUSSES HITTING RESISTANCE, RAIL NO CONFLICTS (GRADE
SEP)
       LW.LBCURVE=2,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=20-29) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=3,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=30-39) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=3,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=40-49) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=2,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=50-59) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=2,LW.EBCURVE=1,LW.RLCURVE=1
   ENDIF
       LW.LBSPEED=CURVES(LW.LBCURVE,LW.SPEED)
       LW.EBSPEED=CURVES(LW.EBCURVE,LW.SPEED)
       LW.RLSPEED=CURVES(LW.RLCURVE,LW.SPEED)
       LW.LBTIME=60*LI.DISTANCE/LW.LBSPEED
       LW.EBTIME=60*LI.DISTANCE/LW.EBSPEED
       LW.RLTIME=60*LI.DISTANCE/LW.RLSPEED
       TRANTIME[4]=LW.LBTIME
       TRANTIME[6]=LW.EBTIME
       TRANTIME[8]=LW.RLTIME

ENDPROCESS

PROCESS PHASE=DATAPREP
; WALK ACCESS
  GENERATE, COST=(LW.WALKTIME),MAXCOST=103*24.0,LIST=T,NTLEGMODE = 1,
            DIRECTION=1, FROMNODE=1-{zonesa}, TONODE=1000-99999
; WALK EGRESS
  GENERATE, COST=(LW.WALKTIME),MAXCOST=103*24.0,LIST=T,NTLEGMODE=101,
            DIRECTION=2, FROMNODE=1-{zonesa}, TONODE=1000-99999
; WALK CONNECTORS
  GENERATE, COST=(LW.WALKTIME),MAXCOST=103*12,LIST=T,NTLEGMODE = 3,DIRECTION=3,
            FROMNODE=1000-99999, TONODE=1000-99999


ENDPROCESS

;PROCESS PHASE=MATI
; manipulates input and work matrices prior to processing each Origin zone, I (Optional)

;ENDPROCESS

;PROCESS PHASE=SELECTIJ
; allows finer selection of zone pairs, IJ, for Route Evaluation, and the setting
; or revising of trips for Loading (Optional)

;ENDPROCESS

PROCESS PHASE=SKIMIJ
  MW[1]=TIMEA(0,1,101)
```

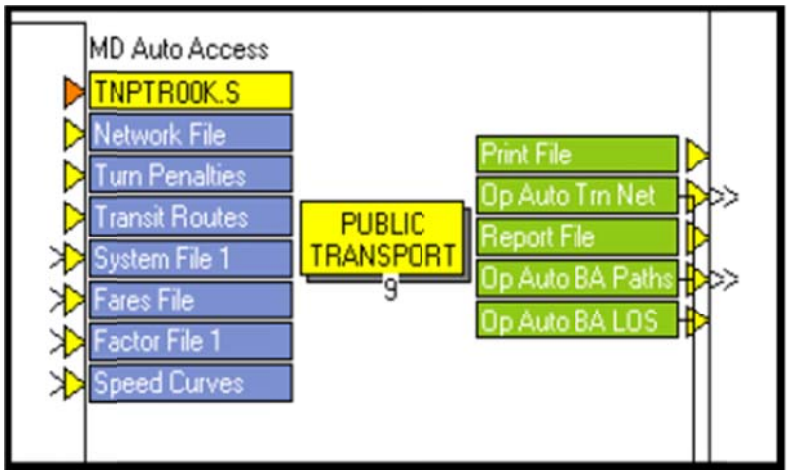
```
  MW[2]=TIMEA(0,2,102)
  MW[3]=TIMEA(0,3)
  MW[4]=TIMEA(0,4)
  MW[5]=TIMEA(0,6)
  MW[6]=TIMEA(0,8)
  MW[7]=IWAITA(0)
  MW[8]=XWAITA(0)
  MW[9]=TIMEA(0,TMODES)
  MW[10]=TIMEA(0,NTMODES)
  MW[11]=FAREA(0,ALLMODES)

;VARIOUS THINGS THAT CAN BE SKIMMED
/*
  COMPCOST(RouteSet)       Skims Composite Costs
  ValOfChoice(RouteSet)    Skims Value of Choice
  IWAITA(RouteSet)         Skims Initial Wait Times Actual
  XWAITA(RouteSet)         Skims Transfer Wait Times Actual
  IWAITP(RouteSet)         Skims Initial Wait Times Perceived
  XWAITP(RouteSet)         Skims Initial Transfer Times Perceived
  TIMEA(RouteSet, Mode)    Skims Travel Time Actual
  TIMEP(RouteSet, Mode)    Skims Travel Time Perceived

  XFERPENA(RouteSet, Mode) Skims Transfer Penalty Actual

  XFERPENP(RouteSet, Mode) Skims Transfer Penalty Actual
  DIST(RouteSet, Mode)     Skims Distance
  BRDINGS(RouteSet, Mode)  Skims Number of Boardings (xfers+1)
  BESTJRNY                 Skims Best Journey Times
  FAREA(RouteSet, Mode)    Skims Fares in Monetary units
  FAREP(RouteSet, Mode)    Skims Fares in Generalized Time units
*/

ENDPROCESS
;PROCESS PHASE=MATO
; allows processing of work matrices prior to them being written to the MATO files
; at the end of each Origin zone (Optional)
;ENDPROCESS
ENDRUN
```



TNPTR00K.S

```
; Script for program PUBLIC TRANSPORT in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNPTR00B.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=PUBLIC TRANSPORT PRNFILE="{SCENARIO_DIR}\output\TNPTR00H.PRN" MSG='MD Auto Access'
FILEI NETI = "{SCENARIO_DIR}\output\UNLOADED.NET"
FILEI LOOKUPI[1] = "{CATALOG_DIR}\Parameters\SPDCRV.CSV"
FILEO REPORTO = "{SCENARIO_DIR}\output\TNPTR00E.PRN"
FILEO MATO[1] = "{SCENARIO_DIR}\output\AUTOMD.MAT",
 MO=1-11, NAME=TIME1M,TIME2M,TIME3M,TIME4M,TIME6M,TIME8M,IWAIT,XWAIT,IVTT,OVTT,FARE
```

```
FILEI FACTORI[1] = "{CATALOG_DIR}\Parameters\ALACHUAPNR.FAC"
FILEI FAREI = "{CATALOG_DIR}\parameters\ALACHUA.FAR"
FILEO ROUTEO[1] = "{SCENARIO_DIR}\output\AUTOALLMD.RTE",
 REPORTI=1-{zonesa}, REPORTJ={cbdzone}
FILEI SYSTEMI = "{CATALOG_DIR}\Parameters\ALACHUA.PTS"
FILEI LINEI[1] = "{SCENARIO_DIR}\input\troute20{YEAR}.lin"
FILEI TURNPENI = "{SCENARIO_DIR}\input\TCARDS.PEN"
FILEO NETO = "{SCENARIO_DIR}\output\TNETAUTOMD.NET"
PARAMETERS TRANTIME=(LI.TIME*1.5), ;GENERIC TRANSIT VS. AUTO RUN TIME
           TRANTIME[4]=LW.LBTIME,    ; MODE SPECIFIC TRANSIT VS. AUTO RUN TIME
           TRANTIME[6]=LW.EBTIME,    ; CREATED THROUGH A LOOKUP FUNCTION
           TRANTIME[8]=LW.RLTIME,
           FARE=F, USERCLASSES=1,    MAPSCALE={UNITS}

           HDWAYPERIOD=2

REPORT LINES=T

;PROCESS PHASE=NODEREAD
; loops over all nodes computes node based scalar and array variables (Optional)


;ENDPROCESS
;
PROCESS PHASE=LINKREAD
   LW.WALKTIME=60*LI.DISTANCE/{walkspeed}
   IF (LI.TIME>0) LW.SPEED=60*LI.DISTANCE/LI.TIME
   LOOKUP, NAME=CURVES, LOOKUP[1]=1, RESULT=2, LOOKUP[2]=1, RESULT=3, LOOKUP[3]=1, RESULT=4,
           INTERPOLATE=Y, LOOKUPI=1
   IF (LI.FTYPE=10-19,80-99) ; FREE FLOW CONDITIONS FOR ALL
       LW.LBCURVE=1,LW.EBCURVE=1,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=10-19) ; BUSSES HITTING RESISTANCE, RAIL NO CONFLICTS (GRADE
SEP)
       LW.LBCURVE=2,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=20-29) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=3,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=30-39) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=3,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=40-49) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=2,LW.EBCURVE=2,LW.RLCURVE=1
   ELSEIF (LI.FTYPE=20-79&LI.ATYPE=50-59) ; BUSSES HITTING RESISTANCE(LB MORE), RAIL NO CONFLICTS
       LW.LBCURVE=2,LW.EBCURVE=1,LW.RLCURVE=1
   ENDIF
       LW.LBSPEED=CURVES(LW.LBCURVE,LW.SPEED)
       LW.EBSPEED=CURVES(LW.EBCURVE,LW.SPEED)
       LW.RLSPEED=CURVES(LW.RLCURVE,LW.SPEED)
       LW.LBTIME=60*LI.DISTANCE/LW.LBSPEED
       LW.EBTIME=60*LI.DISTANCE/LW.EBSPEED
       LW.RLTIME=60*LI.DISTANCE/LW.RLSPEED
       TRANTIME[4]=LW.LBTIME
       TRANTIME[6]=LW.EBTIME
       TRANTIME[8]=LW.RLTIME

ENDPROCESS

PROCESS PHASE=DATAPREP
; AUTO ACCESS
READ,
 FILE = "{SCENARIO_DIR}\OUTPUT\MD_STATDATA.CSV"
; WALK EGRESS
  GENERATE, COST=(LW.WALKTIME),MAXCOST=103*24.0,LIST=T,NTLEGMODE=101,
            DIRECTION=2, FROMNODE=1-{zonesa}, TONODE=1000-99999
; WALK CONNECTORS
  GENERATE, COST=(LW.WALKTIME),MAXCOST=103*12,LIST=T,NTLEGMODE = 3,DIRECTION=3,
            FROMNODE=1000-99999, TONODE=1000-99999

ENDPROCESS

;PROCESS PHASE=MATI
; manipulates input and work matrices prior to processing each Origin zone, I (Optional)
```

```
;ENDPROCESS

;PROCESS PHASE=SELECTIJ
; allows finer selection of zone pairs, IJ, for Route Evaluation, and the setting
; or revising of trips for Loading (Optional)

;ENDPROCESS

PROCESS PHASE=SKIMIJ
  MW[1]=TIMEA(0,1,101)
  MW[2]=TIMEA(0,2,102)
  MW[3]=TIMEA(0,3)
  MW[4]=TIMEA(0,4)
  MW[5]=TIMEA(0,6)
  MW[6]=TIMEA(0,8)
  MW[7]=IWAITA(0)
  MW[8]=XWAITA(0)
  MW[9]=TIMEA(0,TMODES)
  MW[10]=TIMEA(0,NTMODES)
  MW[11]=FAREA(0,ALLMODES)

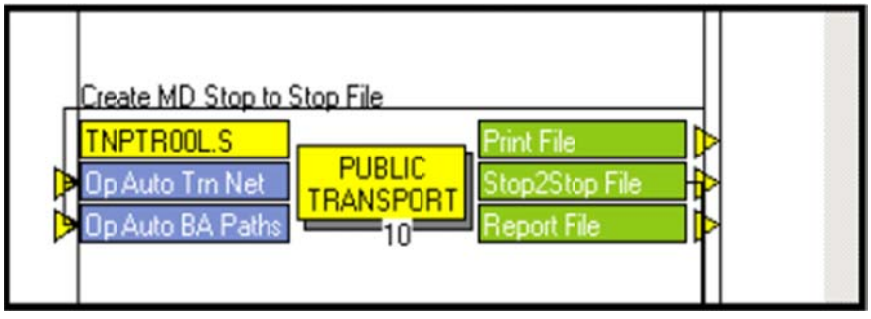
;VARIOUS THINGS THAT CAN BE SKIMMED
/*
  COMPCOST(RouteSet)       Skims Composite Costs
  ValOfChoice(RouteSet)    Skims Value of Choice
  IWAITA(RouteSet)         Skims Initial Wait Times Actual
  XWAITA(RouteSet)         Skims Transfer Wait Times Actual
  IWAITP(RouteSet)         Skims Initial Wait Times Perceived
  XWAITP(RouteSet)         Skims Initial Transfer Times Perceived
  TIMEA(RouteSet, Mode)    Skims Travel Time Actual
  TIMEP(RouteSet, Mode)    Skims Travel Time Perceived
  XFERPENA(RouteSet, Mode) Skims Transfer Penalty Actual
  XFERPENP(RouteSet, Mode) Skims Transfer Penalty Actual
  DIST(RouteSet, Mode)     Skims Distance
  BRDINGS(RouteSet, Mode)  Skims Number of Boardings (xfers+1)
  BESTJRNY                 Skims Best Journey Times

  FAREA(RouteSet, Mode)    Skims Fares in Monetary units
  FAREP(RouteSet, Mode)    Skims Fares in Generalized Time units
*/

ENDPROCESS
;PROCESS PHASE=MATO
; allows processing of work matrices prior to them being written to the MATO files
; at the end of each Origin zone (Optional)

;ENDPROCESS

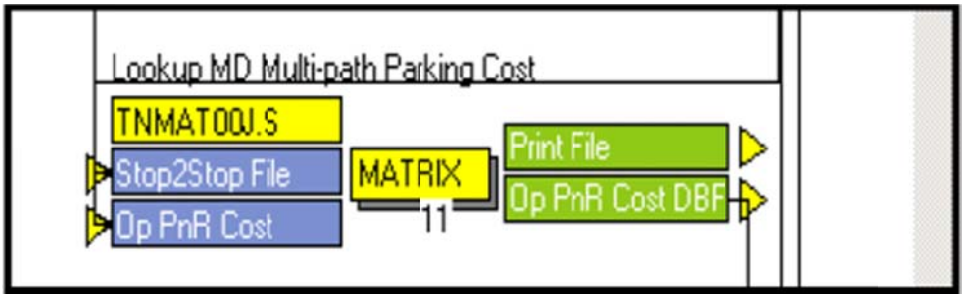
ENDRUN
```



TNPTR00L.S

```
; Script for program PUBLIC TRANSPORT in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNPTR00F.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
```

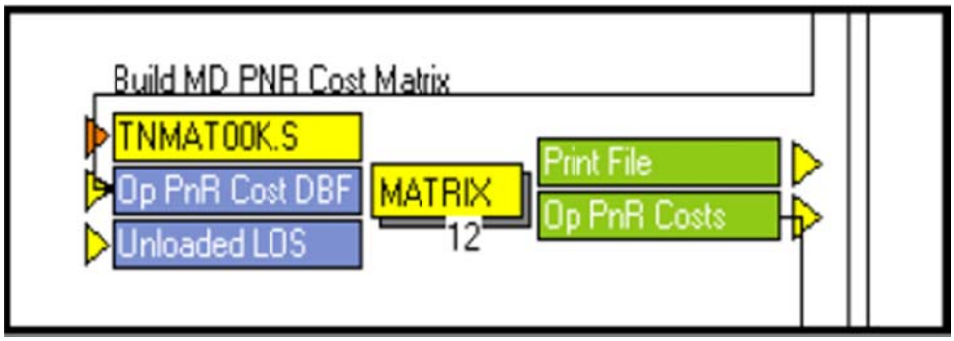
```
RUN PGM=PUBLIC TRANSPORT PRNFILE="{SCENARIO_DIR}\output\TNPTR00K.PRN" MSG='Create MD Stop to Stop
File'
FILEI ROUTEI[1] = "{SCENARIO_DIR}\output\AUTOALLMD.RTE"
FILEI NETI = "{SCENARIO_DIR}\output\TNETAUTOMD.NET"
FILEO REPORTO = "{SCENARIO_DIR}\output\TNPTR00L.PRN"
FILEO STOP2STOPO = "{SCENARIO_DIR}\output\TNPTR00C.DBF",
 ACCUMULATE=FIRSTLAST, NODES=1-99999
PARAMETERS HDWAYPERIOD=2,
           TRIPSIJ[1]=100,
           NOROUTEERRS=999999999
ENDRUN
```



TNMAT00J.S

```
; Script for program MATRIX in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNMAT00D.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\TNMAT00D.PRN" MSG='Lookup MD Multi-path Parking
Cost'
FILEI RECI = "{SCENARIO_DIR}\output\TNPTR00C.DBF"
FILEO RECO[1] = "{SCENARIO_DIR}\output\MDPCOST.DBF",
 FIELDS=ORZ,DSZ,MA,MEANCOST,MB,STNZONE,MC,CNT
FILEI LOOKUPI[1] = "{SCENARIO_DIR}\output\OPPNRCOST.CSV"
LOOKUP, NAME=STATIONS, LOOKUP[1]=1, RESULT=2, LOOKUP[2]=1, RESULT=3, INTERPOLATE=F, FAIL[1]=0,
FAIL[2]=0, LOOKUPI=1
  RO.ORZ=RI.I
  RO.DSZ=RI.J
  statnode=ri.fromnode
  RO.MA=1
  RO.MB=2
  RO.MC=3
  RO.CNT=1
  PCOST=STATIONS(1,statnode)
  RO.STNZONE=STATIONS(2,STATNODE)
  meancost=PCOST*ri.vol/100

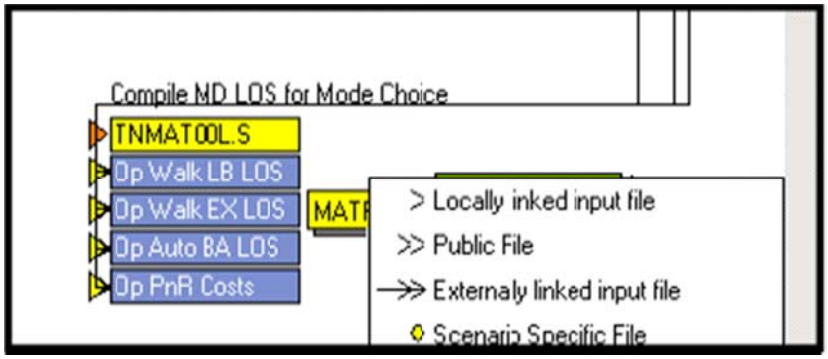
WRITE RECO=1
ENDRUN
```



TNMAT00K.S

```
; Script for program MATRIX in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNMAT00F.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\TNMAT00F.PRN" MSG='Build MD PNR Cost Matrix'
FILEI MATI[2] = "{SCENARIO_DIR}\Output\FHSKIMS.{ALT}{YEAR}.MAT"
FILEI MATI[1] = "{SCENARIO_DIR}\output\MDPCOST.DBF",
PATTERN=IJ:MV, FIELDS=ORZ,DSZ,MA,MEANCOST,MB,STNZONE,MC,CNT
FILEO MATO[1] = "{SCENARIO_DIR}\output\OPPNRCOST.MAT",
 MO=1-4,13,14 NAME=PKPNRCOST,STNZONE,STNTIME,STNDIST,FREQUENCY,TERMTIME

PAR ZONEMSG=100 ZONES={ZONESA}
MW[1]=MI.1.1 ; PNR COST
MW[2]=MI.1.2 ; STNZONE
MW[13]=MI.1.3 ; FREQENCY COUNT
MW[14]=MI.2.TERMINALTIME
MW[10]=MI.2.TIME
MW[11]=MI.2.DISTANCE
jloop
  IF (MW[13]>0)
     MW[2]=MW[2]/MW[13]
     STNZONE=MW[2]
     TIME=MW[10]
     DISTANCE=MW[11]
     MW[3]=TIME, MW[4]=DISTANCE
  ENDIF
endjloop
PAR ZONES={ZONESA}
MW[1]=MI.1.1
ENDRUN
```



TNMAT00L.S

```
; Script for program MATRIX in file "C:\FSUTMS\DISTRICT2\ALACHUA\TNMAT00B.S"
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\TNMAT00B.PRN" MSG='Compile MD LOS for Mode Choice'
FILEI MATI[4] = "{SCENARIO_DIR}\output\OPPNRCOST.MAT"
FILEI MATI[3] = "{SCENARIO_DIR}\output\AUTOMD.MAT"
FILEI MATI[2] = "{SCENARIO_DIR}\output\WALKPREMMD.MAT"
FILEI MATI[1] = "{SCENARIO_DIR}\output\WALKMD.MAT"
FILEO MATO[1] = "{SCENARIO_DIR}\output\OP TRN LOS.MAT",
MO=1-5,11-15,21-25,
NAME=OPWKTIMELB,OPWTTIMELB,OPIVTIMELB,OPPKCOSTLB,OPOPCOSTLB,
OPWKTIMEEX,OPWTTIMEEX,OPIVTIMEEX,OPPKCOSTEX,OPOPCOSTEX,
OPWKTIMEBA,OPWTTIMEBA,OPIVTIMEBA,OPPKCOSTBA,OPOPCOSTBA DEC=15*D

par zonemsg=100

JLOOP

IF (MI.1.TIME6M=0&MI.1.TIME8M=0)
   MW[001]=mi.1.ovtt+mi.4.termtime
   MW[002]=mi.1.iwait+mi.1.xwait
   MW[003]=mi.1.ivtt
   MW[004]=0 ; no parking cost for walk modes
```

```
   MW[005]=mi.1.fare
ELSE
   MW[003]=999999
ENDIF

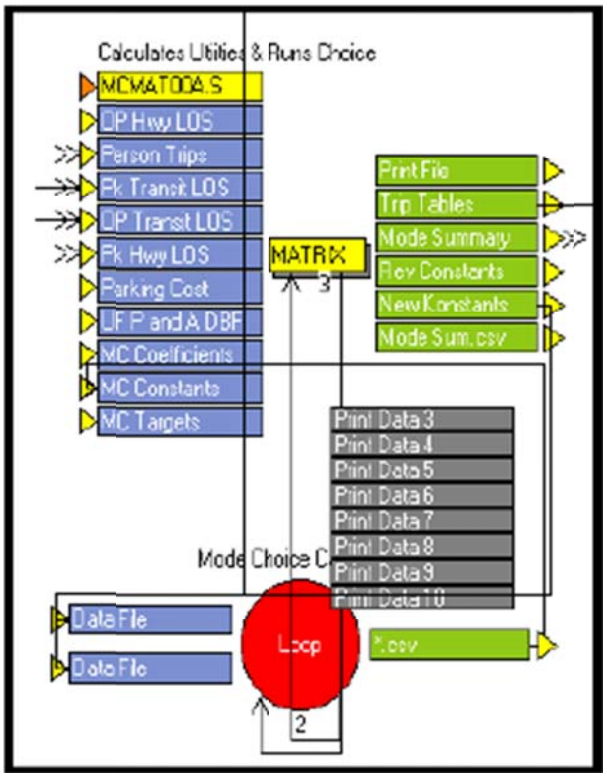
; NEXT PROCESS WALK TO EXPRESS SERVICE

IF (MI.1.TIME6M>0|MI.1.TIME8M>0)
   MW[011]=mi.2.ovtt+mi.4.termtime
   MW[012]=mi.2.iwait+mi.2.xwait
   MW[013]=mi.2.ivtt
   MW[014]=0 ; no parking cost for walk modes
   MW[015]=mi.1.fare
ELSE
   MW[013]=999999
ENDIF

; NEXT PROCESS DRIVE TO BEST AVAILABLE
IF (mi.3.ivtt>0)
   MW[021]=mi.3.ovtt+mi.4.termtime
   MW[022]=mi.3.iwait+mi.3.xwait
   MW[023]=mi.3.ivtt+mi.4.stntime
   MW[024]=mi.4.pkpnrcost+(mi.4.stndist*{hwyopcost})
   MW[025]=mi.3.fare
ELSE
   MW[023]=999999
ENDIF

ENDJLOOP
ENDRUN
```

Mode Choice Step



MCMAT00A.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\MCMAT00A.PRN" MSG='Calculates Utiities & Runs
Choice'
FILEI MATI[1] = "{SCENARIO_DIR}\output\FHSKIMS.{ALT}{YEAR}.MAT"
FILEI ZDATI[3] = "{SCENARIO_DIR}\output\UFPANDA.DBF"
FILEI MATI[5] = "{SCENARIO_DIR}\output\RHSKIMS.MAT"
FILEI MATI[4] = "{SCENARIO_DIR}\output\OP TRN LOS.MAT"
FILEI MATI[3] = "{SCENARIO_DIR}\output\PEAK TRN LOS.MAT"
FILEI MATI[2] = "{SCENARIO_DIR}\output\PTRIPS.MAT"
FILEO PRINTO[4] = "{SCENARIO_DIR}\output\MODE SUM.CSV"
FILEI ZDATI[1] = "{SCENARIO_DIR}\input\ZoneData{YEAR}.DBF",
Z=TAZ_20{year}
FILEI LOOKUPI[2] = "{SCENARIO_DIR}\output\MCLOO00C.CSV"
FILEO PRINTO[3] = "{SCENARIO_DIR}\output\NEWK.CSV"
FILEI LOOKUPI[3] = "{CATALOG_DIR}\parameters\MC_TARGETS.CSV"
FILEO PRINTO[2] = "{SCENARIO_DIR}\output\REV_MODE_CONST.CSV"
FILEO PRINTO[1] = "{SCENARIO_DIR}\output\MODE SUMMARY.PRN"
FILEO MATO[2] = "{SCENARIO_DIR}\output\MODEOUT.MAT",
mo=151-158,161-168,171-178,181-188,191-193,
 name=HBWDA,HBWCP,HBWCX,HBWWB,HBWWX,HBWBA,HBWWK,HBWBK,
      HBODA,HBOCP,HBOCX,HBOWB,HBOWX,HBOBA,HBOWK,HBOBK,
      NHBDA,NHBCP,NHBCX,NHBWB,NHBWX,NHBBA,NHBWK,NHBBK,
      HBUDA,HBUCP,HBUCX,HBUWB,HBUWX,HBUBA,HBUWK,HBUBK,
      HDORMUWB,HDORMUWK,HDORMUBK, DEC=24*S
FILEI LOOKUPI[1] = "{CATALOG_DIR}\parameters\MC_COEFFICIENTS.CSV"
par zonemsg=100

; THE JOB OF THIS SCRIPT IS TO TURN THE COMPONENTS OF UTILITY FOR EACH MODE IN THE MODE CHOICE
; MODEL INTO A COMPOSITE UTILITY.  BECAUSE THE MODEL IS NESTED, WITH NESTING COEFFICIENTS APPLIED
; IN THE MODE CHOICE MODE, THE INPUT UTILITIES SHOULD BE DIVIDED BY THE PRODUCT OF THE NESTING
COEFFICIENTS.

; MARKET SEGMENTS ARE:
; 0 CAR HOUSEHOLDS
; 1 OR MORE CAR HOUSEHOLDS
; UNIVERSITY STUDENTS

; TRIP PURPOSES ARE:
; 1 HBW (AM PEAK LOS MATRICES)
; 2 HBO (MD OFF-PEAK LOS)
; 3 NHB (MD OFF-PEAK LOS)
; 4 HBU (MD OFF-PEAK LOS)
; 5 HDORMU (choice set: walk, bike, MD walk-local BUS)
  MW[1]=MI.2.HBW
  MW[2]=MI.2.HBSH+MI.2.HBSR+MI.2.HBO
  MW[3]=MI.2.NHB
  MW[4]=MI.2.HBU
  MW[5]=MI.2.HDORMU

; THE AUTO DIVISOR IS NESTCMOTOR*NESTCAUTO
  NESTMOTOR={NESTCMOTOR}*{NESTCAUTO}
; THE TRANSIT DIVISOR IS NESTCMOTOR*NESTCTRANSIT
  NESTTRANSIT={NESTCMOTOR}*{NESTCTRANSIT}
  NESTNONMOTOR={NESTCNONMOTOR}

;Coefficients
lookup, name=coefficients,
lookup[1]=1, result=2, lookup[2]=1, result=3, lookup[3]=1, result=4, lookup[4]=1, result=5,
interpolate=n, LIST=Y, lookupi=1
; civt-IN VEHICLE TIME COEFFICIENT
HBWCIVT=COEFFICIENTS(1,1), HBOCIVT=COEFFICIENTS(2,1), NHBCIVT=COEFFICIENTS(3,1),
UNICIVT=COEFFICIENTS(4,1)
; covt-OUT OF VEHICLE TIME COEFFICIENT
HBWCOVT=COEFFICIENTS(1,2), HBOCOVT=COEFFICIENTS(2,2), NHBCOVT=COEFFICIENTS(3,2),
UNICOVT=COEFFICIENTS(4,2)
; ccst-COST COEFFICIENT (cents)
HBWCCST=COEFFICIENTS(1,3), HBOCCST=COEFFICIENTS(2,3), NHBCCST=COEFFICIENTS(3,3),
UNICCST=COEFFICIENTS(4,3)
; cwt-WALK ONLY COEFFICIENT
```

```
HBWCWT=COEFFICIENTS(1,4),  HBOCWT=COEFFICIENTS(2,4),  NHBCWT=COEFFICIENTS(3,4),
UNICWT=COEFFICIENTS(4,4)
; cbt-BIKE ONLY COEFFICIENT
HBWCBT=COEFFICIENTS(1,5),  HBOCBT=COEFFICIENTS(2,5),  NHBCBT=COEFFICIENTS(3,5),
UNICBT=COEFFICIENTS(4,5)
; pti-Walk to transit PEV i
HBWPTI=COEFFICIENTS(1,6),  HBOPTI=COEFFICIENTS(2,6),  NHBPTI=COEFFICIENTS(3,6),
UNIPTI=COEFFICIENTS(4,6)
; pwi-Walk PEV i
HBWPWI=COEFFICIENTS(1,7),  HBOPWI=COEFFICIENTS(2,7),  NHBPWI=COEFFICIENTS(3,7),
UNIPWI=COEFFICIENTS(4,7)
; pwi-Walk PEV J
HBWPWJ=COEFFICIENTS(1,8),  HBOPWJ=COEFFICIENTS(2,8),  NHBPWJ=COEFFICIENTS(3,8),
UNIPWJ=COEFFICIENTS(4,8)
; pbi-BIKE PEV i
HBWPBI=COEFFICIENTS(1,9),  HBOPBI=COEFFICIENTS(2,9),  NHBPBI=COEFFICIENTS(3,9),
UNIPBI=COEFFICIENTS(4,9)
; pbi-BIKE PEV J
HBWPBJ=COEFFICIENTS(1,10), HBOPBJ=COEFFICIENTS(2,10), NHBPBJ=COEFFICIENTS(3,10),
UNIPBJ=COEFFICIENTS(4,10)

;Constants
;3*HBW,HBO,NHB,Constants for 0 car, 1+car and student, rows=mode=da,cp,cx,wl,wx,ab,wk,bk
lookup, name=constants,
lookup[1]=1, result=2, lookup[2]=1, result=3, lookup[3]=1, result=4,
lookup[4]=1, result=5, lookup[5]=1, result=6, lookup[6]=1, result=7,
lookup[7]=1, result=8,lookup[8]=1, result=9,lookup[9]=1, result=10,
interpolate=n, , LIST=Y, lookupi=2
;K=CONSTANT, FOLLOWED BY TRIP PURPOSE FOLLOWED BY MODE
;  DRIVE ALONE
K1_NC_DA=CONSTANTS(1,1), K2_NC_DA=CONSTANTS(4,1), K3_NC_DA=CONSTANTS(7,1),
K4_NC_DA=CONSTANTS(8,1)
K1_WC_DA=CONSTANTS(2,1), K2_WC_DA=CONSTANTS(5,1)                          ,
K5_NC_DA=CONSTANTS(9,1)
K1_ST_DA=CONSTANTS(3,1), K2_ST_DA=CONSTANTS(6,1)
;  2  CARPOOL
K1_NC_CP=CONSTANTS(1,2), K2_NC_CP=CONSTANTS(4,2), K3_NC_CP=CONSTANTS(7,2),
K4_NC_CP=CONSTANTS(8,2)
K1_WC_CP=CONSTANTS(2,2), K2_WC_CP=CONSTANTS(5,2)                          ,
K5_NC_CP=CONSTANTS(9,2)

K1_ST_CP=CONSTANTS(3,2), K2_ST_CP=CONSTANTS(6,2)
;  3+ CARPOOL
K1_NC_CX=CONSTANTS(1,3), K2_NC_CX=CONSTANTS(4,3), K3_NC_CX=CONSTANTS(7,3),
K4_NC_CX=CONSTANTS(8,3)
K1_WC_CX=CONSTANTS(2,3), K2_WC_CX=CONSTANTS(5,3)                          ,
K5_NC_CX=CONSTANTS(9,3)
K1_ST_CX=CONSTANTS(3,3), K2_ST_CX=CONSTANTS(6,3)
;  WALK TO BUS
K1_NC_WB=CONSTANTS(1,4), K2_NC_WB=CONSTANTS(4,4), K3_NC_WB=CONSTANTS(7,4),
K4_NC_WB=CONSTANTS(8,4)
K1_WC_WB=CONSTANTS(2,4), K2_WC_WB=CONSTANTS(5,4)                          ,
K5_NC_WB=CONSTANTS(9,4)
K1_ST_WB=CONSTANTS(3,4), K2_ST_WB=CONSTANTS(6,4)
;  WALK TO PREMIUM TRANSIT
K1_NC_WX=CONSTANTS(1,5), K2_NC_WX=CONSTANTS(4,5), K3_NC_WX=CONSTANTS(7,5),
K4_NC_WX=CONSTANTS(8,5)
K1_WC_WX=CONSTANTS(2,5), K2_WC_WX=CONSTANTS(5,5)                          ,
K5_NC_WX=CONSTANTS(9,5)
K1_ST_WX=CONSTANTS(3,5), K2_ST_WX=CONSTANTS(6,5)
;  AUTO TO TRANSIT
K1_NC_BA=CONSTANTS(1,6), K2_NC_BA=CONSTANTS(4,6), K3_NC_BA=CONSTANTS(7,6),
K4_NC_BA=CONSTANTS(8,6)
K1_WC_BA=CONSTANTS(2,6), K2_WC_BA=CONSTANTS(5,6)                          ,
K5_NC_BA=CONSTANTS(9,6)
K1_ST_BA=CONSTANTS(3,6), K2_ST_BA=CONSTANTS(6,6)
;  WALK ONLY
K1_NC_WK=CONSTANTS(1,7), K2_NC_WK=CONSTANTS(4,7), K3_NC_WK=CONSTANTS(7,7),
K4_NC_WK=CONSTANTS(8,7)
K1_WC_WK=CONSTANTS(2,7), K2_WC_WK=CONSTANTS(5,7)                          ,
K5_NC_WK=CONSTANTS(9,7)
```

```
K1_ST_WK=CONSTANTS(3,7), K2_ST_WK=CONSTANTS(6,7)
;  BIKE ONLY
K1_NC_BK=CONSTANTS(1,8), K2_NC_BK=CONSTANTS(4,8), K3_NC_BK=CONSTANTS(7,8),
K4_NC_BK=CONSTANTS(8,8)
K1_WC_BK=CONSTANTS(2,8), K2_WC_BK=CONSTANTS(5,8)                          ,
K5_NC_BK=CONSTANTS(9,8)
K1_ST_BK=CONSTANTS(3,8), K2_ST_BK=CONSTANTS(6,8)

;TARGETS
;3*HBW,HBO,NHB,Targets for 0 car, 1+car and student, rows=mode=da,cp,cx,wl,wx,ab,wk,bk
lookup, name=targ,
lookup[1]=1, result=2, lookup[2]=1, result=3, lookup[3]=1, result=4,
lookup[4]=1, result=5, lookup[5]=1, result=6, lookup[6]=1, result=7,
lookup[7]=1, result=8,lookup[8]=1, result=9,lookup[9]=1, result=10,
interpolate=n, , LIST=Y, lookupi=3
;t=Target, FOLLOWED BY TRIP PURPOSE FOLLOWED BY MODE
;  DRIVE ALONE
t1_NC_DA=targ(1,1), t2_NC_DA=targ(4,1), t3_NC_DA=targ(7,1), t4_NC_DA=targ(8,1)
t1_WC_DA=targ(2,1), t2_WC_DA=targ(5,1)                    , t5_NC_DA=targ(9,1)
t1_ST_DA=targ(3,1), t2_ST_DA=targ(6,1)
;  2  CARPOOL
t1_NC_CP=targ(1,2), t2_NC_CP=targ(4,2), t3_NC_CP=targ(7,2), t4_NC_CP=targ(8,2)
t1_WC_CP=targ(2,2), t2_WC_CP=targ(5,2)                    , t5_NC_CP=targ(9,2)
t1_ST_CP=targ(3,2), t2_ST_CP=targ(6,2)
;  3+ CARPOOL
t1_NC_CX=targ(1,3), t2_NC_CX=targ(4,3), t3_NC_CX=targ(7,3), t4_NC_CX=targ(8,3)
t1_WC_CX=targ(2,3), t2_WC_CX=targ(5,3)                    , t5_NC_CX=targ(9,3)
t1_ST_CX=targ(3,3), t2_ST_CX=targ(6,3)
;  WALK TO BUS
t1_NC_WB=targ(1,4), t2_NC_WB=targ(4,4), t3_NC_WB=targ(7,4), t4_NC_WB=targ(8,4)
t1_WC_WB=targ(2,4), t2_WC_WB=targ(5,4)                    , t5_NC_WB=targ(9,4)
t1_ST_WB=targ(3,4), t2_ST_WB=targ(6,4)
;  WALK TO PREMIUM TRANSIT
t1_NC_WX=targ(1,5), t2_NC_WX=targ(4,5), t3_NC_WX=targ(7,5), t4_NC_WX=targ(8,5)
t1_WC_WX=targ(2,5), t2_WC_WX=targ(5,5)                    , t5_NC_WX=targ(9,5)
t1_ST_WX=targ(3,5), t2_ST_WX=targ(6,5)
;  AUTO TO TRANSIT
t1_NC_BA=targ(1,6), t2_NC_BA=targ(4,6), t3_NC_BA=targ(7,6), t4_NC_BA=targ(8,6)
t1_WC_BA=targ(2,6), t2_WC_BA=targ(5,6)                    , t5_NC_BA=targ(9,6)
t1_ST_BA=targ(3,6), t2_ST_BA=targ(6,6)
;  WALK ONLY
t1_NC_WK=targ(1,7), t2_NC_WK=targ(4,7), t3_NC_WK=targ(7,7), t4_NC_WK=targ(8,7)
t1_WC_WK=targ(2,7), t2_WC_WK=targ(5,7)                    , t5_NC_WK=targ(9,7)
t1_ST_WK=targ(3,7), t2_ST_WK=targ(6,7)
;  BIKE ONLY
t1_NC_BK=targ(1,8), t2_NC_BK=targ(4,8), t3_NC_BK=targ(7,8), t4_NC_BK=targ(8,8)
t1_WC_BK=targ(2,8), t2_WC_BK=targ(5,8)                    , t5_NC_BK=targ(9,8)
t1_ST_BK=targ(3,8), t2_ST_BK=targ(6,8)

; COST UNITS
; assume parking costs are in cents, both for auto and PnR lots
; assume fares are in dollars, so multiply by 100.
; assume auto operating costs are in dollars, so multiply by 100.

; Bus fare factor
; Difference of bus fare factors between year 2007 (1.0) and
; future scenarios (1.5) will be reduced to 10% of actual difference amount
; due to significant impact from this bus fare increase since year 2007 ($1.00 to $1.50).
busfarefac=1+(({BUSFAREFAC}-1)*0.10)

    JLOOP
; ============================================================================
; HBW (PEAK) TRIP PURPOSE
; ============================================================================

  ;   PEAK PERIOD DRIVE ALONE ELEMENTS OF UTILITY ARE:
  ;   WALK TIME
      MW[11]=(MI.5.TERMINALTIME)*HBWCOVT
  ;   WAIT TIME
      ;MW[12]=(0)*HBWCOVT
  ;   IVTT
```

```
     MW[13]=(MI.5.TIME)*HBWCIVT
;    PARKING COST - ONLY AT DESTINATION (J), HALF IN EACH DIRECTION
     MW[14]=0.5 * ZI.1.LONGPARK[J] * HBWCCST
;    OTHER COST
     MW[15]=MI.5.DISTANCE * {HWYOPCOST} * 100 * HBWCCST
;    COMPOSITE UTILITY
     ;MW[021]=(MW[11]+ MW[13]+MW[14]+MW[15]+K1_NC_DA)/NESTMOTOR
     MW[031]=(MW[11]+ MW[13]+MW[14]+MW[15]+K1_WC_DA)/NESTMOTOR
     MW[041]=(MW[11]+ MW[13]+MW[14]+MW[15]+K1_ST_DA)/NESTMOTOR


;    PEAK PERIOD CARPOOL2 ELEMENTS OF UTILITY ARE:
;    WALK TIME
     MW[11]=(MI.5.TERMINALTIME)*HBWCOVT
;    WAIT TIME
     ;MW[12]=(0)*HBWCOVT
;    IVTT
     MW[13]=(MI.5.TIME)*HBWCIVT
;    PARKING COST - ONLY AT DESTINATION (J), HALF IN EACH DIRECTION, SHARED BY 2 = 0.25
     MW[14]=0.25 * ZI.1.LONGPARK[J] * HBWCCST
;    OTHER COST
     MW[15]= 0.50 * MI.5.DISTANCE * {HWYOPCOST} * 100 * HBWCCST
;    COMPOSITE UTILITY
     MW[022]=(MW[11]+ MW[13]+MW[14]+MW[15]+K1_NC_CP)/NESTMOTOR
     MW[032]=(MW[11]+ MW[13]+MW[14]+MW[15]+K1_WC_CP)/NESTMOTOR
     MW[042]=(MW[11]+ MW[13]+MW[14]+MW[15]+K1_ST_CP)/NESTMOTOR


;    PEAK PERIOD CARPOOL3 ALONE ELEMENTS OF UTILITY ARE:
;    WALK TIME
     MW[11]=(MI.5.TERMINALTIME)*HBWCOVT
;    WAIT TIME
     ;MW[12]=(0)*HBWCOVT
;    IVTT
     MW[13]=(MI.5.TIME)*HBWCIVT
;    PARKING COST - ONLY AT DESTINATION (J), HALF IN EACH DIRECTION, SHARED BY {hbw3p}
     MW[14]=0.5 * ZI.1.LONGPARK[J] * HBWCCST/{hbw3p}
;    OTHER COST
     MW[15]=MI.5.DISTANCE*{HWYOPCOST} * 100 *HBWCCST/{hbw3p}
;    COMPOSITE UTILITY
     MW[023]=(MW[11]+ MW[13]+MW[14]+MW[15]+K1_NC_CX)/NESTMOTOR
     MW[033]=(MW[11]+ MW[13]+MW[14]+MW[15]+K1_WC_CX)/NESTMOTOR
     MW[043]=(MW[11]+ MW[13]+MW[14]+MW[15]+K1_ST_CX)/NESTMOTOR

;    PEAK PERIOD WALK TO LOCAL BUS ELEMENTS OF UTILITY ARE:
;    WALK TIME
     MW[11]=(mi.3.pkwktimelb)*HBWCOVT
;    WAIT TIME
     MW[12]=(mi.3.pkwttimelb)*HBWCOVT
;    IVTT
     MW[13]=(mi.3.pkivtimelb)*HBWCIVT
     if (mw[13]=0) mw[13]=-9999
;    PARKING COST
     MW[14]=(mi.3.pkpkcostlb)*HBWCCST
;    OTHER COST - t
     MW[15]=(mi.3.pkopcostlb*100*0.25*busfarefac)*HBWCCST
                                                  ; CS applied 25% (discounted) bus fare
                                                  ; due to employee pass program
;    PEDESTRIAN ENVIRONMENT
     MW[16]=HBWPTI * ZI.1.SUM[I]*0.25
;    COMPOSITE UTILITY
     MW[024]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K1_NC_WB)/NESTTRANSIT
     MW[034]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K1_WC_WB)/NESTTRANSIT
     MW[044]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K1_ST_WB)/NESTTRANSIT

;    PEAK PERIOD WALK TO PREMIUM TRANSIT ELEMENTS OF UTILITY ARE:
;    WALK TIME
     MW[11]=(mi.3.pkwktimeex)*HBWCOVT
;    WAIT TIME
     MW[12]=(mi.3.pkwttimeex)*HBWCOVT
;    IVTT
```

```
      MW[13]=(mi.3.pkivtimeex)*HBWCIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.3.pkpkcostex)*HBWCCST
  ;   OTHER COST - FARE
      MW[15]=(mi.3.pkopcostex * 100)*HBWCCST
  ;   PEDESTRIAN ENVIRONMENT
      MW[16]=HBWPTI * ZI.1.SUM[I]*0.25
  ;   COMPOSITE UTILITY
      MW[025]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K1_NC_WX)/NESTTRANSIT
      MW[035]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K1_WC_WX)/NESTTRANSIT
      MW[045]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K1_ST_WX)/NESTTRANSIT

  ;   PEAK PERIOD AUTO TO BEST AVAILABLE TRANSIT ELEMENTS OF UTILITY ARE:
  ;   WALK TIME
      MW[11]=(mi.3.pkwktimeba)*HBWCOVT
  ;   WAIT TIME
      MW[12]=(mi.3.pkwttimeba)*HBWCOVT
  ;   IVTT
      MW[13]=(mi.3.pkivtimeba)*HBWCIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.3.pkpkcostba)*HBWCCST
  ;   OTHER COST - FARE
      MW[15]=(mi.3.pkopcostba * 100)*HBWCCST
  ;   COMPOSITE UTILITY
      MW[026]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+K1_NC_BA)/NESTTRANSIT
      MW[036]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+K1_WC_BA)/NESTTRANSIT
      MW[046]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+K1_ST_BA)/NESTTRANSIT

; ============================================================================
; HBO, NHB, HBU AND HDORMU (OFF-PEAK) TRIP PURPOSES
; ============================================================================
  ;   OFF-PEAK PERIOD DRIVE ALONE ELEMENTS OF UTILITY ARE:
  ;   -- HBO --
  ;   WALK TIME
      MW[11]=(MI.5.TERMINALTIME)*HBOCOVT
  ;   WAIT TIME
      ;MW[12]=(0)*HBOCOVT
  ;   IVTT
      MW[13]=(MI.1.TIME)*HBOCIVT
  ;   PARKING COST - ONLY AT DESTINATION (J), HALF IN EACH DIRECTION
      MW[14]=0.5 * ZI.1.SHORTPARK[J] * HBOCCST
  ;   OTHER COST
      MW[15]=MI.1.DISTANCE * {HWYOPCOST} * 100 * HBOCCST
  ;   COMPOSITE UTILITY
      ;MW[051]=(MW[11]+MW[13]+MW[14]+MW[15]+K2_NC_DA)/NESTMOTOR
      MW[061]=(MW[11]+MW[13]+MW[14]+MW[15]+K2_WC_DA)/NESTMOTOR
      MW[071]=(MW[11]+MW[13]+MW[14]+MW[15]+K2_ST_DA)/NESTMOTOR

  ;   -- NHB --
  ;   WALK TIME
      MW[11]=(MI.5.TERMINALTIME)*NHBCOVT
  ;   WAIT TIME
      ;MW[12]=(0)*NHBCOVT
  ;   IVTT
      MW[13]=(MI.1.TIME)*NHBCIVT
  ;   PARKING COST - AVG ORIGIN AND DESTINATION
      MW[14]=0.5 * (ZI.1.SHORTPARK[I]+ZI.1.SHORTPARK[J]) * NHBCCST
  ;   OTHER COST
      MW[15]=MI.1.DISTANCE * {HWYOPCOST} * 100 * NHBCCST
  ;   COMPOSITE UTILITY
      MW[081]=(MW[11]+MW[13]+MW[14]+MW[15]+K3_NC_DA)/NESTMOTOR

  ;   -- HBU --
  ;   WALK TIME
      MW[11]=(MI.5.TERMINALTIME)*UNICOVT
  ;   WAIT TIME
      ;MW[12]=(0)*UNICOVT
  ;   IVTT
      MW[13]=(MI.1.TIME)*UNICIVT
```

```
;   PARKING COST - ONLY AT DESTINATION (J), HALF IN EACH DIRECTION
    MW[14]=0.5 * ZI.1.STUDENTPAR[J] * UNICCST ; university gets long term cost
;   OTHER COST
    MW[15]=MI.1.DISTANCE * {HWYOPCOST} * 100 * UNICCST
;   COMPOSITE UTILITY
    MW[101]=(MW[11]+MW[13]+MW[14]+MW[15]+K4_NC_DA)/NESTMOTOR

;   OFF-PEAK PERIOD CARPOOL2 ELEMENTS OF UTILITY ARE:
;   -- HBO --
;   WALK TIME
    MW[11]=(MI.5.TERMINALTIME)*HBOCOVT
;   WAIT TIME

    ;MW[12]=(0)*HBOCOVT
;   IVTT
    MW[13]=(MI.1.TIME)*HBOCIVT
;   PARKING COST - ONLY AT DESTINATION (J), HALF IN EACH DIRECTION

    MW[14]=0.25 * ZI.1.SHORTPARK[J] * HBOCCST
;   OTHER COST
    MW[15]=0.5 * MI.1.DISTANCE * {HWYOPCOST} * 100 * HBOCCST
;   COMPOSITE UTILITY
    MW[052]=(MW[11]+MW[13]+MW[14]+MW[15]+K2_NC_CP)/NESTMOTOR
    MW[062]=(MW[11]+MW[13]+MW[14]+MW[15]+K2_WC_CP)/NESTMOTOR
    MW[072]=(MW[11]+MW[13]+MW[14]+MW[15]+K2_ST_CP)/NESTMOTOR

;   -- NHB --
;   WALK TIME
    MW[11]=(MI.5.TERMINALTIME)*NHBCOVT
;   WAIT TIME
    ;MW[12]=(0)*NHBCOVT
;   IVTT
    MW[13]=(MI.1.TIME)*NHBCIVT
;   PARKING COST - ONLY AT DESTINATION (J), HALF IN EACH DIRECTION
    MW[14]=0.25 * (ZI.1.SHORTPARK[I]+ZI.1.SHORTPARK[J]) * NHBCCST
;   OTHER COST
    MW[15]=0.5 * MI.1.DISTANCE * {HWYOPCOST} * 100 * NHBCCST
;   COMPOSITE UTILITY
    MW[082]=(MW[11]+MW[13]+MW[14]+MW[15]+K3_NC_CP)/NESTMOTOR

;   -- HBU --
;   WALK TIME
    MW[11]=(MI.5.TERMINALTIME)*UNICOVT
;   WAIT TIME
    ;MW[12]=(0)*UNICOVT
;   IVTT
    MW[13]=(MI.1.TIME)*UNICIVT
;   PARKING COST - ONLY AT DESTINATION (J), HALF IN EACH DIRECTION
    MW[14]=0.25 * ZI.1.STUDENTPAR[J] * UNICCST ; university gets long term cost
;   OTHER COST
    MW[15]=0.5 * MI.1.DISTANCE * {HWYOPCOST} * 100 * UNICCST
;   COMPOSITE UTILITY
    MW[102]=(MW[11]+MW[13]+MW[14]+MW[15]+K4_NC_CP)/NESTMOTOR

;   OFF-PEAK PERIOD CARPOOL3 ELEMENTS OF UTILITY ARE:
;   -- HBO --
;   WALK TIME
    MW[11]=(MI.5.TERMINALTIME)*HBOCOVT
;   WAIT TIME
    ;MW[12]=(0)*HBOCOVT
;   IVTT
    MW[13]=(MI.1.TIME)*HBOCIVT
;   PARKING COST
    MW[14]=0.50 * ZI.1.SHORTPARK[J] * HBOCCST/{hbo3p}
;   OTHER COST
    MW[15]=(MI.1.DISTANCE*{HWYOPCOST} * 100)*HBOCCST/{hbo3p}
;   COMPOSITE UTILITY
    MW[053]=(MW[11]+MW[13]+MW[14]+MW[15]+K2_NC_CX)/NESTMOTOR
    MW[063]=(MW[11]+MW[13]+MW[14]+MW[15]+K2_WC_CX)/NESTMOTOR
    MW[073]=(MW[11]+MW[13]+MW[14]+MW[15]+K2_ST_CX)/NESTMOTOR
```

```
  ;   -- NHB --
  ;   WALK TIME
      MW[11]=(MI.5.TERMINALTIME)*NHBCOVT
  ;   WAIT TIME
      ;MW[12]=(0)*NHBCOVT
  ;   IVTT
      MW[13]=(MI.1.TIME)*NHBCIVT
  ;   PARKING COST
      MW[14]=0.50 * (ZI.1.SHORTPARK[I]+ZI.1.SHORTPARK[J]) * NHBCCST/{NHB3P}
  ;   OTHER COST
      MW[15]=(MI.1.DISTANCE*{HWYOPCOST} * 100)*NHBCCST/{NHB3P}
  ;   COMPOSITE UTILITY
      MW[083]=(MW[11]+MW[13]+MW[14]+MW[15]+K3_NC_CX)/NESTMOTOR

  ;   -- HBU --
  ;   WALK TIME
      MW[11]=(MI.5.TERMINALTIME)*UNICOVT
  ;   WAIT TIME
      ;MW[12]=(0)*UNICOVT
  ;   IVTT
      MW[13]=(MI.1.TIME)*UNICIVT
  ;   PARKING COST
      MW[14]=0.50 * ZI.1.STUDENTPAR[J] * UNICCST/{hbw3p} ; assume 3+ occ like work & Long park
cost
  ;   OTHER COST
      MW[15]=(MI.1.DISTANCE*{HWYOPCOST} * 100)*UNICCST/{hbw3p} ; assume 3+ occ like work
  ;   COMPOSITE UTILITY
      MW[103]=(MW[11]+MW[13]+MW[14]+MW[15]+K4_NC_CX)/NESTMOTOR

  ;   OFF-PEAK PERIOD WALK TO LOCAL BUS ELEMENTS OF UTILITY ARE:
  ;   -- HBO --
  ;   WALK TIME
      MW[11]=(mi.4.opwktimelb)*HBOCOVT
  ;   WAIT TIME
      MW[12]=(mi.4.opwttimelb)*HBOCOVT
  ;   IVTT
      MW[13]=(mi.4.opivtimelb)*HBOCIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.4.oppkcostlb)*HBOCCST
  ;   OTHER COST - FARE
      MW[15]=(mi.4.opopcostlb * 100 * busfarefac)*HBOCCST
  ;   PEDESTRIAN ENVIRONMENT
      MW[16]=HBOPTI * ZI.1.SUM[I]*0.25
  ;   COMPOSITE UTILITY
      MW[054]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K2_NC_WB)/NESTTRANSIT
      MW[064]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K2_WC_WB)/NESTTRANSIT
      MW[074]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K2_ST_WB)/NESTTRANSIT

  ;   -- NHB --
  ;   WALK TIME
      MW[11]=(mi.4.opwktimelb)*NHBCOVT
  ;   WAIT TIME
      MW[12]=(mi.4.opwttimelb)*NHBCOVT
  ;   IVTT
      MW[13]=(mi.4.opivtimelb)*NHBCIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.4.oppkcostlb)*NHBCCST
  ;   OTHER COST - FARE
      MW[15]=(mi.4.opopcostlb * 100 * busfarefac)*NHBCCST
  ;   PEDESTRIAN ENVIRONMENT
      MW[16]=NHBPTI * ZI.1.SUM[I]*0.25
  ;   COMPOSITE UTILITY
      MW[084]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K3_NC_WB)/NESTTRANSIT

  ;   -- HBU --
  ;   WALK TIME
      MW[11]=(mi.4.opwktimelb)*UNICOVT
  ;   WAIT TIME
      MW[12]=(mi.4.opwttimelb)*UNICOVT
```

```
  ;   IVTT
      MW[13]=(mi.4.opivtimelb)*UNICIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.4.oppkcostlb)*UNICCST
  ;   OTHER COST - FARE
      MW[15]=(mi.4.opopcostlb * 100 * 0.10*busfarefac)*UNICCST
                                                ; CS applied 10% (discounted) bus fare
                                                ; due to transit fare payed in tuition
;      MW[15]=0 ; UF fare free - previous model
  ;   PEDESTRIAN ENVIRONMENT
      MW[16]=UNIPTI * ZI.1.SUM[I]*0.25
  ;   COMPOSITE UTILITY
      MW[104]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K4_NC_WB)/NESTTRANSIT

  ;   -- HDORMU --
  ;   WALK TIME
      MW[11]=(mi.4.opwktimelb)*UNICOVT
  ;   WAIT TIME
      MW[12]=(mi.4.opwttimelb)*UNICOVT
  ;   IVTT
      MW[13]=(mi.4.opivtimelb)*UNICIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.4.oppkcostlb)*UNICCST
  ;   OTHER COST - FARE
      MW[15]=(mi.4.opopcostlb * 100 * 0.10*busfarefac)*UNICCST
                                                ; CS applied 10% (discounted) bus fare
                                                ; due to transit fare payed in tuition
      ;MW[15]=0 ; UF fare free - previous model
  ;   PEDESTRIAN ENVIRONMENT
      MW[16]=UNIPTI * ZI.1.SUM[I]*0.25
  ;   COMPOSITE UTILITY
      MW[110]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K5_NC_WB);/{NESTCTRANSIT}

  ;   OFF-PEAK PERIOD WALK TO PREMIUM TRANSIT ELEMENTS OF UTILITY ARE:

  ;   -- HBO --
  ;   WALK TIME
      MW[11]=(mi.4.opwktimeex)*HBOCOVT
  ;   WAIT TIME
      MW[12]=(mi.4.opwttimeex)*HBOCOVT
  ;   IVTT
      MW[13]=(mi.4.opivtimeex)*HBOCIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.4.oppkcostex)*HBOCCST
  ;   OTHER COST
      MW[15]=(mi.4.opopcostex * 100)*HBOCCST
  ;   PEDESTRIAN ENVIRONMENT
      MW[16]=HBOPTI * ZI.1.SUM[I]*0.25
  ;   COMPOSITE UTILITY
      MW[055]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K2_NC_WX)/NESTTRANSIT
      MW[065]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K2_WC_WX)/NESTTRANSIT
      MW[075]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K2_ST_WX)/NESTTRANSIT

  ;   -- NHB --
  ;   WALK TIME
      MW[11]=(mi.4.opwktimeex)*NHBCOVT
  ;   WAIT TIME
      MW[12]=(mi.4.opwttimeex)*NHBCOVT
  ;   IVTT
      MW[13]=(mi.4.opivtimeex)*NHBCIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.4.oppkcostex)*NHBCCST
  ;   OTHER COST
      MW[15]=(mi.4.opopcostex * 100)*NHBCCST
  ;   PEDESTRIAN ENVIRONMENT
      MW[16]=NHBPTI * ZI.1.SUM[I]*0.25
  ;   COMPOSITE UTILITY
```

```
      MW[085]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K3_NC_WX)/NESTTRANSIT

  ;   -- HBU --
  ;   WALK TIME
      MW[11]=(mi.4.opwktimeex)*UNICOVT
  ;   WAIT TIME
      MW[12]=(mi.4.opwttimeex)*UNICOVT
  ;   IVTT
      MW[13]=(mi.4.opivtimeex)*UNICIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.4.oppkcostex)*UNICCST
  ;   OTHER COST
      ;MW[15]=(mi.4.opopcostex)*UNICCST
      MW[15]=0 ; UF fare free
  ;   PEDESTRIAN ENVIRONMENT
      MW[16]=UNIPTI * ZI.1.SUM[I]*0.25
  ;   COMPOSITE UTILITY
      MW[105]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+MW[16]+K4_NC_WX)/NESTTRANSIT

  ;   OFF-PEAK PERIOD AUTO TO BEST AVAILABLE TRANSIT ELEMENTS OF UTILITY ARE:
  ;   -- HBO --
  ;   WALK TIME
      MW[11]=(mi.4.opwktimeba)*HBOCOVT
  ;   WAIT TIME
      MW[12]=(mi.4.opwttimeba)*HBOCOVT
  ;   IVTT
      MW[13]=(mi.4.opivtimeba)*HBOCIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.4.oppkcostba)*HBOCCST
  ;   OTHER COST
      MW[15]=(mi.4.opopcostba * 100)*HBOCCST
  ;   COMPOSITE UTILITY
      MW[056]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+K2_NC_BA)/NESTTRANSIT
      MW[066]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+K2_WC_BA)/NESTTRANSIT
      MW[076]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+K2_ST_BA)/NESTTRANSIT

  ;   -- NHB --
  ;   WALK TIME
      MW[11]=(mi.4.opwktimeba)*NHBCOVT
  ;   WAIT TIME
      MW[12]=(mi.4.opwttimeba)*NHBCOVT
  ;   IVTT
      MW[13]=(mi.4.opivtimeba)*NHBCIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.4.oppkcostba)*NHBCCST
  ;   OTHER COST
      MW[15]=(mi.4.opopcostba * 100)*NHBCCST
  ;   COMPOSITE UTILITY
      MW[086]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+K3_NC_BA)/NESTTRANSIT

  ;   -- HBU --
  ;   WALK TIME
      MW[11]=(mi.4.opwktimeba)*UNICOVT
  ;   WAIT TIME
      MW[12]=(mi.4.opwttimeba)*UNICOVT
  ;   IVTT
      MW[13]=(mi.4.opivtimeba)*UNICIVT
      if (mw[13]=0) mw[13]=-9999
  ;   PARKING COST
      MW[14]=(mi.4.oppkcostba)*UNICCST
  ;   OTHER COST
      ;MW[15]=(mi.4.opopcostba)*UNICCST
      MW[15]=0 ; UF fare free
  ;   COMPOSITE UTILITY
      MW[106]=(MW[11]+MW[12]+MW[13]+MW[14]+MW[15]+K4_NC_BA)/NESTTRANSIT

; ---------- END MOTORIZED UTILITIES --------------------
```

```
; WALK ONLY (NON-MOTORIZED) ELEMENTS OF UTILITY ARE:
; WALK AND BIKE TIMES
      mw[8]=60*MI.1.WALKDISTANCE/{WALKSPEED} ;all walk
      mw[9]=MI.1.BIKETIME ;all bike

;HBW
  ;   WALK TIME
      MW[11]=mw[8]*HBWCWT
  ;   PEDESTRIAN ENVIRONMENT
      MW[12]= 0.25*(ZI.1.SUM[I]*HBWPWI + ZI.1.SUM[J]*HBWPWJ)
      ; 0.25 because we are using sum, not composite
  ;   UTILITIES
      MW[027]=(MW[11]+MW[12]+K1_NC_WK)/{NESTCNONMOTOR}
      MW[037]=(MW[11]+MW[12]+K1_WC_WK)/{NESTCNONMOTOR}
      MW[047]=(MW[11]+MW[12]+K1_ST_WK)/{NESTCNONMOTOR}
;HBO
  ;   WALK TIME
      MW[11]=mw[8]*HBOCWT
  ;   PEDESTRIAN ENVIRONMENT
      MW[12]= 0.25*(ZI.1.SUM[I]*HBOPWI + ZI.1.SUM[J]*HBOPWJ)
  ;   UTILITIES
      MW[057]=(MW[11]+MW[12]+K2_NC_WK)/{NESTCNONMOTOR}
      MW[067]=(MW[11]+MW[12]+K2_WC_WK)/{NESTCNONMOTOR}
      MW[077]=(MW[11]+MW[12]+K2_ST_WK)/{NESTCNONMOTOR}
;NHB
  ;   WALK TIME
      MW[11]=mw[8]*NHBCWT
  ;   PEDESTRIAN ENVIRONMENT
      MW[12]= 0.25*(ZI.1.SUM[I]*NHBPWI + ZI.1.SUM[J]*NHBPWJ)
  ;   UTILITIES
      MW[087]=(MW[11]+MW[12]+K3_NC_WK)/{NESTCNONMOTOR}
;UNIVERSITY
  ;   WALK TIME
      MW[11]=mw[8]*UNICWT
  ;   PEDESTRIAN ENVIRONMENT
      MW[12]= 0.25*(ZI.1.SUM[I]*UNIPWI + ZI.1.SUM[J]*UNIPWJ)
  ;   UTILITIES
      MW[089]=(MW[11]+MW[12]+K4_NC_WK)/{NESTCNONMOTOR}
      MW[090]=(MW[11]+MW[12]+K5_NC_WK);/{NESTCNONMOTOR}

; BIKE ONLY (NON-MOTORIZED) ELEMENTS OF UTILITY ARE:

;HBW
  ;   BIKE TIME
      MW[11]=mw[9]*HBWCBT
  ;   PEDESTRIAN ENVIRONMENT
      MW[12]=0.25*(ZI.1.SUM[I]*HBWPBI + ZI.1.SUM[J]*HBWPBJ)
  ;   UTILITIES
      MW[028]=(MW[11]+MW[12]+K1_NC_BK)/{NESTCNONMOTOR}
      MW[038]=(MW[11]+MW[12]+K1_WC_BK)/{NESTCNONMOTOR}
      MW[048]=(MW[11]+MW[12]+K1_ST_BK)/{NESTCNONMOTOR}
;HBO
  ;   BIKE TIME
      MW[11]=mw[9]*HBOCBT
  ;   PEDESTRIAN ENVIRONMENT
      MW[12]=0.25*(ZI.1.SUM[I]*HBOPBI + ZI.1.SUM[J]*HBOPBJ)
  ;   UTILITIES
      MW[058]=(MW[11]+MW[12]+K2_NC_BK)/{NESTCNONMOTOR}
      MW[068]=(MW[11]+MW[12]+K2_WC_BK)/{NESTCNONMOTOR}
      MW[078]=(MW[11]+MW[12]+K2_ST_BK)/{NESTCNONMOTOR}
;NHB
  ;   BIKE TIME
      MW[11]=mw[9]*NHBCBT
  ;   PEDESTRIAN ENVIRONMENT
      MW[12]=0.25*(ZI.1.SUM[I]*NHBPBI + ZI.1.SUM[J]*NHBPBJ)
  ;   UTILITIES
      MW[088]=(MW[11]+MW[12]+K3_NC_BK)/{NESTCNONMOTOR}
;UNIVERSITY
  ;   BIKE TIME
      MW[11]=mw[9]*UNICBT
  ;   PEDESTRIAN ENVIRONMENT
```

```
      MW[12]=0.25*(ZI.1.SUM[I]*UNIPBI + ZI.1.SUM[J]*UNIPBJ)
  ;   UTILITIES
      MW[091]=(MW[11]+MW[12]+K4_NC_BK)/{NESTCNONMOTOR}
      MW[092]=(MW[11]+MW[12]+K5_NC_BK);/{NESTCNONMOTOR}

    endjloop


; MARKET SEGMENTATION: car, no car student
     MW[301]=MW[1]*ZI.3.NOCARPCT ; 0 car
     MW[302]=MW[1]*ZI.3.WCARPCT  ; with car
     MW[303]=MW[1]*ZI.3.STUPCT   ; students
     MW[304]=MW[2]*ZI.3.NOCARPCT ; 0 car
     MW[305]=MW[2]*ZI.3.WCARPCT  ; with car
     MW[306]=MW[2]*ZI.3.STUPCT   ; students

; HBW (USE 0 CAR)
; DA, BA not in market
   CHOICE ALTERNATIVES=CP,CX,WB,WX,WK,BK,
      DEMAND=MW[301],
      UTILITIES=MW[022],MW[023],MW[024],MW[025],MW[027],MW[028],
      ODEMAND=402,403,404,405,407,408,
      STARTMW=500,
      SPLIT=TOTAL,    {NESTCNONMOTOR} NONMOTOR, {NESTCMOTOR} MOTOR,
      SPLIT=MOTOR,    {NESTCAUTO} AUTO,     {NESTCTRANSIT} TRANSIT,
      SPLIT=NONMOTOR, 1.0 WK, 1.0 BK,
      SPLIT=AUTO,     1.0 CP, 1.0 CX,
      SPLIT=TRANSIT,  1.0 WB, 1.0 WX

  MW[401]=0; no drive alone
  MW[406]=0; no auto access

; HBW (USE 1+ CAR)
   CHOICE ALTERNATIVES=DA,CP,CX,WB,WX,BA,WK,BK,
      DEMAND=MW[302],
      UTILITIES=MW[031],MW[032],MW[033],MW[034],MW[035],MW[036],MW[037],MW[038],
      ODEMAND=411,412,413,414,415,416,417,418,
      STARTMW=500,
      SPLIT=TOTAL,    {NESTCNONMOTOR} NONMOTOR, {NESTCMOTOR} MOTOR,
      SPLIT=MOTOR,    {NESTCAUTO} AUTO,     {NESTCTRANSIT} TRANSIT,
      SPLIT=NONMOTOR, 1.0 WK, 1.0 BK,
      SPLIT=AUTO,     1.0 DA, 1.0 CP, 1.0 CX,
      SPLIT=TRANSIT,  1.0 WB, 1.0 WX, 1.0 BA
; HBW (USE STUDENT)
   CHOICE ALTERNATIVES=DA,CP,CX,WB,WX,BA,WK,BK,
      DEMAND=MW[303],
      UTILITIES=MW[041],MW[042],MW[043],MW[044],MW[045],MW[046],MW[047],MW[048],
      ODEMAND=421,422,423,424,425,426,427,428,
      STARTMW=500,
      SPLIT=TOTAL,    {NESTCNONMOTOR} NONMOTOR, {NESTCMOTOR} MOTOR,
      SPLIT=MOTOR,    {NESTCAUTO} AUTO,     {NESTCTRANSIT} TRANSIT,
      SPLIT=NONMOTOR, 1.0 WK, 1.0 BK,
      SPLIT=AUTO,     1.0 DA, 1.0 CP, 1.0 CX,
      SPLIT=TRANSIT,  1.0 WB, 1.0 WX, 1.0 BA
MW[151]=MW[401]+MW[411]+MW[421]
MW[152]=MW[402]+MW[412]+MW[422]
MW[153]=MW[403]+MW[413]+MW[423]
MW[154]=MW[404]+MW[414]+MW[424]
MW[155]=MW[405]+MW[415]+MW[425]
MW[156]=MW[406]+MW[416]+MW[426]
MW[157]=MW[407]+MW[417]+MW[427]
MW[158]=MW[408]+MW[418]+MW[428]


; HBO (USE 0 CAR)
; DA, BA not in market
   CHOICE ALTERNATIVES=CP,CX,WB,WX,WK,BK,
      DEMAND=MW[304],
      UTILITIES=MW[052],MW[053],MW[054],MW[055],MW[057],MW[058],
      ODEMAND=432,433,434,435,437,438,
      STARTMW=500,
```

```
      SPLIT=TOTAL,    {NESTCNONMOTOR} NONMOTOR, {NESTCMOTOR} MOTOR,
      SPLIT=MOTOR,    {NESTCAUTO} AUTO,     {NESTCTRANSIT} TRANSIT,
      SPLIT=NONMOTOR, 1.0 WK, 1.0 BK,
      SPLIT=AUTO,     1.0 CP, 1.0 CX,
      SPLIT=TRANSIT,  1.0 WB, 1.0 WX

  MW[431]=0; no drive alone
  MW[436]=0; no auto access

; HBO (USE 1+ CAR)
   CHOICE ALTERNATIVES=DA,CP,CX,WB,WX,BA,WK,BK,
      DEMAND=MW[305],
      UTILITIES=MW[061],MW[062],MW[063],MW[064],MW[065],MW[066],MW[067],MW[068],
      ODEMAND=441,442,443,444,445,446,447,448,
      STARTMW=500,
      SPLIT=TOTAL,    {NESTCNONMOTOR} NONMOTOR, {NESTCMOTOR} MOTOR,
      SPLIT=MOTOR,    {NESTCAUTO} AUTO,     {NESTCTRANSIT} TRANSIT,
      SPLIT=NONMOTOR, 1.0 WK, 1.0 BK,
      SPLIT=AUTO,     1.0 DA, 1.0 CP, 1.0 CX,
      SPLIT=TRANSIT,  1.0 WB, 1.0 WX, 1.0 BA
; HBO (USE STUDENT)
   CHOICE ALTERNATIVES=DA,CP,CX,WB,WX,BA,WK,BK,
      DEMAND=MW[306],
      UTILITIES=MW[071],MW[072],MW[073],MW[074],MW[075],MW[076],MW[077],MW[078],
      ODEMAND=451,452,453,454,455,456,457,458,
      STARTMW=500,
      SPLIT=TOTAL,    {NESTCNONMOTOR} NONMOTOR, {NESTCMOTOR} MOTOR,
      SPLIT=MOTOR,    {NESTCAUTO} AUTO,     {NESTCTRANSIT} TRANSIT,
      SPLIT=NONMOTOR, 1.0 WK, 1.0 BK,
      SPLIT=AUTO,     1.0 DA, 1.0 CP, 1.0 CX,
      SPLIT=TRANSIT,  1.0 WB, 1.0 WX, 1.0 BA
MW[161]=MW[431]+MW[441]+MW[451]
MW[162]=MW[432]+MW[442]+MW[452]
MW[163]=MW[433]+MW[443]+MW[453]
MW[164]=MW[434]+MW[444]+MW[454]
MW[165]=MW[435]+MW[445]+MW[455]
MW[166]=MW[436]+MW[446]+MW[456]
MW[167]=MW[437]+MW[447]+MW[457]
MW[168]=MW[438]+MW[448]+MW[458]



; NHB (USE 0 CAR CONSTANTS, NO MARKET SEGMENTATION IS NEEDED FOR THIS TRIP PURPOSE)
   CHOICE ALTERNATIVES=DA,CP,CX,WB,WX,BA,WK,BK,
      DEMAND=MW[003],
      UTILITIES=MW[081],MW[082],MW[083],MW[084],MW[085],MW[086],MW[087],MW[088],
      ODEMAND=171,172,173,174,175,176,177,178,
      STARTMW=500,
      SPLIT=TOTAL,    {NESTCNONMOTOR} NONMOTOR, {NESTCMOTOR} MOTOR,
      SPLIT=MOTOR,    {NESTCAUTO} AUTO,     {NESTCTRANSIT} TRANSIT,
      SPLIT=NONMOTOR, 1.0 WK, 1.0 BK,
      SPLIT=AUTO,     1.0 DA, 1.0 CP, 1.0 CX,
      SPLIT=TRANSIT,  1.0 WB, 1.0 WX, 1.0 BA

; HBU (FULL CHOICE SET)
   CHOICE ALTERNATIVES=DA,CP,CX,WB,WX,BA,WK,BK,
      DEMAND=MW[004],
      UTILITIES=MW[101],MW[102],MW[103],MW[104],MW[105],MW[106],MW[089],MW[091],
      ODEMAND=181,182,183,184,185,186,187,188,
      STARTMW=500,
      SPLIT=TOTAL,    {NESTCNONMOTOR} NONMOTOR, {NESTCMOTOR} MOTOR,


      SPLIT=MOTOR,    {NESTCAUTO} AUTO,     {NESTCTRANSIT} TRANSIT,
      SPLIT=NONMOTOR, 1.0 WK, 1.0 BK,
      SPLIT=AUTO,     1.0 DA, 1.0 CP, 1.0 CX,
      SPLIT=TRANSIT,  1.0 WB, 1.0 WX, 1.0 BA

; CAMPUS HOUSING -HDORMU- (PARTIAL CHOICE SET)
   CHOICE ALTERNATIVES=WB,WK,BK,
      DEMAND=MW[5],
```

```
      UTILITIES=MW[110],MW[090],MW[092],
      ODEMAND=191,192,193,
      STARTMW=600,
      SPLIT=TOTAL,    1.0 WB, 1.0 WK, 1.0 BK

JLOOP
;
HBWDA=HBWDA+MW[151]
HBWCP=HBWCP+MW[152]
HBWCX=HBWCX+MW[153]
HBWWB=HBWWB+MW[154]
HBWWX=HBWWX+MW[155]
HBWBA=HBWBA+MW[156]
HBWWK=HBWWK+MW[157]
HBWBK=HBWBK+MW[158]

HBODA=HBODA+MW[161]
HBOCP=HBOCP+MW[162]
HBOCX=HBOCX+MW[163]
HBOWB=HBOWB+MW[164]
HBOWX=HBOWX+MW[165]
HBOBA=HBOBA+MW[166]
HBOWK=HBOWK+MW[167]
HBOBK=HBOBK+MW[168]

NHBDA=NHBDA+MW[171]
NHBCP=NHBCP+MW[172]
NHBCX=NHBCX+MW[173]
NHBWB=NHBWB+MW[174]
NHBWX=NHBWX+MW[175]
NHBBA=NHBBA+MW[176]
NHBWK=NHBWK+MW[177]
NHBBK=NHBBK+MW[178]

HBUDA=HBUDA+MW[181]
HBUCP=HBUCP+MW[182]
HBUCX=HBUCX+MW[183]
HBUWB=HBUWB+MW[184]
HBUWX=HBUWX+MW[185]
HBUBA=HBUBA+MW[186]
HBUWK=HBUWK+MW[187]
HBUBK=HBUBK+MW[188]

UNIWB=UNIWB+MW[191]
UNIWK=UNIWK+MW[192]
UNIBK=UNIBK+MW[193]

MW401=MW401+MW[401]
MW411=MW411+MW[411]
MW421=MW421+MW[421]
MW431=MW431+MW[431]
MW441=MW441+MW[441]
MW451=MW451+MW[451]
MW171=MW171+MW[171]
MW181=MW181+MW[181]
MW402=MW402+MW[402]
MW412=MW412+MW[412]
MW422=MW422+MW[422]
MW432=MW432+MW[432]
MW442=MW442+MW[442]
MW452=MW452+MW[452]
MW172=MW172+MW[172]
MW182=MW182+MW[182]
MW403=MW403+MW[403]
MW413=MW413+MW[413]
MW423=MW423+MW[423]
MW433=MW433+MW[433]
MW443=MW443+MW[443]
MW453=MW453+MW[453]
MW173=MW173+MW[173]
MW183=MW183+MW[183]
```

```
MW404=MW404+MW[404]
MW414=MW414+MW[414]
MW424=MW424+MW[424]
MW434=MW434+MW[434]
MW444=MW444+MW[444]
MW454=MW454+MW[454]
MW174=MW174+MW[174]
MW184=MW184+MW[184]
MW191=MW191+MW[191]
MW405=MW405+MW[405]
MW415=MW415+MW[415]
MW425=MW425+MW[425]
MW435=MW435+MW[435]
MW445=MW445+MW[445]
MW455=MW455+MW[455]
MW175=MW175+MW[175]
MW185=MW185+MW[185]
MW406=MW406+MW[406]
MW416=MW416+MW[416]
MW426=MW426+MW[426]
MW436=MW436+MW[436]
MW446=MW446+MW[446]
MW456=MW456+MW[456]
MW176=MW176+MW[176]
MW186=MW186+MW[186]
MW407=MW407+MW[407]
MW417=MW417+MW[417]
MW427=MW427+MW[427]
MW437=MW437+MW[437]
MW447=MW447+MW[447]
MW457=MW457+MW[457]
MW177=MW177+MW[177]
MW187=MW187+MW[187]
MW192=MW192+MW[192]
MW408=MW408+MW[408]
MW418=MW418+MW[418]
MW428=MW428+MW[428]
MW438=MW438+MW[438]
MW448=MW448+MW[448]
MW458=MW458+MW[458]
MW178=MW178+MW[178]
MW188=MW188+MW[188]
MW193=MW193+MW[193]

ENDJLOOP

if (i=_zones)


SUMHBW=HBWDA+HBWCP+HBWCX+HBWWB+HBWWX+HBWBA+HBWWK+HBWBK

SUMHBO=HBODA+HBOCP+HBOCX+HBOWB+HBOWX+HBOBA+HBOWK+HBOBK
SUMNHB=NHBDA+NHBCP+NHBCX+NHBWB+NHBWX+NHBBA+NHBWK+NHBBK
SUMHBU=HBUDA+HBUCP+HBUCX+HBUWB+HBUWX+HBUBA+HBUWK+HBUBK
SUMUNI=UNIWB+UNIWK+UNIBK
;Total trips by purpose
mx1=MW401+MW402+MW403+MW404+MW405+MW406+MW407+MW408
mx2=MW411+MW412+MW413+MW414+MW415+MW416+MW417+MW418
mx3=MW421+MW422+MW423+MW424+MW425+MW426+MW427+MW428
mx4=MW431+MW432+MW433+MW434+MW435+MW436+MW437+MW438
mx5=MW441+MW442+MW443+MW444+MW445+MW446+MW447+MW448
mx6=MW451+MW452+MW453+MW454+MW455+MW456+MW457+MW458
mx7=MW171+MW172+MW173+MW174+MW175+MW176+MW177+MW178
mx8=MW181+MW182+MW183+MW184+MW185+MW186+MW187+MW188
mx9=MW191+MW192+MW193
;mode shares
MW401=MW401/mx1
MW402=MW402/mx1
MW403=MW403/mx1
MW404=MW404/mx1
MW405=MW405/mx1
```

```
MW406=MW406/mx1
MW407=MW407/mx1
MW408=MW408/mx1
MW411=MW411/mx2
MW412=MW412/mx2
MW413=MW413/mx2
MW414=MW414/mx2
MW415=MW415/mx2
MW416=MW416/mx2
MW417=MW417/mx2
MW418=MW418/mx2

MW421=MW421/mx3
MW422=MW422/mx3
MW423=MW423/mx3
MW424=MW424/mx3
MW425=MW425/mx3
MW426=MW426/mx3
MW427=MW427/mx3
MW428=MW428/mx3
MW431=MW431/mx4
MW432=MW432/mx4
MW433=MW433/mx4
MW434=MW434/mx4
MW435=MW435/mx4
MW436=MW436/mx4
MW437=MW437/mx4
MW438=MW438/mx4
MW441=MW441/mx5
MW442=MW442/mx5
MW443=MW443/mx5

MW444=MW444/mx5
MW445=MW445/mx5

MW446=MW446/mx5
MW447=MW447/mx5
MW448=MW448/mx5
MW451=MW451/mx6
MW452=MW452/mx6
MW453=MW453/mx6
MW454=MW454/mx6
MW455=MW455/mx6


MW456=MW456/mx6
MW457=MW457/mx6
MW458=MW458/mx6
MW171=MW171/mx7
MW172=MW172/mx7
MW173=MW173/mx7
MW174=MW174/mx7
MW175=MW175/mx7
MW176=MW176/mx7
MW177=MW177/mx7
MW178=MW178/mx7
MW181=MW181/mx8
MW182=MW182/mx8
MW183=MW183/mx8
MW184=MW184/mx8
MW185=MW185/mx8
MW186=MW186/mx8
MW187=MW187/mx8
MW188=MW188/mx8
MW191=MW191/mx9
MW192=MW192/mx9
MW193=MW193/mx9


PRINT LIST="\n +++++ MODE CHOICE SUMMARY +++++\n" PRINTO=1
PRINT LIST="{DESC}" PRINTO=1
```

```
PRINT LIST="{SCENARIO_SHORTNAME}\n" PRINTO=1

PRINT FORM=8.OC, LIST='HOME-BASED WORK MODE CHOICE RESULTS',
'\nHBW TOTAL                       =',SUMHBW,'  ',1.0(5.4),
'\nDRIVE ALONE                     =',HBWDA,'  ',HBWDA/SUMHBW(5.4),
'\nCARPOOL 2                       =',HBWCP,'  ',HBWCP/SUMHBW(5.4),
'\nCARPOOL 3+                      =',HBWCX,'  ',HBWCX/SUMHBW(5.4),
'\nWALK TO LOCAL TRANSIT           =',HBWWB,'  ',HBWWB/SUMHBW(5.4),
'\nWALK TO PREMIUM TRANSIT         =',HBWWX,'  ',HBWWX/SUMHBW(5.4),
'\nDRIVE TO BEST AVAILABLE TRANSIT=',HBWBA,'  ',HBWBA/SUMHBW(5.4),
'\nNON-MOTORIZED WALK              =',HBWWK,'  ',HBWWK/SUMHBW(5.4),
'\nNON-MOTORIZED BICYCLE           =',HBWBK,'  ',HBWBK/SUMHBW(5.4),
'\n   Average Auto Occupancy
=',(HBWDA+HBWCP+HBWCX)/(HBWDA+HBWCP/2+HBWCX/{HBW3P})(4.3),PRINTO=1

PRINT FORM=8.OC, LIST='\n ','\nHOME-BASED OTHER MODE CHOICE RESULTS',
'\nHBO TOTAL                       =',SUMHBO,'  ',1.0(5.4),
'\nDRIVE ALONE                     =',HBODA,'  ',HBODA/SUMHBO(5.4),
'\nCARPOOL 2                       =',HBOCP,'  ',HBOCP/SUMHBO(5.4),
'\nCARPOOL 3+                      =',HBOCX,'  ',HBOCX/SUMHBO(5.4),
'\nWALK TO LOCAL TRANSIT           =',HBOWB,'  ',HBOWB/SUMHBO(5.4),
'\nWALK TO PREMIUM TRANSIT         =',HBOWX,'  ',HBOWX/SUMHBO(5.4),
'\nDRIVE TO BEST AVAILABLE TRANSIT=',HBOBA,'  ',HBOBA/SUMHBO(5.4),
'\nNON-MOTORIZED WALK              =',HBOWK,'  ',HBOWK/SUMHBO(5.4),
'\nNON-MOTORIZED BICYCLE           =',HBOBK,'  ',HBOBK/SUMHBO(5.4),
'\n   Average Auto Occupancy
=',(HBODA+HBOCP+HBOCX)/(HBODA+HBOCP/2+HBOCX/{HBO3P})(4.3),PRINTO=1

PRINT FORM=8.OC, LIST='\n ','\nNON-HOME BASED MODE CHOICE RESULTS',
'\nNHB TOTAL                       =',SUMNHB,'  ',1.0(5.4),
'\nDRIVE ALONE                     =',NHBDA,'  ',NHBDA/SUMNHB(5.4),
'\nCARPOOL 2                       =',NHBCP,'  ',NHBCP/SUMNHB(5.4),
'\nCARPOOL 3+                      =',NHBCX,'  ',NHBCX/SUMNHB(5.4),
'\nWALK TO LOCAL TRANSIT           =',NHBWB,'  ',NHBWB/SUMNHB(5.4),
'\nWALK TO PREMIUM TRANIST         =',NHBWX,'  ',NHBWX/SUMNHB(5.4),
'\nDRIVE TO BEST AVAILABLE TRANSIT=',NHBBA,'  ',NHBBA/SUMNHB(5.4),
'\nNON-MOTORIZED WALK              =',NHBWK,'  ',NHBWK/SUMNHB(5.4),
'\nNON-MOTORIZED BICYCLE           =',NHBBK,'  ',NHBBK/SUMNHB(5.4),
'\n   Average Auto Occupancy
=',(NHBDA+NHBCP+NHBCX)/(NHBDA+NHBCP/2+NHBCX/{NHB3P})(4.3),PRINTO=1

PRINT FORM=8.OC, LIST='\n ','\nHOME BASED UNIVERSITY MODE CHOICE RESULTS',
'\nHBU TOTAL                       =',SUMHBU,'  ',1.0(5.4),
'\nDRIVE ALONE                     =',HBUDA,'  ',HBUDA/SUMHBU(5.4),
'\nCARPOOL 2                       =',HBUCP,'  ',HBUCP/SUMHBU(5.4),
'\nCARPOOL 3+                      =',HBUCX,'  ',HBUCX/SUMHBU(5.4),
'\nWALK TO LOCAL TRANSIT           =',HBUWB,'  ',HBUWB/SUMHBU(5.4),
'\nWALK TO PREMIUM TRANSIT         =',HBUWX,'  ',HBUWX/SUMHBU(5.4),
'\nDRIVE TO BEST AVAILABLE TRANSIT=',HBUBA,'  ',HBUBA/SUMHBU(5.4),
'\nNON-MOTORIZED WALK              =',HBUWK,'  ',HBUWK/SUMHBU(5.4),
'\nNON-MOTORIZED BICYCLE           =',HBUBK,'  ',HBUBK/SUMHBU(5.4),
'\n   Average Auto Occupancy
=',(HBUDA+HBUCP+HBUCX)/(HBUDA+HBUCP/2+HBUCX/{HBW3P})(4.3),PRINTO=1

PRINT FORM=8.OC, LIST='\n ','\nCAMPUS UNIVERSITY MODE CHOICE RESULTS',
'\nCAMPUS HOUSING TOTAL            =',SUMUNI,'  ',1.0(5.4),
'\nWALK TO LOCAL TRANSIT           =',UNIWB,'  ',UNIWB/SUMUNI(5.4),
'\nNON-MOTORIZED WALK              =',UNIWK,'  ',UNIWK/SUMUNI(5.4),
'\nNON-MOTORIZED BICYCLE           =',UNIBK,'  ',UNIBK/SUMUNI(5.4),PRINTO=1


; MODE SUMMARY TABLE AS CSV
PRINT CSV=T, LIST=
'PURPOSE','TOTAL','DA','SR2','SR3+','WALKBUS','WALKPREM','DRIVETRN','WALK','BIKE', PRINTO=4
PRINT CSV=T, LIST= 'HBW',SUMHBW,HBWDA,HBWCP,HBWCX,HBWWB,HBWWX,HBWBA,HBWWK,HBWBK,PRINTO=4
PRINT CSV=T, LIST= 'HBO',SUMHBO,HBODA,HBOCP,HBOCX,HBOWB,HBOWX,HBOBA,HBOWK,HBOBK,PRINTO=4
PRINT CSV=T, LIST= 'NHB',SUMNHB,NHBDA,NHBCP,NHBCX,NHBWB,NHBWX,NHBBA,NHBWK,NHBBK,PRINTO=4
PRINT CSV=T, LIST= 'HBU',SUMHBU,HBUDA,HBUCP,HBUCX,HBUWB,HBUWX,HBUBA,HBUWK,HBUBK,PRINTO=4
PRINT CSV=T, LIST= 'DORM',SUMUNI,0,0,0,UNIWB,0,0,UNIWK,UNIBK,PRINTO=4

; Targets
```

```
PRINT CSV=T, LIST= 'TARGETS', PRINTO=2
PRINT CSV=T, LIST=
1,t1_NC_DA(7.5),t1_WC_DA(7.5),t1_ST_DA(7.5),t2_NC_DA(7.5),t2_WC_DA(7.5),t2_ST_DA(7.5),t3_NC_DA(7.
5),t4_NC_DA(7.5),t5_NC_DA(7.5), PRINTO=2
PRINT CSV=T, LIST=
2,t1_NC_CP(7.5),t1_WC_CP(7.5),t1_ST_CP(7.5),t2_NC_CP(7.5),t2_WC_CP(7.5),t2_ST_CP(7.5),t3_NC_CP(7.
5),t4_NC_CP(7.5),t5_NC_CP(7.5), PRINTO=2
PRINT CSV=T, LIST=
3,t1_NC_CX(7.5),t1_WC_CX(7.5),t1_ST_CX(7.5),t2_NC_CX(7.5),t2_WC_CX(7.5),t2_ST_CX(7.5),t3_NC_CX(7.
5),t4_NC_CX(7.5),t5_NC_CX(7.5), PRINTO=2
PRINT CSV=T, LIST=
4,t1_NC_WB(7.5),t1_WC_WB(7.5),t1_ST_WB(7.5),t2_NC_WB(7.5),t2_WC_WB(7.5),t2_ST_WB(7.5),t3_NC_WB(7.
5),t4_NC_WB(7.5),t5_NC_WB(7.5), PRINTO=2
PRINT CSV=T, LIST=
5,t1_NC_WX(7.5),t1_WC_WX(7.5),t1_ST_WX(7.5),t2_NC_WX(7.5),t2_WC_WX(7.5),t2_ST_WX(7.5),t3_NC_WX(7.
5),t4_NC_WX(7.5),t5_NC_WX(7.5), PRINTO=2
PRINT CSV=T, LIST=
6,t1_NC_BA(7.5),t1_WC_BA(7.5),t1_ST_BA(7.5),t2_NC_BA(7.5),t2_WC_BA(7.5),t2_ST_BA(7.5),t3_NC_BA(7.
5),t4_NC_BA(7.5),t5_NC_BA(7.5), PRINTO=2
PRINT CSV=T, LIST=
7,t1_NC_WK(7.5),t1_WC_WK(7.5),t1_ST_WK(7.5),t2_NC_WK(7.5),t2_WC_WK(7.5),t2_ST_WK(7.5),t3_NC_WK(7.
5),t4_NC_WK(7.5),t5_NC_WK(7.5), PRINTO=2
PRINT CSV=T, LIST=
8,t1_NC_BK(7.5),t1_WC_BK(7.5),t1_ST_BK(7.5),t2_NC_BK(7.5),t2_WC_BK(7.5),t2_ST_BK(7.5),t3_NC_BK(7.
5),t4_NC_BK(7.5),t5_NC_BK(7.5), PRINTO=2

; Shares
PRINT CSV=T, LIST= 'MODAL SHARES', PRINTO=2
PRINT CSV=T, LIST=
1,MW401(7.5),MW411(7.5),MW421(7.5),MW431(7.5),MW441(7.5),MW451(7.5),MW171(7.5),MW181(7.5),0(7.5)
, PRINTO=2
PRINT CSV=T, LIST=
2,MW402(7.5),MW412(7.5),MW422(7.5),MW432(7.5),MW442(7.5),MW452(7.5),MW172(7.5),MW182(7.5),0(7.5)
, PRINTO=2
PRINT CSV=T, LIST=
3,MW403(7.5),MW413(7.5),MW423(7.5),MW433(7.5),MW443(7.5),MW453(7.5),MW173(7.5),MW183(7.5),0(7.5)
, PRINTO=2
PRINT CSV=T, LIST=
4,MW404(7.5),MW414(7.5),MW424(7.5),MW434(7.5),MW444(7.5),MW454(7.5),MW174(7.5),MW184(7.5),MW191(7
.5)  , PRINTO=2
PRINT CSV=T, LIST=
5,MW405(7.5),MW415(7.5),MW425(7.5),MW435(7.5),MW445(7.5),MW455(7.5),MW175(7.5),MW185(7.5),0(7.5)
, PRINTO=2
PRINT CSV=T, LIST=
6,MW406(7.5),MW416(7.5),MW426(7.5),MW436(7.5),MW446(7.5),MW456(7.5),MW176(7.5),MW186(7.5),0(7.5)
, PRINTO=2
PRINT CSV=T, LIST=
7,MW407(7.5),MW417(7.5),MW427(7.5),MW437(7.5),MW447(7.5),MW457(7.5),MW177(7.5),MW187(7.5),MW192(7
.5)  , PRINTO=2
PRINT CSV=T, LIST=
8,MW408(7.5),MW418(7.5),MW428(7.5),MW438(7.5),MW448(7.5),MW458(7.5),MW178(7.5),MW188(7.5),MW193(7
.5)  , PRINTO=2
PRINT CSV=T, LIST= 'T',mx1,mx2,mx3,mx4,mx5,mx6,mx7,mx8,mx9  , PRINTO=2

; print INPUT modal constants
PRINT CSV=T, LIST= 'INPUT CONSTANTS', PRINTO=2
PRINT CSV=T, LIST=
1.0,K1_NC_DA,K1_WC_DA,K1_ST_DA,K2_NC_DA,K2_WC_DA,K2_ST_DA,K3_NC_DA,K4_NC_DA,K5_NC_DA, PRINTO=2
PRINT CSV=T, LIST=
2.0,K1_NC_CP,K1_WC_CP,K1_ST_CP,K2_NC_CP,K2_WC_CP,K2_ST_CP,K3_NC_CP,K4_NC_CP,K5_NC_CP, PRINTO=2
PRINT CSV=T, LIST=
3.0,K1_NC_CX,K1_WC_CX,K1_ST_CX,K2_NC_CX,K2_WC_CX,K2_ST_CX,K3_NC_CX,K4_NC_CX,K5_NC_CX, PRINTO=2
PRINT CSV=T, LIST=
4.0,K1_NC_WB,K1_WC_WB,K1_ST_WB,K2_NC_WB,K2_WC_WB,K2_ST_WB,K3_NC_WB,K4_NC_WB,K5_NC_WB, PRINTO=2
PRINT CSV=T, LIST=
5.0,K1_NC_WX,K1_WC_WX,K1_ST_WX,K2_NC_WX,K2_WC_WX,K2_ST_WX,K3_NC_WX,K4_NC_WX,K5_NC_WX, PRINTO=2
PRINT CSV=T, LIST=
6.0,K1_NC_BA,K1_WC_BA,K1_ST_BA,K2_NC_BA,K2_WC_BA,K2_ST_BA,K3_NC_BA,K4_NC_BA,K5_NC_BA, PRINTO=2
PRINT CSV=T, LIST=
7.0,K1_NC_WK,K1_WC_WK,K1_ST_WK,K2_NC_WK,K2_WC_WK,K2_ST_WK,K3_NC_WK,K4_NC_WK,K5_NC_WK, PRINTO=2
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PRINT CSV=T, LIST=
8.0,K1_NC_BK,K1_WC_BK,K1_ST_BK,K2_NC_BK,K2_WC_BK,K2_ST_BK,K3_NC_BK,K4_NC_BK,K5_NC_BK, PRINTO=2

if ({MC_Cal}>1) ; Calibrate?
; -- Revised constants
D=+1.0    ; Dampening factor
; HBW No+Car: DA(1) and BA(6) not in set, No WX present so omit from calibration
R1_NC_DA=0
/*
NESTMOTOR    = 1.0
NESTTRANSIT  = 1.0
NESTNONMOTOR = 1.0
*/

LCP=Ln(MW402/t1_NC_CP)*NESTMOTOR
LCX=Ln(MW403/t1_NC_CX)*NESTMOTOR
LWB=Ln(MW404/t1_NC_WB)*NESTTRANSIT
LWK=Ln(MW407/t1_NC_WK)*NESTNONMOTOR
LBK=Ln(MW408/t1_NC_BK)*NESTNONMOTOR

R1_NC_CP=K1_NC_CP
R1_NC_CX=K1_NC_CX+D*(+LCP-LCX)
R1_NC_WB=K1_NC_WB+D*(+LCP-LWB)
R1_NC_WX=R1_NC_WB ;  express same as local
R1_NC_BA=K1_NC_BA
R1_NC_WK=K1_NC_WK+D*(+LCP-LWK)
R1_NC_BK=K1_NC_BK+D*(+LCP-LBK)

; HBW With+Car: No WX present so omit from calibration
;R1_WC_DA=K1_WC_DA+D*(-
Ln(MW411/t1_WC_DA)+Ln(MW412/t1_WC_CP)+Ln(MW413/t1_WC_CX)+Ln(MW414/t1_WC_WB)+Ln(MW416/t1_WC_BA)+Ln
(MW417/t1_WC_WK)+Ln(MW418/t1_WC_BK)
R1_WC_DA=0


LDA=Ln(MW411/t1_WC_DA)*NESTMOTOR
LCP=Ln(MW412/t1_WC_CP)*NESTMOTOR
LCX=Ln(MW413/t1_WC_CX)*NESTMOTOR
LWB=Ln(MW414/t1_WC_WB)*NESTTRANSIT
LBA=Ln(MW416/t1_WC_BA)*NESTTRANSIT
LWK=Ln(MW417/t1_WC_WK)*NESTNONMOTOR
LBK=Ln(MW418/t1_WC_BK)*NESTNONMOTOR

R1_WC_CP=K1_WC_CP+D*(+LDA-LCP)
R1_WC_CX=K1_WC_CX+D*(+LDA-LCX)
R1_WC_WB=K1_WC_WB+D*(+LDA-LWB)
R1_WC_WX=R1_WC_WB ;  express same as local
R1_WC_BA=K1_WC_BA+D*(+LDA-LBA)
R1_WC_WK=K1_WC_WK+D*(+LDA-LWK)
R1_WC_BK=K1_WC_BK+D*(+LDA-LBK)

; HBW Student: No WX present so omit from calibration
;R1_ST_DA=K1_ST_DA+D*(-
Ln(MW421/t1_ST_DA)+Ln(MW422/t1_ST_CP)+Ln(MW423/t1_ST_CX)+Ln(MW424/t1_ST_WB)+Ln(MW426/t1_ST_BA)+Ln
(MW427/t1_ST_WK)+Ln(MW428/t1_ST_BK)
R1_ST_DA=0
LDA=Ln(MW421/t1_ST_DA)*NESTMOTOR
LCP=Ln(MW422/t1_ST_CP)*NESTMOTOR
LCX=Ln(MW423/t1_ST_CX)*NESTMOTOR
LWB=Ln(MW424/t1_ST_WB)*NESTTRANSIT
LBA=Ln(MW426/t1_ST_BA)*NESTTRANSIT
LWK=Ln(MW427/t1_ST_WK)*NESTNONMOTOR
LBK=Ln(MW428/t1_ST_BK)*NESTNONMOTOR

R1_ST_CP=K1_ST_CP+D*(+LDA-LCP)
R1_ST_CX=K1_ST_CX+D*(+LDA-LCX)
R1_ST_WB=K1_ST_WB+D*(+LDA-LWB)
R1_ST_WX=R1_ST_WB ;  express same as local
R1_ST_BA=K1_ST_BA+D*(+LDA-LBA)
R1_ST_WK=K1_ST_WK+D*(+LDA-LWK)
R1_ST_BK=K1_ST_BK+D*(+LDA-LBK)
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```
; HBO No+Car: DA(1) and BA(6) not in set, No WX present so omit from calibration
;R2_NC_DA=K2_NC_DA
R2_NC_DA=0

LCP=Ln(MW432/t2_NC_CP)*NESTMOTOR
LCX=Ln(MW433/t2_NC_CX)*NESTMOTOR
LWB=Ln(MW434/t2_NC_WB)*NESTTRANSIT
LWK=Ln(MW437/t2_NC_WK)*NESTNONMOTOR
LBK=Ln(MW438/t2_NC_BK)*NESTNONMOTOR

R2_NC_CP=K2_NC_CP
R2_NC_CX=K2_NC_CX+D*(+LCP-LCX)
R2_NC_WB=K2_NC_WB+D*(+LCP-LWB)

R2_NC_WX=R2_NC_WB ;  express same as local
R2_NC_BA=K2_NC_BA
R2_NC_WK=K2_NC_WK+D*(+LCP-LWK)
R2_NC_BK=K2_NC_BK+D*(+LCP-LBK)

; HBO With+Car: No WX present so omit from calibration
;R2_WC_DA=K2_WC_DA-
Ln(MW441/t2_WC_DA)+Ln(MW442/t2_WC_CP)+Ln(MW443/t2_WC_CX)+Ln(MW444/t2_WC_WB)+Ln(MW446/t2_WC_BA)+Ln
(MW447/t2_WC_WK)+Ln(MW448/t2_WC_BK)
R2_WC_DA=0
LDA=Ln(MW441/t2_WC_DA)*NESTMOTOR
LCP=Ln(MW442/t2_WC_CP)*NESTMOTOR
LCX=Ln(MW443/t2_WC_CX)*NESTMOTOR
LWB=Ln(MW444/t2_WC_WB)*NESTTRANSIT
LBA=Ln(MW446/t2_WC_BA)*NESTTRANSIT
LWK=Ln(MW447/t2_WC_WK)*NESTNONMOTOR
LBK=Ln(MW448/t2_WC_BK)*NESTNONMOTOR

R2_WC_CP=K2_WC_CP+D*(+LDA-LCP)
R2_WC_CX=K2_WC_CX+D*(+LDA-LCX)
R2_WC_WB=K2_WC_WB+D*(+LDA-LWB)
R2_WC_WX=R2_WC_WB ;  express same as local
R2_WC_BA=K2_WC_BA+D*(+LDA-LBA)
R2_WC_WK=K2_WC_WK+D*(+LDA-LWK)
R2_WC_BK=K2_WC_BK+D*(+LDA-LBK)

; HBO Student: No WX present so omit from calibration
;R2_ST_DA=K2_ST_DA-
Ln(MW451/t2_ST_DA)+Ln(MW452/t2_ST_CP)+Ln(MW453/t2_ST_CX)+Ln(MW454/t2_ST_WB)+Ln(MW456/t2_ST_BA)+Ln
(MW457/t2_ST_WK)+Ln(MW458/t2_ST_BK)
R2_ST_DA=0
LDA=Ln(MW451/t2_ST_DA)*NESTMOTOR
LCP=Ln(MW452/t2_ST_CP)*NESTMOTOR
LCX=Ln(MW453/t2_ST_CX)*NESTMOTOR
LWB=Ln(MW454/t2_ST_WB)*NESTTRANSIT
LBA=Ln(MW456/t2_ST_BA)*NESTTRANSIT
LWK=Ln(MW457/t2_ST_WK)*NESTNONMOTOR
LBK=Ln(MW458/t2_ST_BK)*NESTNONMOTOR

R2_ST_CP=K2_ST_CP+D*(+LDA-LCP)
R2_ST_CX=K2_ST_CX+D*(+LDA-LCX)
R2_ST_WB=K2_ST_WB+D*(+LDA-LWB)
R2_ST_WX=R2_ST_WB ;  express same as local
R2_ST_BA=K2_ST_BA+D*(+LDA-LBA)
R2_ST_WK=K2_ST_WK+D*(+LDA-LWK)
R2_ST_BK=K2_ST_BK+D*(+LDA-LBK)

; NHB: No WX present so omit from calibration
;R3_NC_DA=K3_NC_DA-
Ln(MW171/t3_NC_DA)+Ln(MW172/t3_NC_CP)+Ln(MW173/t3_NC_CX)+Ln(MW174/t3_NC_WB)+Ln(MW176/t3_NC_BA)+Ln
(MW177/t3_NC_WK)+Ln(MW178/t3_NC_BK)
R3_NC_DA=0
LDA=Ln(MW171/t3_NC_DA)*NESTMOTOR
LCP=Ln(MW172/t3_NC_CP)*NESTMOTOR
LCX=Ln(MW173/t3_NC_CX)*NESTMOTOR
LWB=Ln(MW174/t3_NC_WB)*NESTTRANSIT
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LBA=Ln(MW176/t3_NC_BA)*NESTTRANSIT
LWK=Ln(MW177/t3_NC_WK)*NESTNONMOTOR
LBK=Ln(MW178/t3_NC_BK)*NESTNONMOTOR

R3_NC_CP=K3_NC_CP+D*(+LDA-LCP)
R3_NC_CX=K3_NC_CX+D*(+LDA-LCX)
R3_NC_WB=K3_NC_WB+D*(+LDA-LWB)
R3_NC_WX=R3_NC_WB ;  express same as local
R3_NC_BA=K3_NC_BA+D*(+LDA-LBA)
R3_NC_WK=K3_NC_WK+D*(+LDA-LWK)
R3_NC_BK=K3_NC_BK+D*(+LDA-LBK)

; HBU: No WX present so omit from calibration
;R4_NC_DA=K4_NC_DA-
Ln(MW181/t4_NC_DA)+Ln(MW182/t4_NC_CP)+Ln(MW183/t4_NC_CX)+Ln(MW184/t4_NC_WB)+Ln(MW186/t4_NC_BA)+Ln
(MW187/t4_NC_WK)+Ln(MW188/t4_NC_BK)
R4_NC_DA=0
LDA=Ln(MW181/t4_NC_DA)*NESTMOTOR
LCP=Ln(MW182/t4_NC_CP)*NESTMOTOR
LCX=Ln(MW183/t4_NC_CX)*NESTMOTOR
LWB=Ln(MW184/t4_NC_WB)*NESTTRANSIT
LBA=Ln(MW186/t4_NC_BA)*NESTTRANSIT
LWK=Ln(MW187/t4_NC_WK)*NESTNONMOTOR
LBK=Ln(MW188/t4_NC_BK)*NESTNONMOTOR

R4_NC_CP=K4_NC_CP+D*(+LDA-LCP)
R4_NC_CX=K4_NC_CX+D*(+LDA-LCX)
R4_NC_WB=K4_NC_WB+D*(+LDA-LWB)
R4_NC_WX=R4_NC_WB ;  express same as local
R4_NC_BA=K4_NC_BA+D*(+LDA-LBA)
R4_NC_WK=K4_NC_WK+D*(+LDA-LWK)
R4_NC_BK=K4_NC_BK+D*(+LDA-LBK)

; DORM: AUTO, PNR and WX NOT IN CHOICE SET. No WX present so omit from calibration
R5_NC_DA=0
LWB=Ln(MW191/t5_NC_WB)*NESTTRANSIT
LWK=Ln(MW192/t5_NC_WK)*NESTNONMOTOR
LBK=Ln(MW193/t5_NC_BK)*NESTNONMOTOR

R5_NC_CP=0
R5_NC_CX=0
R5_NC_WB=K5_NC_WB
R5_NC_WX=0
R5_NC_BA=0
R5_NC_WK=K5_NC_WK+D*(+LWB-LWK)
R5_NC_BK=K5_NC_BK+D*(+LWB-LBK)

; print REVISED modal constants
PRINT CSV=T, LIST= 'REVISED CONSTANTS', PRINTO=2
PRINT CSV=T, LIST=
1.0,R1_NC_DA(10.5),R1_WC_DA(10.5),R1_ST_DA(10.5),R2_NC_DA(10.5),R2_WC_DA(10.5),R2_ST_DA(10.5),R3_
NC_DA(10.5),R4_NC_DA(10.5),R5_NC_DA(10.5), PRINTO=2
PRINT CSV=T, LIST=
2.0,R1_NC_CP(10.5),R1_WC_CP(10.5),R1_ST_CP(10.5),R2_NC_CP(10.5),R2_WC_CP(10.5),R2_ST_CP(10.5),R3_
NC_CP(10.5),R4_NC_CP(10.5),R5_NC_CP(10.5), PRINTO=2
PRINT CSV=T, LIST=
3.0,R1_NC_CX(10.5),R1_WC_CX(10.5),R1_ST_CX(10.5),R2_NC_CX(10.5),R2_WC_CX(10.5),R2_ST_CX(10.5),R3_
NC_CX(10.5),R4_NC_CX(10.5),R5_NC_CX(10.5), PRINTO=2
PRINT CSV=T, LIST=
4.0,R1_NC_WB(10.5),R1_WC_WB(10.5),R1_ST_WB(10.5),R2_NC_WB(10.5),R2_WC_WB(10.5),R2_ST_WB(10.5),R3_
NC_WB(10.5),R4_NC_WB(10.5),R5_NC_WB(10.5), PRINTO=2
PRINT CSV=T, LIST=
5.0,R1_NC_WX(10.5),R1_WC_WX(10.5),R1_ST_WX(10.5),R2_NC_WX(10.5),R2_WC_WX(10.5),R2_ST_WX(10.5),R3_
NC_WX(10.5),R4_NC_WX(10.5),R5_NC_WX(10.5), PRINTO=2
PRINT CSV=T, LIST=
6.0,R1_NC_BA(10.5),R1_WC_BA(10.5),R1_ST_BA(10.5),R2_NC_BA(10.5),R2_WC_BA(10.5),R2_ST_BA(10.5),R3_
NC_BA(10.5),R4_NC_BA(10.5),R5_NC_BA(10.5), PRINTO=2
PRINT CSV=T, LIST=
7.0,R1_NC_WK(10.5),R1_WC_WK(10.5),R1_ST_WK(10.5),R2_NC_WK(10.5),R2_WC_WK(10.5),R2_ST_WK(10.5),R3_
NC_WK(10.5),R4_NC_WK(10.5),R5_NC_WK(10.5), PRINTO=2
```

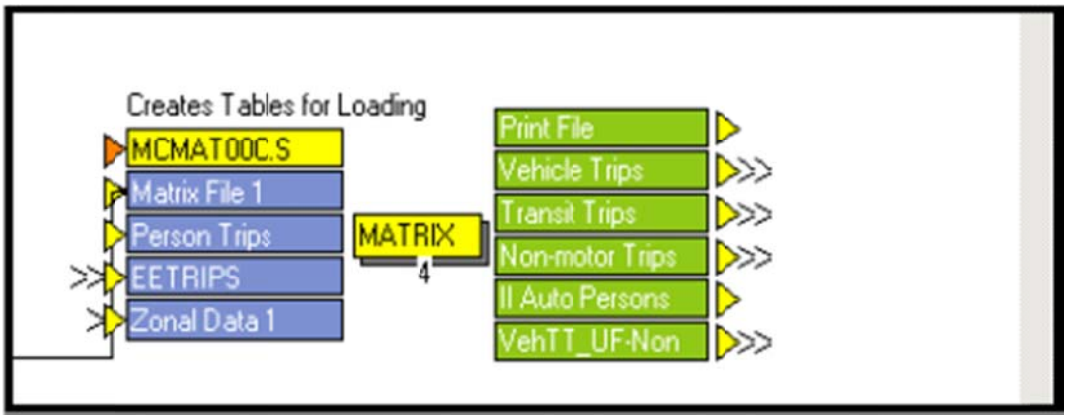
```
PRINT CSV=T, LIST=
8.0,R1_NC_BK(10.5),R1_WC_BK(10.5),R1_ST_BK(10.5),R2_NC_BK(10.5),R2_WC_BK(10.5),R2_ST_BK(10.5),R3_
NC_BK(10.5),R4_NC_BK(10.5),R5_NC_BK(10.5), PRINTO=2


; print REVISED modal constants
PRINT CSV=T, LIST=
1.0,R1_NC_DA(10.5),R1_WC_DA(10.5),R1_ST_DA(10.5),R2_NC_DA(10.5),R2_WC_DA(10.5),R2_ST_DA(10.5),R3_
NC_DA(10.5),R4_NC_DA(10.5),R5_NC_DA(10.5), PRINTO=3
PRINT CSV=T, LIST=
2.0,R1_NC_CP(10.5),R1_WC_CP(10.5),R1_ST_CP(10.5),R2_NC_CP(10.5),R2_WC_CP(10.5),R2_ST_CP(10.5),R3_
NC_CP(10.5),R4_NC_CP(10.5),R5_NC_CP(10.5), PRINTO=3
PRINT CSV=T, LIST=
3.0,R1_NC_CX(10.5),R1_WC_CX(10.5),R1_ST_CX(10.5),R2_NC_CX(10.5),R2_WC_CX(10.5),R2_ST_CX(10.5),R3_
NC_CX(10.5),R4_NC_CX(10.5),R5_NC_CX(10.5), PRINTO=3
PRINT CSV=T, LIST=
4.0,R1_NC_WB(10.5),R1_WC_WB(10.5),R1_ST_WB(10.5),R2_NC_WB(10.5),R2_WC_WB(10.5),R2_ST_WB(10.5),R3_
NC_WB(10.5),R4_NC_WB(10.5),R5_NC_WB(10.5), PRINTO=3
PRINT CSV=T, LIST=
5.0,R1_NC_WX(10.5),R1_WC_WX(10.5),R1_ST_WX(10.5),R2_NC_WX(10.5),R2_WC_WX(10.5),R2_ST_WX(10.5),R3_
NC_WX(10.5),R4_NC_WX(10.5),R5_NC_WX(10.5), PRINTO=3
PRINT CSV=T, LIST=
6.0,R1_NC_BA(10.5),R1_WC_BA(10.5),R1_ST_BA(10.5),R2_NC_BA(10.5),R2_WC_BA(10.5),R2_ST_BA(10.5),R3_
NC_BA(10.5),R4_NC_BA(10.5),R5_NC_BA(10.5), PRINTO=3
PRINT CSV=T, LIST=
7.0,R1_NC_WK(10.5),R1_WC_WK(10.5),R1_ST_WK(10.5),R2_NC_WK(10.5),R2_WC_WK(10.5),R2_ST_WK(10.5),R3_
NC_WK(10.5),R4_NC_WK(10.5),R5_NC_WK(10.5), PRINTO=3
PRINT CSV=T, LIST=
8.0,R1_NC_BK(10.5),R1_WC_BK(10.5),R1_ST_BK(10.5),R2_NC_BK(10.5),R2_WC_BK(10.5),R2_ST_BK(10.5),R3_
NC_BK(10.5),R4_NC_BK(10.5),R5_NC_BK(10.5), PRINTO=3

endif ; MC_Cal

ENDIF

ENDRUN
```



MCMAT00C.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX PRNFILE="{SCENARIO_DIR}\output\FINALTABLES.PRN" MSG='Creates Tables for Loading'
FILEI MATI[3] = "{SCENARIO_DIR}\output\EETAB.MAT"
FILEI MATI[2] = "{SCENARIO_DIR}\output\PTRIPS.MAT"
FILEO MATO[5] = "{SCENARIO_DIR}\output\VEHSBYUF_NON.MAT",
MO=41,42,51,52,61,62,
 NAME=UF_light,UF_heavy,Non_light,Non_heavy,SelZones_light,SelZones_heavy, DEC=6*S
FILEI ZDATI[1] = "{SCENARIO_DIR}\input\ZoneData{YEAR}.DBF",
Z=TAZ_20{year}
FILEO MATO[4] = "{SCENARIO_DIR}\output\IIAUTOPERSONS.MAT",
```

```
 MO=31, NAME=iiAutoPersons, DEC=5*S
FILEO MATO[3] = "{SCENARIO_DIR}\output\NONMOTOR.MAT",
 MO=21-22, NAME=WALK,BIKE, DEC=2*S
FILEO MATO[2] = "{SCENARIO_DIR}\output\TRANSIT.MAT",
 MO=11-16,
NAME=PKWALKLOCAL,PKWALKPREM,PKAUTOBA,OPWALKLOCAL,OPWALKPREM,OPAUTOBA, DEC=6*S
FILEO MATO[1] = "{SCENARIO_DIR}\output\VEHICLES.MAT",
MO=1-5,
 NAME=DRIVEALONE,CARPOOL,LIGHTTRUCK,HEAVYTRUCK,EETRIPS, DEC=5*S
FILEI MATI[1] = "{SCENARIO_DIR}\output\MODEOUT.MAT"
PARAMETERS ZONEMSG=100
; DRIVE ALONE
MW[1]=((MI.1.HBWDA+MI.1.HBWDA.T)/1.0+
       (MI.1.HBODA+MI.1.HBODA.T)/1.0+
       (MI.1.NHBDA+MI.1.NHBDA.T)/1.0+
       (MI.1.HBUDA+MI.1.HBUDA.T)/1.0+
       (MI.2.SOVIE+MI.2.SOVIE.T)/1.0)*0.50
; CARPOOL
MW[2]=((MI.1.HBWCP+MI.1.HBWCP.T)/2.0+
       (MI.1.HBOCP+MI.1.HBOCP.T)/2.0+
       (MI.1.NHBCP+MI.1.NHBCP.T)/2.0+
       (MI.1.HBUCP+MI.1.HBUCP.T)/2.0+
       (MI.1.HBWCX+MI.1.HBWCX.T)/{HBW3P}+
       (MI.1.HBOCX+MI.1.HBOCX.T)/{HBO3P}+
       (MI.1.NHBCX+MI.1.NHBCX.T)/{NHB3P}+
       (MI.1.HBUCX+MI.1.HBUCX.T)/{HBW3P}+ ; ASSUME 3+ occ same as work
       (MI.2.HOVIE+MI.2.HOVIE.T)/1.0)*0.50
; LIGHT DUTY TRUCKS
MW[3]=((MI.2.TRUCK4+MI.2.TRUCK4.T)+(MI.2.TRUCKLDIE+MI.2.TRUCKLDIE.T)+(MI.2.TRUCKSU+MI.2.TRUCKSU.T
))*0.50
; HEAVY DUTY TRUCKS
MW[4]=((MI.2.TRUCKTRLR+MI.2.TRUCKTRLR.T)+(MI.2.TRUCKHDIE+MI.2.TRUCKHDIE.T))*0.50 ; 0.5 added by
KDK
; EETRIPS
MW[5]=MI.3.1
; TRANSIT, PEAK PERIOD
MW[011]=MI.1.HBWWB
MW[012]=MI.1.HBWWX
MW[013]=MI.1.HBWBA
; TRANSIT, OFF-PEAK PERIOD
MW[014]=MI.1.HBOWB+MI.1.NHBWB+MI.1.HBUWB+MI.1.HDORMUWB
MW[015]=MI.1.HBOWX+MI.1.NHBWX+MI.1.HBUWX
MW[016]=MI.1.HBOBA+MI.1.NHBBA+MI.1.HBUBA
; NON-MOTORIZED
MW[021]=MI.1.HBWWK+MI.1.HBOWK+MI.1.NHBWK+MI.1.HBUWK+MI.1.HDORMUWK
MW[022]=MI.1.HBWBK+MI.1.HBOBK+MI.1.NHBBK+MI.1.HBUBK+MI.1.HDORMUBK
; Internal Auto Persons
MW[31]= MI.1.HBWDA+        MI.1.HBODA+        MI.1.NHBDA+
        MI.1.HBUDA+        MI.1.HBWCP+        MI.1.HBOCP+
        MI.1.NHBCP+        MI.1.HBUCP+        MI.1.HBWCX+
        MI.1.HBOCX+        MI.1.NHBCX+        MI.1.HBUCX

; Select Zone Vehicle Trips

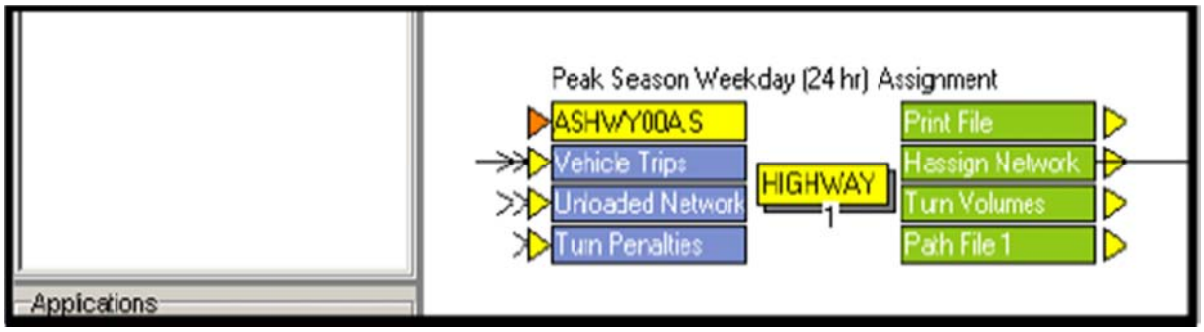
  JLOOP
   if(i=1 & j=1) MW[011]=MW[011]+0.01
   if(i=1 & j=1) MW[012]=MW[012]+0.01
   if(i=1 & j=1) MW[013]=MW[013]+0.01
   if(i=1 & j=1) MW[014]=MW[014]+0.01
   if(i=1 & j=1) MW[015]=MW[015]+0.01
   if(i=1 & j=1) MW[016]=MW[016]+0.01

   if((ZI.1.SELECTZONE[J]=1) || (ZI.1.SELECTZONE[I]=1)) ; Select Zones
     mw[61] = mw[1] + mw[2] + mw[3] +mw[5] ; Select Zones light Vehicles
     mw[62] = mw[4]                        ; Select Zones heavy vehicles
   endif


; UF vs Non-UF Vehicle Trips
   if((ZI.1.UFZONES[J]=1) || (ZI.1.UFZONES[I]=1)) ; UF related
```

```
    mw[41] = mw[1] + mw[2] + mw[3] +mw[5] ; UF light Vehicles
    mw[42] = mw[4]                        ; UF heavy vehicles
  else
    mw[51] = mw[1] + mw[2] + mw[3] +mw[5] ; non-UF light Vehicles
    mw[52] = mw[4]                        ; non-UF heavy vehicles
  endif
 ENDJLOOP
ENDRUN
```

Assignment Step



ASHWY00A.S

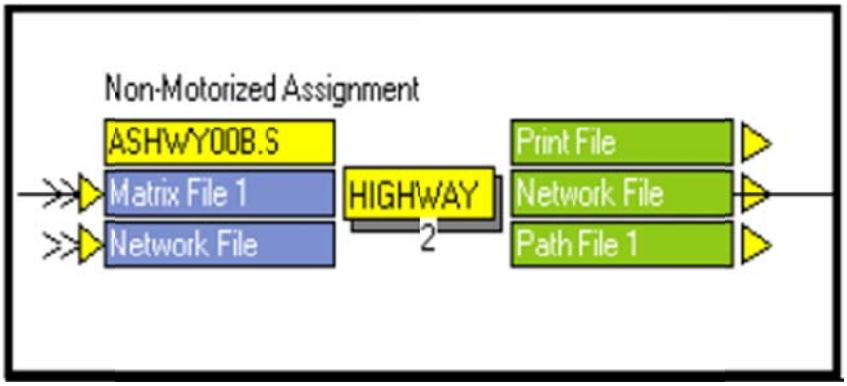
```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=HIGHWAY PRNFILE="{SCENARIO_DIR}\output\HASSIGN.PRN" MSG='Peak Season Weekday (24 hr)
Assignment'
FILEI NETI = "{SCENARIO_DIR}\output\UNLOADED.NET"
FILEO TURNVOLO = "{SCENARIO_DIR}\output\TURNVOL.BIN",
FORMAT=DBF
TURNS N=1-999999, T=TURN[1] + TURN[2] +TURN[3] +TURN[4]
FILEI MATI[1] = "{SCENARIO_DIR}\output\VEHSBYUF_NON.MAT"
FILEO NETO = "{SCENARIO_DIR}\output\HASSIGN.NET"
FILEO PATHO[1] = "{SCENARIO_DIR}\output\AUTOS.PTH"
FILEI TURNPENI = "{SCENARIO_DIR}\input\TCARDS.PEN"
parameters zonemsg=100
PROCESS PHASE=LINKREAD
; USE THE USER SUPPLIED ALPHA AND BETA FOR THE BPR CURVE
  IF (LI.BPRCOEFFICIENT=0)
     LW.BPRCOEFFICIENT=0.15
  ELSE
     LW.BPRCOEFFICIENT=LI.BPRCOEFFICIENT
  ENDIF
  IF (LI.BPREXPONENT=0)
     LW.BPREXPONENT=4.0
  ELSE
     LW.BPREXPONENT=LI.BPREXPONENT
  ENDIF
  IF (LI.CAPACITY=0)
     LW.DAILYCAP=999999
  ELSE
      LW.DAILYCAP=(LI.CAPACITY/li.confac)*li.uroadfactor
  ENDIF
  IF (LI.TIME=0)
     LW.FFTIME=0.00001
  ELSE
     LW.FFTIME=LI.TIME
  ENDIF
C=LW.DAILYCAP
T0=LW.FFTIME
IF (LI.FTYPE=49) ADDTOGROUP=1
ENDPROCESS


PROCESS PHASE=ILOOP
```

```
  MW[1]=MI.1.UF_light
  MW[2]=MI.1.UF_heavy*{PCE_HT}
  MW[3]=MI.1.Non_light
  MW[4]=MI.1.Non_heavy*{PCE_HT}
  MW[5]=MI.1.SelZones_light
  MW[6]=MI.1.SelZones_heavy*{PCE_HT}
  PATHLOAD PATH=TIME,
VOL[1]=MW[1],VOL[2]=MW[2],VOL[3]=MW[3],VOL[4]=MW[4],VOL[5]=MW[5],VOL[6]=MW[6], PENI=1,
EXCLUDEGROUP=1,
  PATHO=1, ALLJ=T, INCLUDECOST=F, NAME=ALLTRIPS
ENDPROCESS


PROCESS PHASE=ADJUST
  V = VOL[1] + VOL[2]+ VOL[3] + VOL[4]
  FUNCTION   TC[1]=T0*(1+LW.BPRCOEFFICIENT*(V/C)^LW.BPREXPONENT) ; congested time equation, no
toll model in place
ENDPROCESS

ENDRUN
```



ASHWY00B.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=HIGHWAY PRNFILE="{SCENARIO_DIR}\output\ASHWY00A.PRN" MSG='Non-Motorized Assignment'
FILEI NETI = "{SCENARIO_DIR}\output\UNLOADED.NET"
FILEO PATHO[1] = "{SCENARIO_DIR}\output\NONMOTOR.PTH"
FILEO NETO = "{SCENARIO_DIR}\output\NONMOTOR.NET"
FILEI MATI[1] = "{SCENARIO_DIR}\output\NONMOTOR.MAT"

PARAMETERS MAXITERS=1

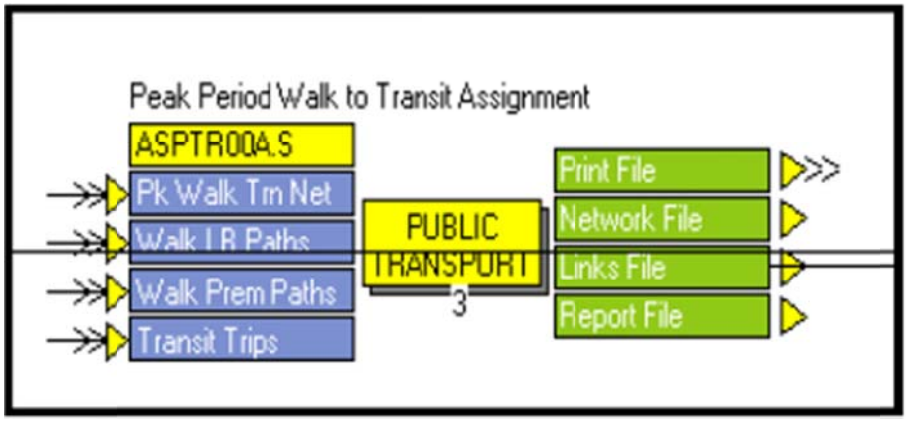
PROCESS PHASE=LINKREAD
IF (LI.FTYPE=10-19,70-99) ADDTOGROUP=1

ENDPROCESS

PROCESS PHASE=ILOOP
 PATHLOAD PATH=LI.DISTANCE, VOL[1]=MI.1.WALK, VOL[2]=MI.1.BIKE, EXCLUDEGROUP=1,
    PATHO=1,NAME='NONMOTOR',ALLJ=T,INCLUDECOSTS=F

ENDPROCESS

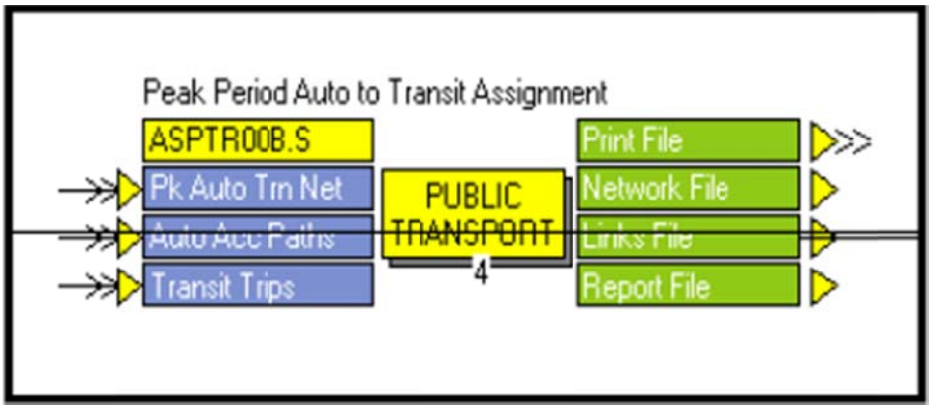
ENDRUN
```



ASPTR00A.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=PUBLIC TRANSPORT PRNFILE="{SCENARIO_DIR}\output\TRANSIT_AMWALK.PRN" MSG='Peak Period Walk
to Transit Assignment'
FILEI ROUTEI[2] = "{SCENARIO_DIR}\output\WALKPREMAM.RTE"
FILEI ROUTEI[1] = "{SCENARIO_DIR}\output\WALKLBAM.RTE"
FILEI NETI = "{SCENARIO_DIR}\output\TNETWALKAM.NET"
FILEO LINKO = "{SCENARIO_DIR}\output\TLOD1.DBF",
SKIP0=Y,NTLEGS=F
FILEI MATI[1] = "{SCENARIO_DIR}\output\TRANSIT.MAT"
FILEO REPORTO = "{SCENARIO_DIR}\output\ASPTR00B.PRN"
FILEO NETO = "{SCENARIO_DIR}\output\TLOADAM1.NET"
PARAMETERS USERCLASSES=1,2,
           TRIPSIJ[1]=(MI.1.PKWALKLOCAL),
           TRIPSIJ[2]=(MI.1.PKWALKPREM),
           NOROUTEERRS=9999999,
           NOROUTEMSGS=0
;Selection of Loading Reports
REPORT LINES=T; LINEVOLS=T STOPSONLY=T
PAGEHEIGHT=32767

ENDRUN
```

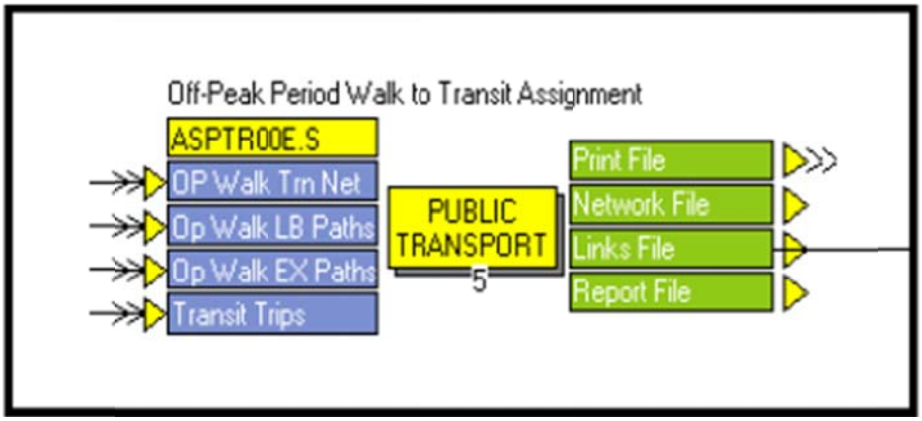


ASPTR00B.S

```
 ; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=PUBLIC TRANSPORT PRNFILE="{SCENARIO_DIR}\output\TRANSIT_AMAUTO.PRN" MSG='Peak Period Auto
to Transit Assignment'
FILEI NETI = "{SCENARIO_DIR}\output\TNETAUTOAM.NET"
FILEO LINKO = "{SCENARIO_DIR}\output\TLOD2.DBF",
SKIP0=Y,NTLEGS=F
```

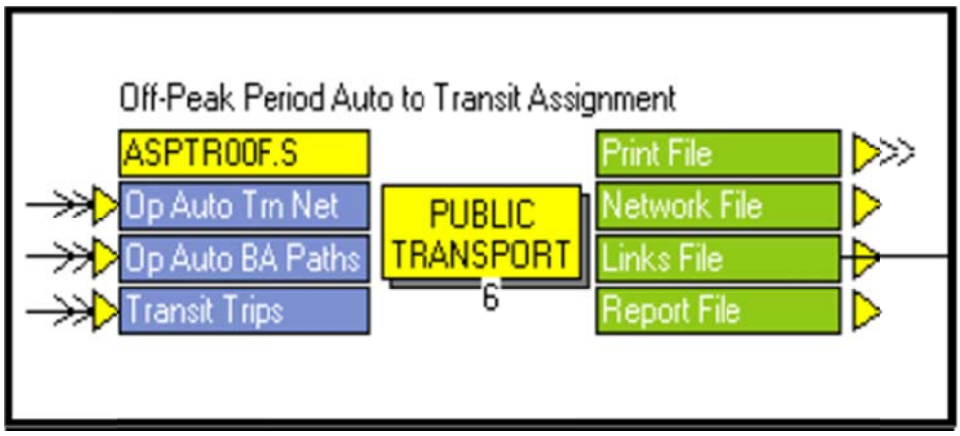
```
FILEO REPORTO = "{SCENARIO_DIR}\output\ASPTR00D.PRN"
FILEO NETO = "{SCENARIO_DIR}\output\TLOADAM2.NET"
FILEI MATI[1] = "{SCENARIO_DIR}\output\TRANSIT.MAT"
FILEI ROUTEI[1] = "{SCENARIO_DIR}\output\AUTOALLAM.RTE"
PARAMETERS USERCLASSES=1,
           TRIPSIJ=(MI.1.PKAUTOBA),
           NOROUTEERRS=999999,
           NOROUTEMSGS=0
REPORT LINES=T ;LINEVOLS=T
PAGEHEIGHT=32767

ENDRUN
```



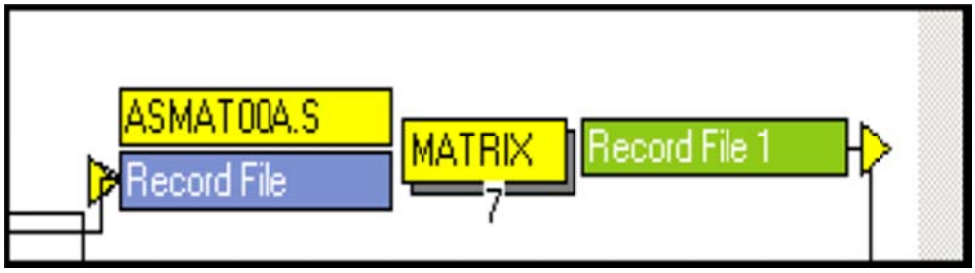
ASPTR00E.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=PUBLIC TRANSPORT PRNFILE="{SCENARIO_DIR}\output\TRANSIT_MDWALK.PRN" MSG='Off-Peak Period
Walk to Transit Assignment'
FILEI ROUTEI[2] = "{SCENARIO_DIR}\output\WALKPREMMD.RTE"
FILEI NETI = "{SCENARIO_DIR}\output\TNETWALKMD.NET"
FILEO LINKO = "{SCENARIO_DIR}\output\TLOD3.DBF",
SKIP0=Y,NTLEGS=F
FILEI ROUTEI[1] = "{SCENARIO_DIR}\output\WALKLBMD.RTE"
FILEI MATI[1] = "{SCENARIO_DIR}\output\TRANSIT.MAT"
FILEO REPORTO = "{SCENARIO_DIR}\output\ASPTR00F.PRN"
FILEO NETO = "{SCENARIO_DIR}\output\TLOADMD1.NET"
PARAMETERS USERCLASSES=1,2,
           TRIPSIJ[1]=(MI.1.OPWALKLOCAL),
           TRIPSIJ[2]=(MI.1.OPWALKPREM)
           NOROUTEERRS=9999999,
           NOROUTEMSGS=0, HDWAYPERIOD=2
REPORT LINES=T ; LINEVOLS=T
PAGEHEIGHT=32767
ENDRUN
```



ASPTR00F.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=PUBLIC TRANSPORT PRNFILE="{SCENARIO_DIR}\output\TRANSIT_MDAUTO.PRN" MSG='Off-Peak Period
Auto to Transit Assignment'
FILEI ROUTEI[1] = "{SCENARIO_DIR}\output\AUTOALLMD.RTE"
FILEO LINKO = "{SCENARIO_DIR}\output\TLOD4.DBF",
SKIP0=Y,NTLEGS=F
FILEI NETI = "{SCENARIO_DIR}\output\TNETAUTOMD.NET"
FILEI MATI[1] = "{SCENARIO_DIR}\output\TRANSIT.MAT"
FILEO REPORTO = "{SCENARIO_DIR}\output\ASPTR00H.PRN"
FILEO NETO = "{SCENARIO_DIR}\output\TLOADMD2.NET"
PARAMETERS USERCLASSES=1,
           TRIPSIJ=(MI.1.OPAUTOBA),
           NOROUTEERRS=999999,
           NOROUTEMSGS=0, HDWAYPERIOD=2
REPORT LINES=T ;LINEVOLS=T
PAGEHEIGHT=32767
ENDRUN
```

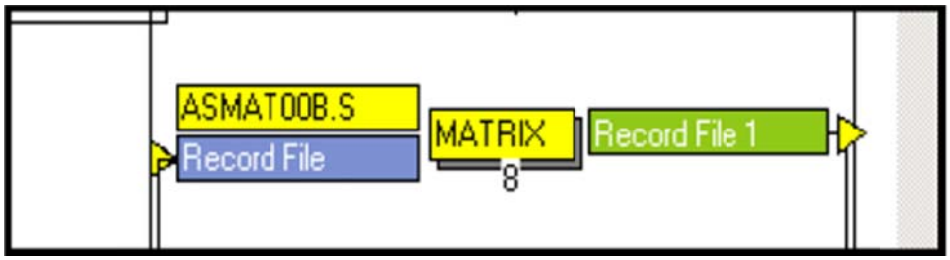


ASMAT00A.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX
FILEO RECO[1] = "{SCENARIO_DIR}\output\LL1.DBF",
  FIELDS=A,B,MODE,NAME,DIST,TIME,SEQ,CNT,HEADWAY_1,VOL
FILEI RECI = "{SCENARIO_DIR}\output\TLOD1.DBF"
vtot=vtot+ri.VOL
if (ri.SEQ==ri.CNT)
  A      = ri.A
  B      = ri.B
  MODE   = ri.MODE
  NAME   = 'COMBINED'
  DIST   = ri.DIST
  TIME   = ri.TIME
  SEQ    = 1
  CNT    = 1
```

```
  HEADWAY= ri.HEADWAY_1
  VOL    = vtot
  vtot   = 0.0
  WRITE RECO=1
endif

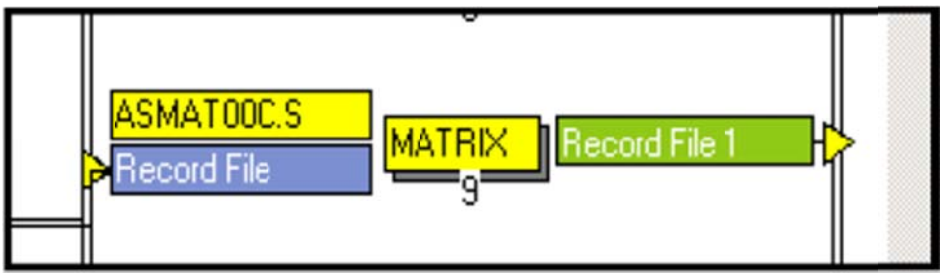
ENDRUN
```



ASMAT00B.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX
FILEI RECI = "{SCENARIO_DIR}\output\TLOD2.DBF"
FILEO RECO[1] = "{SCENARIO_DIR}\output\LL2.DBF",
  FIELDS=A,B,MODE,NAME,DIST,TIME,SEQ,CNT,HEADWAY_1,VOL
vtot=vtot+ri.VOL
if (ri.SEQ==ri.CNT)
  RO.A      = ri.A
  RO.B      = ri.B
  RO.MODE   = ri.MODE
  RO.NAME   = 'COMBINED'
  RO.DIST   = ri.DIST
  RO.TIME   = ri.TIME
  RO.SEQ    = 1
  RO.CNT    = 1
  RO.HEADWAY= ri.HEADWAY_1
  RO.VOL    = vtot
  vtot   = 0.0
  WRITE RECO=1
endif

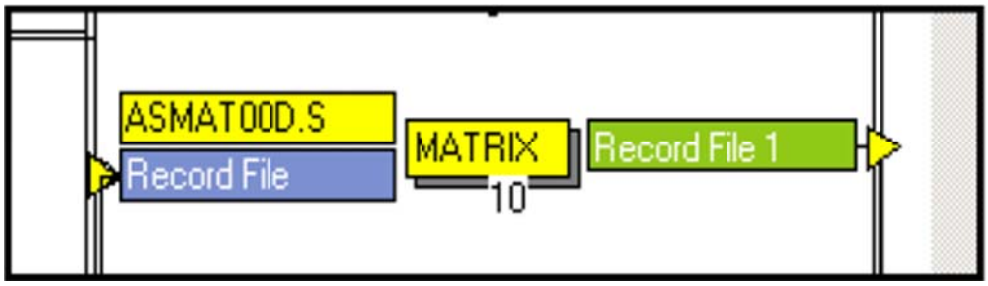
ENDRUN
```



ASMAT00C.S

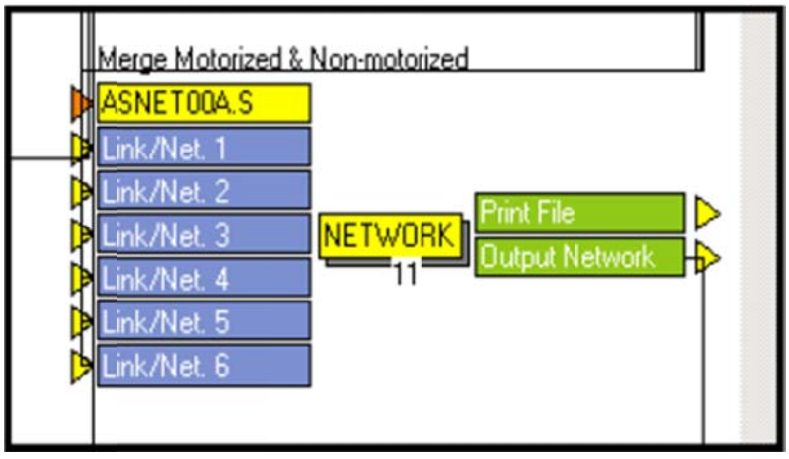
```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX
FILEI RECI = "{SCENARIO_DIR}\output\TLOD3.DBF"
FILEO RECO[1] = "{SCENARIO_DIR}\output\LL3.DBF",
  FIELDS=A,B,MODE,NAME,DIST,TIME,SEQ,CNT,HEADWAY_2,VOL
vtot=vtot+ri.VOL
if (ri.SEQ==ri.CNT)
  RO.A      = ri.A
  RO.B      = ri.B
  RO.MODE   = ri.MODE
  RO.NAME   = 'COMBINED'
```

```
  RO.DIST   = ri.DIST
  RO.TIME   = ri.TIME
  RO.SEQ    = 1
  RO.CNT    = 1
  RO.HEADWAY= "ri.HEADWAY_2"
  RO.VOL    = vtot
  vtot   = 0.0
  WRITE RECO=1
endif
ENDRUN
```



ASMAT00D.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=MATRIX
FILEI RECI = "{SCENARIO_DIR}\output\TLOD4.DBF"
FILEO RECO[1] = "{SCENARIO_DIR}\output\LL4.DBF",
  FIELDS=A,B,MODE,NAME,DIST,TIME,SEQ,CNT,HEADWAY_2,VOL
vtot=vtot+ri.VOL
if (ri.SEQ==ri.CNT)
  RO.A      = ri.A
  RO.B      = ri.B
  RO.MODE   = ri.MODE
  RO.NAME   = 'COMBINED'
  RO.DIST   = ri.DIST
  RO.TIME   = ri.TIME
  RO.SEQ    = 1
  RO.CNT    = 1
  RO.HEADWAY= "ri.HEADWAY_2"
  RO.VOL    = vtot
  vtot   = 0.0
  WRITE RECO=1
Endif
ENDRUN
```



ASNET00A.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=NETWORK PRNFILE="{SCENARIO_DIR}\output\ASNET00A.PRN" MSG='Merge Motorized & Non-
motorized'
FILEO NETO = "{SCENARIO_DIR}\output\COMB_TEMP.NET"
;FILEO PRINTO[1] = "{SCENARIO_DIR}\output\UFOUCH.PRN"
FILEI LINKI[6] = "{SCENARIO_DIR}\output\LL4.DBF"
FILEI LINKI[5] = "{SCENARIO_DIR}\output\LL3.DBF"
FILEI LINKI[4] = "{SCENARIO_DIR}\output\LL2.DBF"
FILEI LINKI[3] = "{SCENARIO_DIR}\output\LL1.DBF"
FILEI LINKI[2] = "{SCENARIO_DIR}\output\NONMOTOR.NET"
FILEI LINKI[1] = "{SCENARIO_DIR}\output\HASSIGN.NET"

PROCESS PHASE=LINKMERGE

  NONMOTORVOL=LI.2.V_1
  CGSPEED=LI.1.CSPD_1
  CGTIME=LI.1.TIME_1
  _UF_LIGHT=LI.1.V1_1
  _UF_HEAVY=LI.1.V2_1/{PCE_HT}
  _NON_LIGHT=LI.1.V3_1
  _NON_HEAVY=LI.1.V4_1/{PCE_HT}
  _SELZONE_LIGHT=LI.1.V5_1
  _SELZONE_HEAVY=LI.1.V6_1/{PCE_HT}

  SELZONE_MOTOR=_SELZONE_LIGHT+_SELZONE_HEAVY

  UF_MOTOR=_UF_LIGHT+_UF_HEAVY
  LIGHTVEHICLES=_UF_LIGHT+_NON_LIGHT
  HEAVYTRUCKS=_UF_HEAVY+_NON_HEAVY
  MOTORIZEDVOL=LIGHTVEHICLES+HEAVYTRUCKS
  if (MOTORIZEDVOL>0.0)
     UFPCT=100*UF_MOTOR/MOTORIZEDVOL
  endif
  VMT=MOTORIZEDVOL*DISTANCE
  VHT=MOTORIZEDVOL*CGTIME/60.
  PEDESTRIANS=LI.2.V1_1
  BICYCLISTS=LI.2.V2_1
  VOL_CAP=MOTORIZEDVOL/DAILYCAP

  IF (CAPACITY=0)
     DAILYCAPE=999999
  ELSE
      DAILYCAPE= 10.0*CAPACITY
  ENDIF

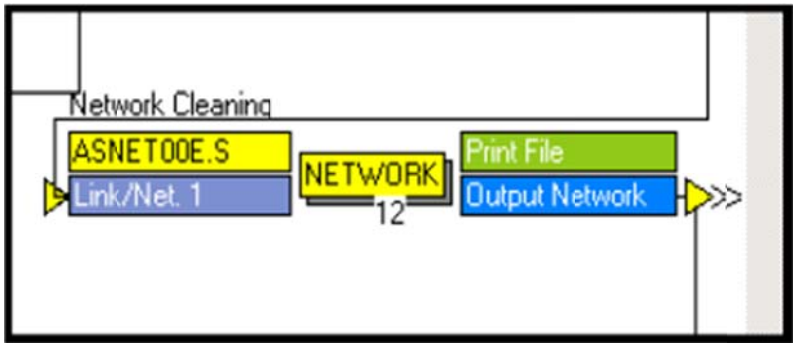
  VOL_CAPE=MOTORIZEDVOL/DAILYCAPE

  TranVol=li.3.vol+li.4.vol+li.5.vol+li.6.vol

if(COUNT{year} > 0)
  VC=MOTORIZEDVOL/COUNT{year}
endif

ENDPROCESS

ENDRUN
```

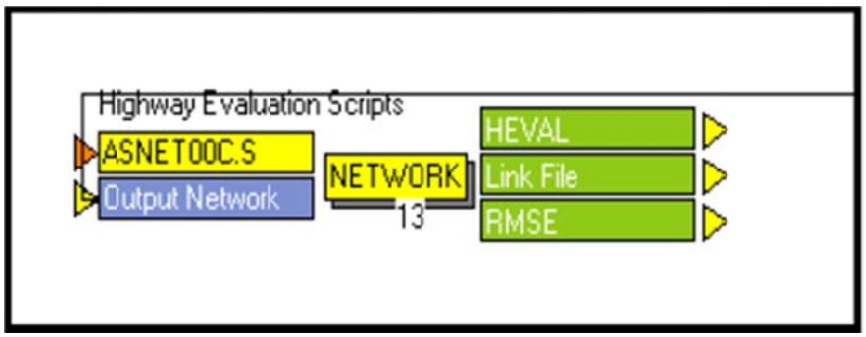


ASNET00E.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=NETWORK PRNFILE="C:\Users\mgao\Documents\Gainesville 2040 LRTP\Project Management\08-
Model\Gainesville_2010_2040_run7_Final\APPLICATIONS\ASNET00C.PRN" MSG='Network Cleaning'
FILEO NETO = "{SCENARIO_DIR}\output\COMBINEDLOADED.NET",
   EXCLUDE=VOL,MODE,DIST,TIME,SEQ,CNT,HEADWAY_1,HEADWAY_2,SECNUM,TWOWAY,
FTYPE1,DIR,ATYPE1,BPRCOEFFICIENT,V_1,VC_1,CSPD_1,VDT_1,VHT_1,V1_1,V2_1,VT_1,V1T_1,
V2T_1,V3_1,V4_1,V5_1,  V6_1,V3T_1,V4T_1,V5T_1,V6T_1,FTYPE1,ATYPE1,TIME_1,UROADFACTOR,
BPRCOEFFICIENT,BPREXPONENT

FILEI LINKI[1] = "{SCENARIO_DIR}\output\COMB_TEMP.NET"

ENDRUN
```



ASNET00C.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=NETWORK PRNFILE="{SCENARIO_DIR}\output\HEVAl_Daily.PRN" MSG='Highway Evaluation Scripts'
FILEO LINKO = "{SCENARIO_DIR}\output\Daily_Links.DBF"
FILEI LINKI[1] = "{SCENARIO_DIR}\output\COMBINEDLOADED.NET"
FILEO PRINTO[1] = "{SCENARIO_DIR}\output\RMSE.PRN"

; ============================================================
; LINKMERGE PHASE
; ============================================================
PHASE=LINKMERGE

; DUMMY VARIABLES FOR HEVALDBF
ZONE        =1
USECODE     =1
LOCATION    =1
LANDUSE     =1
CCODE       =1
TOTCNT      =li.1.COUNT{year}
CAP         =LI.1.CAPACITY*LI.1.LANES/LI.1.CONFAC


;
```

```
   ft=int(li.1.FTYPE/10)
   at=int(li.1.ATYPE/10)
   LNS=li.1.LANES
   TOTAL_VOL=ROUND(li.1.MOTORIZEDVOL)
;
; initialize arrays and variables
   ARRAY _err=13, _cns=13, _cnt=13, _RGP=13, _volbyft=100, _cntbyft=100
   ARRAY _volbyat=100, _cntbyat=100, _lnkbyft=100, _lnkbyat=100
   ARRAY _capbyft=100, _capbyat=100
   _group=(0.0*FT)
   _RGP[1]=1, _RGP[2]=5000, _RGP[3]=10000, _RGP[4]=20000, _RGP[5]=30000, _RGP[6]=40000,
_RGP[7]=50000,
   _RGP[8]=60000, _RGP[9]=70000, _RGP[10]=80000, _RGP[11]=90000, _RGP[12]=100000, _RGP[13]=500000
   IF (A=1)
     LOOP _iter=1,13
           _err[_iter]=0,_cnt[_iter]=0,_cns[_iter]=0
     ENDLOOP
     LOOP _iter=1,99
           _volbyft[_iter]=0, _cntbyft[_iter]=0, _lnkbyft[_iter]=0, _capbyft[_iter]=0
           _volbyat[_iter]=0, _cntbyat[_iter]=0, _lnkbyat[_iter]=0, _capbyat[_iter]=0
     ENDLOOP
   ENDIF

   links=1
   lanemiles=lns*li.1.distance
; calculate and compartmentalize
 if (ft<>8)
   IF(TOTCNT>0) VOLCNT=TOTAL_VOL/TOTCNT, NETDIFF=TOTAL_VOL-TOTCNT, ABSDIFF=ABS(NETDIFF),
ERRORSQ=NETDIFF^2, PCTDIFF=100*NETDIFF/TOTCNT _group=1
   IF (TOTCNT>5000) _group=2
   IF (TOTCNT>10000) _group=3
   IF (TOTCNT>20000) _group=4
   IF (TOTCNT>30000) _group=5
   IF (TOTCNT>40000) _group=6
   IF (TOTCNT>50000) _group=7
   IF (TOTCNT>60000) _group=8
   IF (TOTCNT>70000) _group=9
   IF (TOTCNT>80000) _group=10
   IF (TOTCNT>90000) _group=11
   IF (TOTCNT>100000) _group=12
   IF (TOTCNT>0)
   _ERR[_group]=ERRORSQ+_ERR[_group], _CNS[_group]=TOTCNT+_CNS[_group],
_CNT[_group]=_CNT[_group]+1
   _ERR[13]=ERRORSQ+_ERR[13], _CNS[13]=TOTCNT+_CNS[13], _CNT[13]=_CNT[13]+1
   ENDIF
  endif
IF (TOTCNT>0)
   _volbyft[ft]=_volbyft[ft]+TOTAL_VOL
   _cntbyft[ft]=_cntbyft[ft]+TOTCNT
   _lnkbyft[ft]=_lnkbyft[ft]+1
   _capbyft[ft]=_capbyft[ft]+CAP
   _volbyat[at]=_volbyat[at]+TOTAL_VOL
   _cntbyat[at]=_cntbyat[at]+TOTCNT
   _lnkbyat[at]=_lnkbyat[at]+1
   _capbyat[at]=_capbyat[at]+CAP
   _volbyft[100]=_volbyft[100]+TOTAL_VOL
   _cntbyft[100]=_cntbyft[100]+TOTCNT
   _lnkbyft[100]=_lnkbyft[100]+1
   _volbyat[100]=_volbyat[100]+TOTAL_VOL
   _cntbyat[100]=_cntbyat[100]+TOTCNT
   _lnkbyat[100]=_lnkbyat[100]+1
endif

CROSSTAB  VAR= LINKS LANEMILES, form=14.0c,
    col=FT, range=1-9-1,1-9,
    row=LANES, range=1-9-1,1-9
IF (TOTCNT>0)
    _C_VMT=DISTANCE*TOTCNT
    _A_VMT=DISTANCE*TOTAL_VOL
    _C_VHT=TOTCNT*CGTIME/60.
    _A_VHT=TOTAL_VOL*CGTIME/60.
```

```
    _A_VOL=TOTAL_VOL
    _C_VOL=TOTCNT
    _C_CAP=CAP
CROSSTAB  VAR= _A_VOL,_C_VOL,_C_VMT,_A_VMT,_C_VHT,_A_VHT,_C_CAP, form=14.0c,
    col=FT, range=1-4-1,6-9-1,1-9,
    row=AT, range=1-5-1,1-9,
    comp=_A_VOL/_C_VOL,form=8.3,
    comp=_A_VMT/_C_VMT,form=8.3,
    comp=_A_VHT/_C_VHT,form=8.3,
    comp=_A_VOL/_C_CAP,form=8.3
CROSSTAB  VAR= _A_VOL,_C_VOL, form=14.0c,
    col=FT, range=1-4-1,6-9-1,1-9,
    row=LANES, range=1-9-1,1-6

;CROSSTAB  VAR= _A_VOL,_C_VOL,_C_VMT,_A_VMT,_C_VHT,_A_VHT,_C_CAP, form=14.0c,
;    col=FT, range=1-4-1,6-9-1,1-9,
;    row=LOCATION, range=1-7-1,1-7,
;    comp=_A_VOL/_C_VOL,form=8.3,
;    comp=_A_VMT/_C_VMT,form=8.3,
;    comp=_A_VHT/_C_VHT,form=8.3,
;    comp=_A_VOL/_C_CAP,form=8.3
ENDIF
IF (TOTCNT>0 & SCRN<>0)
    _sVOL=TOTAL_VOL
    _sCNT=TOTCNT
CROSSTAB  VAR= _sVOL,_sCNT, form=9.0c,
    col=FT, range=1-9,
    row=SCRN, range=1-20-1,1-20,
    comp=_sVOL/_sCNT,form=8.3
ENDIF

    _A_VMT_ALL=DISTANCE*TOTAL_VOL
CROSSTAB  VAR= _A_VMT_ALL, form=14.0c,
    col=FT, range=1-4-1,6-9-1,1-9,
    row=AT, range=1-5-1,1-9


;********************PERCENT ERROR BY VOLUME GROUPS CALCULATION*************

ARRAY _PCT_ERR_VOLGRP=7
ARRAY _LINKS_VOLGRP=7

IF (_C_VOL<>0)

  IF (_A_VOL >= 1 & _A_VOL< 5000)
  _PCT_ERR_VOLGRP[1]= _PCT_ERR_VOLGRP[1] + ((_A_VOL-_C_VOL)/_C_VOL)*100
  _LINKS_VOLGRP[1]= _LINKS_VOLGRP[1] + 1
  ENDIF

  IF (_A_VOL >= 5000 & _A_VOL< 10000)
  _PCT_ERR_VOLGRP[2]= _PCT_ERR_VOLGRP[2] +  ((_A_VOL-_C_VOL)/_C_VOL)*100
  _LINKS_VOLGRP[2]= _LINKS_VOLGRP[2] + 1
  ENDIF

  IF (_A_VOL >= 10000 & _A_VOL< 20000)
  _PCT_ERR_VOLGRP[3]= _PCT_ERR_VOLGRP[3] +  ((_A_VOL-_C_VOL)/_C_VOL)*100
  _LINKS_VOLGRP[3]= _LINKS_VOLGRP[3] + 1
  ENDIF

  IF (_A_VOL >= 20000 & _A_VOL< 30000)
  _PCT_ERR_VOLGRP[4]= _PCT_ERR_VOLGRP[4] +  ((_A_VOL-_C_VOL)/_C_VOL)*100
  _LINKS_VOLGRP[4]= _LINKS_VOLGRP[4] + 1
  ENDIF

  IF (_A_VOL >= 30000 & _A_VOL< 40000)
  _PCT_ERR_VOLGRP[5]= _PCT_ERR_VOLGRP[5] +  ((_A_VOL-_C_VOL)/_C_VOL)*100
  _LINKS_VOLGRP[5]= _LINKS_VOLGRP[5] + 1
  ENDIF

  IF (_A_VOL >= 40000 & _A_VOL< 50000)
  _PCT_ERR_VOLGRP[6]= _PCT_ERR_VOLGRP[6] +  ((_A_VOL-_C_VOL)/_C_VOL)*100
```

```
  _LINKS_VOLGRP[6]= _LINKS_VOLGRP[6] + 1
  ENDIF

  IF (_A_VOL >= 1 & _A_VOL< 500000)
  _PCT_ERR_VOLGRP[7]= _PCT_ERR_VOLGRP[7] +  ((_A_VOL-_C_VOL)/_C_VOL)*100
  _LINKS_VOLGRP[7]= _LINKS_VOLGRP[7] + 1
  ENDIF

ENDIF


ENDPHASE

; ============================================================
; SUMMARY REPORTING
; ============================================================
PHASE=SUMMARY
PRINT LIST="Scenario = {SCENARIO_SHORTNAME}\n" PRINTO=1
; a little loop to write out the Percent Root Mean Square Error

print list="**************** ALL COUNT ROOT MEAN SQUARE ERROR SUMMARY (exclude HOV)
****************", printo=1
print list=" Group   Volume Range    % RMSE   Target %   Obs", PRINTO=1

LOOP _iter=1,12

  if (_iter=1) _limit='45 - 55'
  if (_iter=2) _limit='35 - 45'
  if (_iter=3) _limit='27 - 35'
  if (_iter=4) _limit='24 - 27'
  if (_iter=5) _limit='22 - 24'
  if (_iter=6) _limit='20 - 22'
  if (_iter=7) _limit='18 - 20'
  if (_iter=8) _limit='17 - 18'
  if (_iter=9) _limit='16 - 17'
  if (_iter=10) _limit='15 - 16'
  if (_iter=11) _limit='14 - 15'
  if (_iter=12) _limit='LT 14  '

 if (_cnt[_iter]>0)
 _RMSE=sqrt(_err[_iter]/(_cnt[_iter]-1))/(_cns[_iter]/_cnt[_iter])*100
 print,
 list=_iter(6.0c)," ",_RGP[_iter](7.0c),"-",_RGP[_iter+1](7.0c)," ",_RMSE(7.1),"%", "  ",
_limit,"    ",_cnt[_iter](5.0), PRINTO=1
 endif
ENDLOOP
 _iter=13
 _RMSE=sqrt(_err[_iter]/(_cnt[_iter]-1))/(_cns[_iter]/_cnt[_iter])*100
 _limit='32 - 39'
 list=_iter(6.0c)," ",_RGP[1](7.0c),"-",_RGP[_iter](7.0c)," ",_RMSE(7.1),"%", "  ", _limit,"
",_cnt[_iter](5.0), PRINTO=1

; one for Vol/Cnt by FT
_iter=0
LOOP _iter=1,100
  if (_iter=1) print list="\n","\n ********************* VOLUME AND COUNT SUMMARY BY FACILITY
TYPE **********************", PRINTO=1
if (_cntbyft[_iter]>0) print,
 list="Facility Type Summary for FT=",_iter(3.0c),
 " VOL=",_volbyft[_iter](11.0c),
 " CNT=",_cntbyft[_iter](11.0c),
 " VOL/CNT=",(_volbyft[_iter]/_cntbyft[_iter])(5.2c),
 "   N=",_lnkbyft[_iter](5.0c), PRINTO=1
ENDLOOP

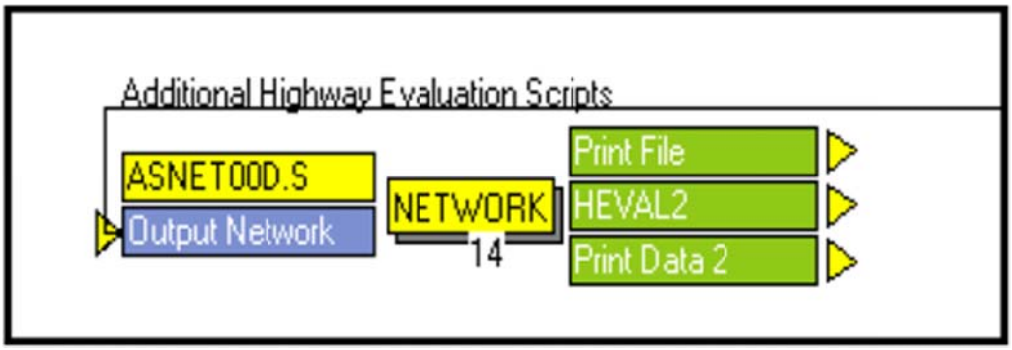
; one for Vol/Cnt by AT
_iter=0
LOOP _iter=1,100
  if (_iter=1) print list="\n","\n ************************ VOLUME AND COUNT SUMMARY BY AREA
TYPE ************************", PRINTO=1
if (_cntbyat[_iter]>0) print,
```

```
 list="    Area Type Summary for AT=",_iter(3.0c),
 " VOL=",_volbyat[_iter](11.0c),
 " CNT=",_cntbyat[_iter](11.0c),
 " VOL/CNT=",(_volbyat[_iter]/_cntbyat[_iter])(5.2c),
 "   N=",_lnkbyat[_iter](5.0c), PRINTO=1
ENDLOOP


_iter=0
LOOP _iter= 1,7
  if (_iter=1) print list="\n","\n ********************** PERCENT ERROR SUMMARY BY VOLUME
GROUP **********************", PRINTO=1
PERCENT_ERROR= _PCT_ERR_VOLGRP[_iter]/_LINKS_VOLGRP[_iter]
PRINT,
 LIST="   VOLUME GROUP=", _iter(3.0c), "   ",
 "   GROUP TOTAL PERCENT ERROR=", _PCT_ERR_VOLGRP[_iter](13.0c),
 "   PERCENT_ERROR=", PERCENT_ERROR(6.2c),
 "   N=", _LINKS_VOLGRP[_iter](11.0c), PRINTO=1
ENDLOOP

ENDPHASE

ENDRUN
```



ASNET00D.S

```
; Do not change filenames or add or remove FILEI/FILEO statements using an editor. Use
Cube/Application Manager.
RUN PGM=NETWORK PRNFILE="{SCENARIO_DIR}\output\HASSIGN2.PRN" MSG='Additional Highway Evaluation
Scripts'
FILEO PRINTO[2] = "{SCENARIO_DIR}\output\OverallSummary.PRN"
FILEO PRINTO[1] = "{SCENARIO_DIR}\output\HEVAL_Daily2.PRN"
FILEI LINKI[1] = "{SCENARIO_DIR}\output\COMBINEDLOADED.NET"


;=====================================================================
;  LINKMERGE BEGINS
;=====================================================================

PROCESS PHASE=LINKMERGE

;Calculate working link variables for highway analysis calculations
;~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
_FT2=li.1.FTYPE                    ;2-digit Facility Type
_AT2=li.1.ATYPE                        ;2-digit Area Type
_FT1=int(_FT2/10)                          ;1-digit Facility Type
_AT1=int(_AT2/10)                          ;1-digit Area Type
_LNS=li.1.LANES                            ;Number of Lanes

_SL=li.1.SCRN                              ;Screenline

_CNT=li.1.COUNT{year}                         ;Traffic Count
_CAP=li.1.CAPACITY*li.1.LANES/li.1.CONFAC  ;Daily Directional Capacity
_VOL=ROUND(li.1.MOTORIZEDVOL)              ;Estimated Volume
```

```
_LNKCNTR=1                                  ;Link Counter
if (_CNT>0) _LNK_w_CNT=1                    ;Counter for links w/counts

_MLS=li.1.DISTANCE                          ;Directional System Miles
_LMLS=_LNS*_MLS                             ;Lane Miles
_CGT=li.1.CGTIME                          ;Congested Time
_CGS=li.1.CGSPEED                         ;Congested Speed
_SPD=li.1.SPEED                             ;Free Flow Speed
_WCGS=_CGS*_MLS                             ;Weighted Congested Speed
_WSPD=_SPD*_MLS                             ;Weighted Free Flow Speed

_VMT=_VOL*_MLS                              ;Vehicle Miles Traveled
_CVMT=_CNT*_MLS                             ;Vehicle Miles Traveled using counts
_VHT=_VOL*(_CGT/60)                         ;Vehicle Hours Traveled
_CVHT=_CNT*(_CGT/60)                        ;Vehicle Hours Traveled using counts

if (_CNT>0) _VCNT=_VOL/_CNT                 ;Volume over Count
_VCAP=li.1.VOL_CAP                           ;Volume over Capacity

_LIND2=(_AT2*10000)+(_FT2*100 )+(_LNS)      ;2-digit index


;initialize arrays and variables
  ARRAY _err=13, _cns=13, _count=13, _RGP=13
  ARRAY _volby=999999, _cntby=999999, _vcntby=999999, _volall=999999
  ARRAY _lwctot=999999, _lnktot=999999
  ARRAY _lmiles=999999, _dmiles=999999, _wcgspd=999999, _wffspd=999999
  ARRAY _volvmtval=999999, _cntvmtval=999999, _volvhtval=999999, _cntvhtval=999999
  ARRAY _vmtall=999999, _vhtall=999999
  ARRAY _slvol=99, _slcnt=99

   _lnktot[_LIND2]=_lnktot[_LIND2]+_LNKCNTR
   _lmiles[_LIND2]=_lmiles[_LIND2]+_LMLS
   _dmiles[_LIND2]=_dmiles[_LIND2]+_MLS
   _volall[_LIND2]=_volall[_LIND2]+_VOL
   _wcgspd[_LIND2]=_wcgspd[_LIND2]+_WCGS
   _wffspd[_LIND2]=_wffspd[_LIND2]+_WSPD
   _vmtall[_LIND2]=_vmtall[_LIND2]+_VMT
   _vhtall[_LIND2]=_vhtall[_LIND2]+_VHT

IF (_CNT>0)                                     ;Variables only for link with counts
   _volby[_LIND2]=_volby[_LIND2]+_VOL
   _cntby[_LIND2]=_cntby[_LIND2]+_CNT
   _vcntby[_LIND2]=_vcntby[_LIND2]+_VCNT
   _lwctot[_LIND2]=_lwctot[_LIND2]+_LNK_w_CNT
   _volvmtval[_LIND2]=_volvmtval[_LIND2]+_VMT
   _cntvmtval[_LIND2]=_cntvmtval[_LIND2]+_CVMT
   _volvhtval[_LIND2]=_volvhtval[_LIND2]+_VHT
   _cntvhtval[_LIND2]=_cntvhtval[_LIND2]+_CVHT
   _slvol[_SL]=_slvol[_SL]+_VOL
   _slcnt[_SL]=_slcnt[_SL]+_CNT
ENDIF


ENDPROCESS

;~~~~~~~~~~~~~~~~BEGIN REPORTING PORTION OF SCRIPT~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

PROCESS PHASE=SUMMARY

;**************PLACE HOLDER FOR VALIDATE/ANALYSIS SWITCH************

;---------------------------------------------------------------------
; VALIDATION VERSION OF HIGHWAY ANALYSIS BEGINS HERE
;---------------------------------------------------------------------
print list= "Highway Analysis and Evaluation Report---Alpha Version 0.1", PRINTO=1
print list= '@date.rundate@', printo=1
print list= '@time.runtime@', PRINTO=1
;print list= 'Date: ',@date.rundate@, printo=1
;print list= 'Time: ',@time.runtime@, PRINTO=1
;print list= "\n","\n","\n", PRINTO=1
```

```
;print list= " ", PRINTO=1
;print list= " ", PRINTO=1
;print list= "Facility Types",
;       " ",
;       "\n", "10    Generic Freeway",
;       "\n", "11    Urban Freeway Group 1",
;       "\n", "12    Other Freeway not in Group 1",
;       "\n", "15    Collector/Distributor Lanes",
;       "\n", "16    Controlled Access Expressway",
;       "\n", "17    Controlled Access Parkway",
;       "\n", "20    Generic Divided Arterial",
;       "\n", "21    Divided Arterial Unsignalized (55 mph)",
;       "\n", "22    Divided Arterial Unsignalized (45 mph)",
;       "\n", "23    Divided Arterial Class Ia",
;       "\n", "24    Divided Arterial Class Ib",
;       "\n", "25    Divided Arterial Class II/III",
;       "\n", "30    Generic Undivided Arterial",
;       "\n", "31    Undivided Arterial Unsignalized with Turn Bays",
;       "\n", "32    Undivided Arterial Class Ia with Turn Bays",
;       "\n", "33    Undivided Arterial Class Ib with Turn Bays",
;       "\n", "34    Undivided Arterial Class II/III with Turn Bays",
;       "\n", "35    Undivided Arterial Unsignalized without Turn Bays",
;       "\n", "36    Undivided Arterial Class Ia without Turn Bays",
;       "\n", "37    Undivided Arterial Class Ib without Turn Bays",
;       "\n", "38    Undivided Arterial Class II/III without Turn Bays",
;       "\n", "40    Generic Collector",
;       "\n", "41    Major Local Divided Roadway",
;       "\n", "42    Major Local Undivided Roadway with Turn Bays",
;       "\n", "43    Major Local Undivided Roadway without Turn Bays",
;       "\n", "44    Other Local Divided Roadway",
;       "\n", "45    Other Local Undivided Roadway with Turn Bays",
;       "\n", "46    Other Local Undivided Roadway without Turn Bays",
;       "\n", "47    Low Speed Local Collector",
;       "\n", "48    Very Low Speed Local Collector",
;       "\n", "50    Generic Centroid Connector",
;       "\n", "51    Basic Centroid Connector",
;       "\n", "52    External Station Centroid Connector",
;       "\n", "60    Generic One-Way",
;       "\n", "61    One-Way Facility Unsignalized",
;       "\n", "62    One-Way Facility Class Ia",
;       "\n", "63    One-Way Facility Class Ib",
;       "\n", "64    One-Way Facility Class II/III",
;       "\n", "65    Frontage Road Unsignalized",
;       "\n", "66    Frontage Road Class Ia",
;       "\n", "67    Frontage Road Class Ib",
;       "\n", "68    Frontage Road Class II/III",
;       "\n", "70    Generic Ramp",
;       "\n", "71    Freeway On-Ramp",
;       "\n", "72    Freeway Loop On-Ramp",
;       "\n", "73    Other On-Ramp",
;       "\n", "74    Other Loop On-Ramp",
;       "\n", "75    Freeway Off-Ramp",
;       "\n", "76    Freeway Loop Off-Ramp",
;       "\n", "77    Other Off-Ramp",
;       "\n", "78    Other Loop Off-Ramp",
;       "\n", "79    Freeway-Freeway High-Speed Ramp",
;  PRINTO=1


;=============================================================================================
; BEGIN NUMBER OF LINKS REPORT ------------ X = NUMBER OF LINKS
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*********************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                  Number of Directional Links (Centroid Connectors
Excluded)                                      *", PRINTO=1
```

```
Print list="*
*", PRINTO=1
Print
list="*************************************************************************************************
**********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                          ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                         ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                        ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                             ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                         ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                     ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_lnktot[_achkiter]
    ENDLOOP                                                ;^End Loop 3.

    if (_avcheck>0)                                        ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                           ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                        ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1        ;^Header
      Print list= "                                                  Number of Lanes per
Direction                                             ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                             ;^Begin Loop 4: Cycles through FTYPE
                                                           ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                           ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                   ;^Begin Loop 5: Cycles through Lanes
for current
          _vcheck=_vcheck+_lnktot[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                             ;^End Loop 5.

        if (_vcheck>0 & (_fiter<5000 | _fiter>5999))       ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                            ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                       ;^Initialize FTYPE total X.

          LOOP _liter2=1,9,1                               ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            print list="\\"," ",_lnktot[_aiter+_fiter+_liter2](10.0C)," ", PRINTO=1
            _totvols=_totvols+_lnktot[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_lnktot[_aiter+_fiter+_liter2]
          ENDLOOP                                          ;^End Loop 6.

            print list="\\"," ",_totvols(10.0C), PRINTO=1
        endif                                              ;^End Condition 2.

      ENDLOOP                                              ;^End Loop 4.
```

```
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                    ;^Begin Loop 7: Cycles through Lanes
for
                                                            ; current ATYPE in Loop 2.
        _lntotals=0                                         ;^Initialize Lane total X.

        LOOP _aiter2=_aiter,599999,100                      ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                    ; in Loop 2 to generate Lane total X.
          if (_aiter2<_aiter+5000 | _aiter2>_aiter+5999)
            _lntotiter=_aiter2+_liter3
            _lntotals=_lntotals+_lnktot[_lntotiter]
          endif
        ENDLOOP                                             ;^End Loop 8

        print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
      ENDLOOP                                               ;^End Loop 7

      print list="\\"," ",_supertotal(10.0C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                   ;^End Condition 1.

  ENDLOOP                                                   ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                     ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                   ;^Header
Print list= "                                                    Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                   ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                    ; two-digit FTYPE.

  _tafvcheck=0                                              ;^Initialize FTYPE X checking variable.
 if (_fft2<50 | _fft2>59)
  LOOP _liter5=1,9,1                                        ;^Begin Loop 10: Cycles through Lanes
for current
                                                            ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                         ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_lnktot[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order
to total X checking variable.
    ENDLOOP                                                   ;^End Loop 11.

  ENDLOOP                                                   ;^End Loop 10.

  if (_tafvcheck>0)                                         ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1                 ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                     ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                            ; in Loop 9.
        _totftat=0                                          ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                     ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
```

```
        _totftat=_totftat+_lnktot[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                                ;^End Loop 13.

      print list="\\"," ",_totftat(10.0C)," ", PRINTO=1
    ENDLOOP                                                  ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.0C), PRINTO=1
  endif                                                      ;^End Condition 3.
 endif
ENDLOOP                                                      ;^End Loop 9.

Print list= "-------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                                ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                           ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                                ;^Initialize total X for Lanes.

  LOOP _aiter5=100000,599999,100                             ;^Begin Loop 15: Cycles through ATYPE
and
    if ((_aiter5<105000 | _aiter5>105999) &
        (_aiter5<115000 | _aiter5>115999) &
        (_aiter5<125000 | _aiter5>125999) &
        (_aiter5<135000 | _aiter5>135999) &
        (_aiter5<145000 | _aiter5>145999) &
        (_aiter5<155000 | _aiter5>155999) &
        (_aiter5<165000 | _aiter5>165999) &
        (_aiter5<175000 | _aiter5>175999) &
        (_aiter5<185000 | _aiter5>185999) &
        (_aiter5<195000 | _aiter5>195999) &
        (_aiter5<205000 | _aiter5>205999) &
        (_aiter5<215000 | _aiter5>215999) &
        (_aiter5<225000 | _aiter5>225999) &
        (_aiter5<235000 | _aiter5>235999) &
        (_aiter5<245000 | _aiter5>245999) &
        (_aiter5<255000 | _aiter5>255999) &
        (_aiter5<265000 | _aiter5>265999) &
        (_aiter5<275000 | _aiter5>275999) &
        (_aiter5<285000 | _aiter5>285999) &
        (_aiter5<295000 | _aiter5>295999) &
        (_aiter5<305000 | _aiter5>305999) &
        (_aiter5<315000 | _aiter5>315999) &
        (_aiter5<325000 | _aiter5>325999) &
        (_aiter5<335000 | _aiter5>335999) &
        (_aiter5<345000 | _aiter5>345999) &
        (_aiter5<355000 | _aiter5>355999) &
        (_aiter5<365000 | _aiter5>365999) &
        (_aiter5<375000 | _aiter5>375999) &
        (_aiter5<385000 | _aiter5>385999) &
        (_aiter5<395000 | _aiter5>395999) &
        (_aiter5<405000 | _aiter5>405999) &
        (_aiter5<415000 | _aiter5>415999) &
        (_aiter5<425000 | _aiter5>425999) &
        (_aiter5<435000 | _aiter5>435999) &
        (_aiter5<445000 | _aiter5>445999) &
        (_aiter5<455000 | _aiter5>455999) &
        (_aiter5<465000 | _aiter5>465999) &
        (_aiter5<475000 | _aiter5>475999) &
        (_aiter5<485000 | _aiter5>485999) &
        (_aiter5<495000 | _aiter5>495999) &
        (_aiter5<505000 | _aiter5>505999) &
        (_aiter5<515000 | _aiter5>515999) &
        (_aiter5<525000 | _aiter5>525999) &
        (_aiter5<535000 | _aiter5>535999) &
        (_aiter5<545000 | _aiter5>545999) &
        (_aiter5<555000 | _aiter5>555999) &
        (_aiter5<565000 | _aiter5>565999) &
```

```
        (_aiter5<575000 | _aiter5>575999) &
        (_aiter5<585000 | _aiter5>585999) &
        (_aiter5<595000 | _aiter5>595999))

      _lntotiter=_aiter5+_liter6                          ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_lnktot[_lntotiter]              ; Lanes.

    endif
  ENDLOOP                                                 ;^End Loop 15.

  print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                       ;^Generate total X for all ATYPE.

ENDLOOP                                                   ;^End Loop 14.
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                  Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                        ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                              ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                              ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                           ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                          ; get single digit FTYPE.
      _totftlns=0                                         ;^Initialize total X for all FTYPE by
all Lanes.
      if (_f1iter<5000 | _f1iter>5999)
      LOOP _fiter3=_f1iter,9900,100                       ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                    ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK               ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                    ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_lnktot[_aiter6+_fiter3+_liter7]   ; in order to generate total
X for FTYPE by ATYPE.
            ENDLOOP                                               ;^End Loop 20.

        ENDLOOP                                           ;^End Loop 19.

      ENDLOOP                                             ;^End Loop 18.
      endif
      _fttotal=_fttotal+_totftlns                         ;^Generate total X for ATYPE.

      print list="\\"," ",_totftlns(10.0C)," ", PRINTO=1
    ENDLOOP                                               ;^End Loop 17.

  print list="\\"," ",_fttotal(10.0c), PRINTO=1
ENDLOOP                                                   ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1
```

```
print list="Totals", PRINTO=1

_supertotal=0                                          ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                           ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                       ; to get single digit FTYPE.
  _ftotals=0                                           ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                       ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                    ; get all two-digit FTYPE for current
FTYPE in
    if (_f1iter2<5000 | _f1iter2>5999)                                          ;
Loop 21.
    LOOP _liter8=1,9,1                                 ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                 ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8              ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_lnktot[_ftotiter]
      ENDLOOP                                          ;^End Loop 24.

    ENDLOOP                                            ;^End Loop 23.
    endif
  ENDLOOP                                              ;^End Loop 22.
  _supertotal=_supertotal+_ftotals                     ;^Generate overall total for all single
digit ATYPE
                                                       ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.0C)," ", PRINTO=1
ENDLOOP                                                ;^End Loop 21.
_numlinks=_supertotal
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ", PRINTO=1
;*********************************************************************
; END NUMBER OF LINKS REPORT
;*********************************************************************

;=============================================================================================
; BEGIN DIRECTIONAL MILES REPORT ------------- X = DIRECTIONAL MILES
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*****************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                      Directional Miles (Centroid Connectors
Excluded)                                          *", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*****************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                      ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                            ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                     ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                    ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                         ;^Initialize ATYPE X checking variable.
```

```
    LOOP _achkiter=_aiter,599999,1                          ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                      ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_dmiles[_achkiter]
    ENDLOOP                                                 ;^End Loop 3.

    if (_avcheck>0)                                         ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                            ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                         ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1         ;^Header
      Print list= "                                                    Number of Lanes per
Direction                                                ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                              ;^Begin Loop 4: Cycles through FTYPE
                                                            ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                            ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                    ;^Begin Loop 5: Cycles through Lanes
for current
          _vcheck=_vcheck+_dmiles[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                              ;^End Loop 5.

        if (_vcheck>0 & (_fiter<5000 | _fiter>5999))        ;^Begin Condition 2: If current FTYPE
in Loop 4
           _fft2=int(_fiter/100)                            ; has X>0 continue to report X. Else
skip FTYPE.
           print list= _fft2(2.0),"    ", PRINTO=1
           _totvols=0                                       ;^Initialize FTYPE total X.

           LOOP _liter2=1,9,1                               ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
             print list="\\"," ",_dmiles[_aiter+_fiter+_liter2](10.2C)," ", PRINTO=1
             _totvols=_totvols+_dmiles[_aiter+_fiter+_liter2]
             _supertotal=_supertotal+_dmiles[_aiter+_fiter+_liter2]
           ENDLOOP                                          ;^End Loop 6.

             print list="\\"," ",_totvols(10.2C), PRINTO=1
        endif                                               ;^End Condition 2.

      ENDLOOP                                               ;^End Loop 4.

      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                    ;^Begin Loop 7: Cycles through Lanes
for
                                                            ; current ATYPE in Loop 2.
        _lntotals=0                                         ;^Initialize Lane total X.

        LOOP _aiter2=_aiter,599999,100                      ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                    ; in Loop 2 to generate Lane total X.
          if (_aiter2<_aiter+5000 | _aiter2>_aiter+5999)
            _lntotiter=_aiter2+_liter3
            _lntotals=_lntotals+_dmiles[_lntotiter]
          endif
        ENDLOOP                                             ;^End Loop 8

        print list="\\"," ",_lntotals(10.2C)," ", PRINTO=1
      ENDLOOP                                               ;^End Loop 7
```

```
      print list="\\"," ",_supertotal(10.2C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                ;^End Condition 1.

  ENDLOOP                                                ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                  ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                ;^Header
Print list= "                                                Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                 ; two-digit FTYPE.

  _tafvcheck=0                                           ;^Initialize FTYPE X checking variable.
 if (_fft2<50 | _fft2>59)
  LOOP _liter5=1,9,1                                     ;^Begin Loop 10: Cycles through Lanes
for current
                                                         ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                      ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_dmiles[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order
to total X checking variable.
    ENDLOOP                                                ;^End Loop 11.

  ENDLOOP                                                ;^End Loop 10.

  if (_tafvcheck>0)                                      ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1              ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                  ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                         ; in Loop 9.
       _totftat=0                                        ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                  ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_dmiles[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                            ;^End Loop 13.

      print list="\\"," ",_totftat(10.2C)," ", PRINTO=1
    ENDLOOP                                              ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.2C), PRINTO=1
  endif                                                  ;^End Condition 3.
 endif
ENDLOOP                                                  ;^End Loop 9.

Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                            ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                       ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                            ;^Initialize total X for Lanes.
```

```
  LOOP _aiter5=100000,599999,100                          ;^Begin Loop 15: Cycles through ATYPE
and
    if ((_aiter5<105000 | _aiter5>105999) &
        (_aiter5<115000 | _aiter5>115999) &
        (_aiter5<125000 | _aiter5>125999) &
        (_aiter5<135000 | _aiter5>135999) &
        (_aiter5<145000 | _aiter5>145999) &
        (_aiter5<155000 | _aiter5>155999) &
        (_aiter5<165000 | _aiter5>165999) &
        (_aiter5<175000 | _aiter5>175999) &
        (_aiter5<185000 | _aiter5>185999) &
        (_aiter5<195000 | _aiter5>195999) &
        (_aiter5<205000 | _aiter5>205999) &
        (_aiter5<215000 | _aiter5>215999) &
        (_aiter5<225000 | _aiter5>225999) &
        (_aiter5<235000 | _aiter5>235999) &
        (_aiter5<245000 | _aiter5>245999) &
        (_aiter5<255000 | _aiter5>255999) &
        (_aiter5<265000 | _aiter5>265999) &
        (_aiter5<275000 | _aiter5>275999) &
        (_aiter5<285000 | _aiter5>285999) &
        (_aiter5<295000 | _aiter5>295999) &
        (_aiter5<305000 | _aiter5>305999) &
        (_aiter5<315000 | _aiter5>315999) &
        (_aiter5<325000 | _aiter5>325999) &
        (_aiter5<335000 | _aiter5>335999) &
        (_aiter5<345000 | _aiter5>345999) &
        (_aiter5<355000 | _aiter5>355999) &
        (_aiter5<365000 | _aiter5>365999) &
        (_aiter5<375000 | _aiter5>375999) &
        (_aiter5<385000 | _aiter5>385999) &
        (_aiter5<395000 | _aiter5>395999) &
        (_aiter5<405000 | _aiter5>405999) &
        (_aiter5<415000 | _aiter5>415999) &
        (_aiter5<425000 | _aiter5>425999) &
        (_aiter5<435000 | _aiter5>435999) &
        (_aiter5<445000 | _aiter5>445999) &
        (_aiter5<455000 | _aiter5>455999) &
        (_aiter5<465000 | _aiter5>465999) &
        (_aiter5<475000 | _aiter5>475999) &
        (_aiter5<485000 | _aiter5>485999) &
        (_aiter5<495000 | _aiter5>495999) &
        (_aiter5<505000 | _aiter5>505999) &
        (_aiter5<515000 | _aiter5>515999) &
        (_aiter5<525000 | _aiter5>525999) &
        (_aiter5<535000 | _aiter5>535999) &
        (_aiter5<545000 | _aiter5>545999) &
        (_aiter5<555000 | _aiter5>555999) &
        (_aiter5<565000 | _aiter5>565999) &
        (_aiter5<575000 | _aiter5>575999) &
        (_aiter5<585000 | _aiter5>585999) &
        (_aiter5<595000 | _aiter5>595999))

      _lntotiter=_aiter5+_liter6                          ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_dmiles[_lntotiter]              ; Lanes.

    endif
  ENDLOOP                                                 ;^End Loop 15.

  print list="\\"," ",_lntotals(10.2C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                       ;^Generate total X for all ATYPE.

ENDLOOP                                                   ;^End Loop 14.
print list="\\"," ",_supertotal(10.2C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
```

```
Print list= "                                                    Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                          ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                                ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                                ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                             ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                            ; get single digit FTYPE.
      _totftlns=0                                           ;^Initialize total X for all FTYPE by
all Lanes.
      if (_f1iter<5000 | _f1iter>5999)
      LOOP _fiter3=_f1iter,9900,100                         ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                      ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                  ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK                 ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                      ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_dmiles[_aiter6+_fiter3+_liter7]   ; in order to generate total
X for FTYPE by ATYPE.
            ENDLOOP                                                 ;^End Loop 20.

        ENDLOOP                                             ;^End Loop 19.

      ENDLOOP                                               ;^End Loop 18.
      endif
      _fttotal=_fttotal+_totftlns                           ;^Generate total X for ATYPE.

      print list="\\"," ",_totftlns(10.2C)," ", PRINTO=1
    ENDLOOP                                                 ;^End Loop 17.

  print list="\\"," ",_fttotal(10.2c), PRINTO=1
ENDLOOP                                                     ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                                ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                            ; to get single digit FTYPE.
  _ftotals=0                                                ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                            ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                         ; get all two-digit FTYPE for current
FTYPE in
    if (_f1iter2<5000 | _f1iter2>5999)                                          ;
Loop 21.
    LOOP _liter8=1,9,1                                      ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                      ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                   ; to generate total X by single digit
FTYPE.
```

```
        _ftotals=_ftotals+_dmiles[_ftotiter]
      ENDLOOP                                                ;^End Loop 24.

    ENDLOOP                                                  ;^End Loop 23.
    endif
  ENDLOOP                                                    ;^End Loop 22.
  _supertotal=_supertotal+_ftotals                           ;^Generate overall total for all single
digit ATYPE
                                                             ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.2C)," ", PRINTO=1
ENDLOOP                                                      ;^End Loop 21.
_dirmiles=_supertotal
print list="\\"," ",_supertotal(10.2C), PRINTO=1
print list=" ", PRINTO=1
;*************************************************************************
; END DIRECTIONAL MILES REPORT
;*************************************************************************
'

;=============================================================================================
; BEGIN LANE MILES REPORT ------------ X = LANE MILES
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*********************************************************************************************
**********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                          Lane Miles (Centroid Connectors Excluded)
*", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*********************************************************************************************
**********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                            ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                  ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                           ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                          ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                               ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                           ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                       ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_lmiles[_achkiter]
    ENDLOOP                                                  ;^End Loop 3.

    if (_avcheck>0)                                          ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                             ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                          ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1          ;^Header
      Print list= "                                                  Number of Lanes per
Direction                                              ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
```

```
      LOOP _fiter=100,9900,100                                ;^Begin Loop 4: Cycles through FTYPE
                                                              ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                              ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                      ;^Begin Loop 5: Cycles through Lanes
for current
         _vcheck=_vcheck+_lmiles[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                                ;^End Loop 5.

        if (_vcheck>0 & (_fiter<5000 | _fiter>5999))          ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                               ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                          ;^Initialize FTYPE total X.

          LOOP _liter2=1,9,1                                  ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            print list="\\"," ",_lmiles[_aiter+_fiter+_liter2](10.2C)," ", PRINTO=1
            _totvols=_totvols+_lmiles[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_lmiles[_aiter+_fiter+_liter2]
          ENDLOOP                                             ;^End Loop 6.

            print list="\\"," ",_totvols(10.2C), PRINTO=1
        endif                                                 ;^End Condition 2.

      ENDLOOP                                                 ;^End Loop 4.

      Print list= "-----------------------------------------------------------------------------------
-------------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                      ;^Begin Loop 7: Cycles through Lanes
for
                                                              ; current ATYPE in Loop 2.
        _lntotals=0                                           ;^Initialize Lane total X.

        LOOP _aiter2=_aiter,599999,100                        ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                      ; in Loop 2 to generate Lane total X.
          if (_aiter2<_aiter+5000 | _aiter2>_aiter+5999)
            _lntotiter=_aiter2+_liter3
            _lntotals=_lntotals+_lmiles[_lntotiter]
          endif
        ENDLOOP                                               ;^End Loop 8

        print list="\\"," ",_lntotals(10.2C)," ", PRINTO=1
      ENDLOOP                                                 ;^End Loop 7

      print list="\\"," ",_supertotal(10.2C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                     ;^End Condition 1.

  ENDLOOP                                                     ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                       ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                     ;^Header
Print list= "                                                      Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-----------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                     ;^Begin Loop 9: Cycles through FTYPES
to get
```

```
  _fft2=int(_fiter2/100)                                    ; two-digit FTYPE.

  _tafvcheck=0                                              ;^Initialize FTYPE X checking variable.
 if (_fft2<50 | _fft2>59)
  LOOP _liter5=1,9,1                                        ;^Begin Loop 10: Cycles through Lanes
for current
                                                            ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                         ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_lmiles[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order
to total X checking variable.
    ENDLOOP                                                   ;^End Loop 11.

  ENDLOOP                                                   ;^End Loop 10.

  if (_tafvcheck>0)                                         ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1                 ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                     ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                            ; in Loop 9.
        _totftat=0                                          ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                     ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_lmiles[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                               ;^End Loop 13.

      print list="\\"," ",_totftat(10.2C)," ", PRINTO=1
    ENDLOOP                                                 ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.2C), PRINTO=1
  endif                                                     ;^End Condition 3.
 endif
ENDLOOP                                                     ;^End Loop 9.

Print list= "-----------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                          ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                               ;^Initialize total X for Lanes.

  LOOP _aiter5=100000,599999,100                            ;^Begin Loop 15: Cycles through ATYPE
and
    if ((_aiter5<105000 | _aiter5>105999) &
        (_aiter5<115000 | _aiter5>115999) &
        (_aiter5<125000 | _aiter5>125999) &
        (_aiter5<135000 | _aiter5>135999) &
        (_aiter5<145000 | _aiter5>145999) &
        (_aiter5<155000 | _aiter5>155999) &
        (_aiter5<165000 | _aiter5>165999) &
        (_aiter5<175000 | _aiter5>175999) &
        (_aiter5<185000 | _aiter5>185999) &
        (_aiter5<195000 | _aiter5>195999) &
        (_aiter5<205000 | _aiter5>205999) &
        (_aiter5<215000 | _aiter5>215999) &
        (_aiter5<225000 | _aiter5>225999) &
        (_aiter5<235000 | _aiter5>235999) &
        (_aiter5<245000 | _aiter5>245999) &
        (_aiter5<255000 | _aiter5>255999) &
        (_aiter5<265000 | _aiter5>265999) &
        (_aiter5<275000 | _aiter5>275999) &
        (_aiter5<285000 | _aiter5>285999) &
```

```
        (_aiter5<295000 | _aiter5>295999) &
        (_aiter5<305000 | _aiter5>305999) &
        (_aiter5<315000 | _aiter5>315999) &
        (_aiter5<325000 | _aiter5>325999) &
        (_aiter5<335000 | _aiter5>335999) &
        (_aiter5<345000 | _aiter5>345999) &
        (_aiter5<355000 | _aiter5>355999) &
        (_aiter5<365000 | _aiter5>365999) &
        (_aiter5<375000 | _aiter5>375999) &
        (_aiter5<385000 | _aiter5>385999) &
        (_aiter5<395000 | _aiter5>395999) &
        (_aiter5<405000 | _aiter5>405999) &
        (_aiter5<415000 | _aiter5>415999) &
        (_aiter5<425000 | _aiter5>425999) &
        (_aiter5<435000 | _aiter5>435999) &
        (_aiter5<445000 | _aiter5>445999) &
        (_aiter5<455000 | _aiter5>455999) &
        (_aiter5<465000 | _aiter5>465999) &
        (_aiter5<475000 | _aiter5>475999) &
        (_aiter5<485000 | _aiter5>485999) &
        (_aiter5<495000 | _aiter5>495999) &
        (_aiter5<505000 | _aiter5>505999) &
        (_aiter5<515000 | _aiter5>515999) &
        (_aiter5<525000 | _aiter5>525999) &
        (_aiter5<535000 | _aiter5>535999) &
        (_aiter5<545000 | _aiter5>545999) &
        (_aiter5<555000 | _aiter5>555999) &
        (_aiter5<565000 | _aiter5>565999) &
        (_aiter5<575000 | _aiter5>575999) &
        (_aiter5<585000 | _aiter5>585999) &
        (_aiter5<595000 | _aiter5>595999))

      _lntotiter=_aiter5+_liter6                          ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_lmiles[_lntotiter]              ; Lanes.

    endif
  ENDLOOP                                                 ;^End Loop 15.

  print list="\\"," ",_lntotals(10.2C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                       ;^Generate total X for all ATYPE.

ENDLOOP                                                   ;^End Loop 14.
print list="\\"," ",_supertotal(10.2C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                  Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                        ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                              ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                              ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                           ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                          ; get single digit FTYPE.
      _totftlns=0                                         ;^Initialize total X for all FTYPE by
all Lanes.
      if (_f1iter<5000 | _f1iter>5999)
      LOOP _fiter3=_f1iter,9900,100                       ;^Begin Loop 18: Cycles through two-
digit FTYPE
```

```
        if (_fiter3>_f1iter+999) BREAK                    ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK               ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                    ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
             _totftlns=_totftlns+_lmiles[_aiter6+_fiter3+_liter7]   ; in order to generate total
X for FTYPE by ATYPE.
            ENDLOOP                                               ;^End Loop 20.

        ENDLOOP                                           ;^End Loop 19.

      ENDLOOP                                             ;^End Loop 18.
      endif
      _fttotal=_fttotal+_totftlns                         ;^Generate total X for ATYPE.

      print list="\\"," ",_totftlns(10.2C)," ", PRINTO=1
    ENDLOOP                                               ;^End Loop 17.

  print list="\\"," ",_fttotal(10.2c), PRINTO=1
ENDLOOP                                                   ;^End Loop 16.

Print list= "-----------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                             ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                              ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                          ; to get single digit FTYPE.
  _ftotals=0                                              ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                          ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                       ; get all two-digit FTYPE for current
FTYPE in
    if (_f1iter2<5000 | _f1iter2>5999)                                                  ;
Loop 21.
    LOOP _liter8=1,9,1                                    ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                    ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                 ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_lmiles[_ftotiter]
      ENDLOOP                                             ;^End Loop 24.

    ENDLOOP                                               ;^End Loop 23.
    endif
  ENDLOOP                                                 ;^End Loop 22.
  _supertotal=_supertotal+_ftotals                        ;^Generate overall total for all single
digit ATYPE
                                                          ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.2C)," ", PRINTO=1
ENDLOOP                                                   ;^End Loop 21.
_lanemiles=_supertotal
print list="\\"," ",_supertotal(10.2C), PRINTO=1
print list=" ", PRINTO=1
;*************************************************************************
;
; END LANE MILES REPORT
;*************************************************************************

;=============================================================================================
; BEGIN VMT VAL REPORT ------------ X = VMT on Links w/ Counts
;=============================================================================================
Print list=" ", PRINTO=1
```

```
Print
list="*************************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                  Vehicle Miles Traveled (VMT) using Volumes on Links
with Counts                                 *", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*************************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                          ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                         ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                        ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                             ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                         ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                     ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_volvmtval[_achkiter]
    ENDLOOP                                                ;^End Loop 3.

    if (_avcheck>0)                                        ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                           ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                        ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1        ;^Header
      Print list= "                                                Number of Lanes per
Direction                                             ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                             ;^Begin Loop 4: Cycles through FTYPE
                                                           ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                           ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                   ;^Begin Loop 5: Cycles through Lanes
for current
         _vcheck=_vcheck+_volvmtval[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                             ;^End Loop 5.

        if (_vcheck>0)                                     ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                            ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                       ;^Initialize FTYPE total X.

          LOOP _liter2=1,9,1                               ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            print list="\\"," ",_volvmtval[_aiter+_fiter+_liter2](10.0C)," ", PRINTO=1
            _totvols=_totvols+_volvmtval[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_volvmtval[_aiter+_fiter+_liter2]
```

```
           ENDLOOP                                          ;^End Loop 6.

             print list="\\"," ",_totvols(10.0C), PRINTO=1
         endif                                            ;^End Condition 2.

       ENDLOOP                                            ;^End Loop 4.

       Print list= "-------------------------------------------------------------------------------------
-------------------------------------------", PRINTO=1
       print list="Totals", PRINTO=1

       LOOP _liter3=1,9,1                                 ;^Begin Loop 7: Cycles through Lanes
for
                                                          ; current ATYPE in Loop 2.
         _lntotals=0                                      ;^Initialize Lane total X.

         LOOP _aiter2=_aiter,599999,100                   ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
           if (_aiter2>_aiter+9999) BREAK                 ; in Loop 2 to generate Lane total X.
           _lntotiter=_aiter2+_liter3
           _lntotals=_lntotals+_volvmtval[_lntotiter]
         ENDLOOP                                          ;^End Loop 8

         print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
       ENDLOOP                                            ;^End Loop 7

       print list="\\"," ",_supertotal(10.0C), PRINTO=1
       print list=" ", PRINTO=1
     endif                                                ;^End Condition 1.

  ENDLOOP                                                 ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                   ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                 ;^Header
Print list= "                                                  Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                 ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                  ; two-digit FTYPE.

  _tafvcheck=0                                            ;^Initialize FTYPE X checking variable.

  LOOP _liter5=1,9,1                                      ;^Begin Loop 10: Cycles through Lanes
for current
                                                          ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                       ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_volvmtval[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in
order to total X checking variable.
    ENDLOOP                                                 ;^End Loop 11.

  ENDLOOP                                                 ;^End Loop 10.

  if (_tafvcheck>0)                                       ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1               ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                   ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                          ; in Loop 9.
```

```
        _totftat=0                                          ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                     ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_volvmtval[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                               ;^End Loop 13.

      print list="\\"," ",_totftat(10.0C)," ", PRINTO=1
    ENDLOOP                                                 ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.0C), PRINTO=1
  endif                                                     ;^End Condition 3.

ENDLOOP                                                     ;^End Loop 9.

Print list= "-----------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                          ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                               ;^Initialize total X for Lanes.

  LOOP _aiter5=100000,599999,100                            ;^Begin Loop 15: Cycles through ATYPE
and
      _lntotiter=_aiter5+_liter6                            ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_volvmtval[_lntotiter]                ; Lanes.
  ENDLOOP                                                   ;^End Loop 15.

  print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                         ;^Generate total X for all ATYPE.

ENDLOOP                                                     ;^End Loop 14.
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                  Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-----------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                          ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                                ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                                ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                             ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                            ; get single digit FTYPE.
      _totftlns=0                                           ;^Initialize total X for all FTYPE by
all Lanes.

      LOOP _fiter3=_f1iter,9900,100                         ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                      ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                  ;^Begin Loop 19: Cycles through two-
digit ATYPE
```

```
          if (_aiter6>_a1iter2+99999) BREAK               ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                    ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
             _totftlns=_totftlns+_volvmtval[_aiter6+_fiter3+_liter7]   ; in order to generate
total X for FTYPE by ATYPE.
            ENDLOOP                                               ;^End Loop 20.

        ENDLOOP                                           ;^End Loop 19.

      ENDLOOP                                             ;^End Loop 18.

      _fttotal=_fttotal+_totftlns                         ;^Generate total X for ATYPE.

      print list="\\"," ",_totftlns(10.0C)," ", PRINTO=1
    ENDLOOP                                               ;^End Loop 17.

  print list="\\"," ",_fttotal(10.0c), PRINTO=1
ENDLOOP                                                   ;^End Loop 16.

Print list= "-----------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                             ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                              ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                          ; to get single digit FTYPE.
  _ftotals=0                                              ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                          ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                       ; get all two-digit FTYPE for current
FTYPE in
                                                          ; Loop 21.
    LOOP _liter8=1,9,1                                    ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                    ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                 ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_volvmtval[_ftotiter]
      ENDLOOP                                             ;^End Loop 24.

    ENDLOOP                                               ;^End Loop 23.

  ENDLOOP                                                 ;^End Loop 22.

  _supertotal=_supertotal+_ftotals                        ;^Generate overall total for all single
digit ATYPE
                                                          ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.0C)," ", PRINTO=1
ENDLOOP                                                   ;^End Loop 21.
_vmtvoloncounts=_supertotal
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ", PRINTO=1
;*************************************************************************
; END VMT VAL REPORT
;*************************************************************************

;=========================================================================================
; BEGIN VMT Count REPORT ------------ X = Count VMT on Links w/ Counts
;=========================================================================================
Print list=" ", PRINTO=1
Print
list="**************************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
```

```
Print list="*                                Vehicle Miles Traveled (VMT) using Counts on Links
with Counts                                    *", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*****************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                          ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                         ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                        ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)


    _avcheck=0                                             ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                         ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                     ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_cntvmtval[_achkiter]
    ENDLOOP                                                ;^End Loop 3.

    if (_avcheck>0)                                        ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                           ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                        ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1        ;^Header
      Print list= "                                                Number of Lanes per
Direction                                             ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-------------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                             ;^Begin Loop 4: Cycles through FTYPE
                                                           ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                           ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                   ;^Begin Loop 5: Cycles through Lanes
for current
         _vcheck=_vcheck+_cntvmtval[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                             ;^End Loop 5.

        if (_vcheck>0)                                     ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                            ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                       ;^Initialize FTYPE total X.

          LOOP _liter2=1,9,1                               ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            print list="\\"," ",_cntvmtval[_aiter+_fiter+_liter2](10.0C)," ", PRINTO=1
            _totvols=_totvols+_cntvmtval[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_cntvmtval[_aiter+_fiter+_liter2]
          ENDLOOP                                          ;^End Loop 6.

            print list="\\"," ",_totvols(10.0C), PRINTO=1
        endif                                              ;^End Condition 2.
```

```
      ENDLOOP                                                ;^End Loop 4.

      Print list= "-------------------------------------------------------------------------------
-------------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                     ;^Begin Loop 7: Cycles through Lanes
for
                                                             ; current ATYPE in Loop 2.
        _lntotals=0                                          ;^Initialize Lane total X.

        LOOP _aiter2=_aiter,599999,100                       ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                     ; in Loop 2 to generate Lane total X.
          _lntotiter=_aiter2+_liter3
          _lntotals=_lntotals+_cntvmtval[_lntotiter]
        ENDLOOP                                              ;^End Loop 8

        print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
      ENDLOOP                                                ;^End Loop 7

      print list="\\"," ",_supertotal(10.0C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                    ;^End Condition 1.

  ENDLOOP                                                    ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                      ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                    ;^Header
Print list= "                                                     Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                    ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                     ; two-digit FTYPE.

  _tafvcheck=0                                               ;^Initialize FTYPE X checking variable.

  LOOP _liter5=1,9,1                                         ;^Begin Loop 10: Cycles through Lanes
for current
                                                             ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                          ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_cntvmtval[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in
order to total X checking variable.
    ENDLOOP                                                    ;^End Loop 11.

  ENDLOOP                                                    ;^End Loop 10.

  if (_tafvcheck>0)                                          ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1                  ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                      ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                             ; in Loop 9.
      _totftat=0                                             ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                      ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
```

```
        _totftat=_totftat+_cntvmtval[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                                ;^End Loop 13.

      print list="\\"," ",_totftat(10.0C)," ", PRINTO=1
    ENDLOOP                                                  ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.0C), PRINTO=1
  endif                                                      ;^End Condition 3.

ENDLOOP                                                      ;^End Loop 9.

Print list= "-------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                                ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                           ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                                ;^Initialize total X for Lanes.

  LOOP _aiter5=100000,599999,100                             ;^Begin Loop 15: Cycles through ATYPE
and
      _lntotiter=_aiter5+_liter6                             ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_cntvmtval[_lntotiter]                 ; Lanes.
  ENDLOOP                                                    ;^End Loop 15.

  print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                          ;^Generate total X for all ATYPE.

ENDLOOP                                                      ;^End Loop 14.
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                           ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                                 ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                                 ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                              ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                             ; get single digit FTYPE.
      _totftlns=0                                            ;^Initialize total X for all FTYPE by
all Lanes.

      LOOP _fiter3=_f1iter,9900,100                          ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                       ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                   ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK                  ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                       ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
```

```
             _totftlns=_totftlns+_cntvmtval[_aiter6+_fiter3+_liter7]   ; in order to generate
total X for FTYPE by ATYPE.
           ENDLOOP                                                    ;^End Loop 20.

        ENDLOOP                                                 ;^End Loop 19.

      ENDLOOP                                                   ;^End Loop 18.

      _fttotal=_fttotal+_totftlns                               ;^Generate total X for ATYPE.

      print list="\\"," ",_totftlns(10.0C)," ", PRINTO=1
    ENDLOOP                                                     ;^End Loop 17.

  print list="\\"," ",_fttotal(10.0c), PRINTO=1
ENDLOOP                                                         ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                                   ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                                    ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                                ; to get single digit FTYPE.
  _ftotals=0                                                    ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                                ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                             ; get all two-digit FTYPE for current
FTYPE in
                                                                ; Loop 21.
    LOOP _liter8=1,9,1                                          ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                          ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                       ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_cntvmtval[_ftotiter]
      ENDLOOP                                                   ;^End Loop 24.

    ENDLOOP                                                     ;^End Loop 23.

  ENDLOOP                                                       ;^End Loop 22.

  _supertotal=_supertotal+_ftotals                              ;^Generate overall total for all single
digit ATYPE
                                                                ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.0C)," ", PRINTO=1
ENDLOOP                                                         ;^End Loop 21.
_vmtcountsoncounts=_supertotal
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ", PRINTO=1
;*********************************************************************
; END COUNT VMT REPORT
;*********************************************************************

;=============================================================================================
; BEGIN VOLUME/COUNT VMT REPORT ------------- X = Volumes over Counts VMT on Links w/ Counts
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                VMT Volume over Count Ratios on Links with Counts
*", PRINTO=1
Print list="*
*", PRINTO=1
```

```
Print
list="*************************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                          ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                         ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                        ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                             ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                         ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                     ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_vcntby[_achkiter]
    ENDLOOP                                                ;^End Loop 3.

    if (_avcheck>0)                                        ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                           ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                        ;^Initialize ATYPE total X.
      _supercnts=0

      Print list= "Area Type ",_aat2(2.0), PRINTO=1        ;^Header
      Print list= "                                                    Number of Lanes per
Direction                                              ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                             ;^Begin Loop 4: Cycles through FTYPE
                                                           ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                           ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                   ;^Begin Loop 5: Cycles through Lanes
for current
          _vcheck=_vcheck+_vcntby[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                             ;^End Loop 5.

        if (_vcheck>0)                                     ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                            ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                       ;^Initialize FTYPE total X.
          _totcnts=0

           LOOP _liter2=1,9,1                               ;^Begin Loop 6: Cycles through Lanes
to generate ATYPE by FTYPE by Lanes total X.
            if (_cntby[_aiter+_fiter+_liter2]>0)
              _links=_volvmtval[_aiter+_fiter+_liter2]/_cntvmtval[_aiter+_fiter+_liter2]
            else
              _links=0
            endif
            print list="\\"," ",_links(10.2C)," ", PRINTO=1
            _totvols=_totvols+_volvmtval[_aiter+_fiter+_liter2]
            _totcnts=_totcnts+_cntvmtval[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_volvmtval[_aiter+_fiter+_liter2]
            _supercnts=_supercnts+_cntvmtval[_aiter+_fiter+_liter2]
```

```
          ENDLOOP                                          ;^End Loop 6.

            if (_totcnts>0)
              _totvc=_totvols/_totcnts
            else
              _totvc=0
            endif
          print list="\\"," ",_totvc(10.2C), PRINTO=1
        endif                                              ;^End Condition 2.

      ENDLOOP                                              ;^End Loop 4.

      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                   ;^Begin Loop 7: Cycles through Lanes
for
                                                           ; current ATYPE in Loop 2.
        _lntotals=0                                        ;^Initialize Lane total X.
        _lncnts=0

        LOOP _aiter2=_aiter,599999,100                     ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                   ; in Loop 2 to generate Lane total X.
          _lntotiter=_aiter2+_liter3
          _lntotals=_lntotals+_volvmtval[_lntotiter]
          _lncnts=_lncnts+_cntvmtval[_lntotiter]
        ENDLOOP                                            ;^End Loop 8

        if (_lncnts>0)
          _lnvc=_lntotals/_lncnts
        else
          _lnvc=0
        endif
        print list="\\"," ",_lnvc(10.2C)," ", PRINTO=1
      ENDLOOP                                              ;^End Loop 7

      if (_supercnts>0)
        _supervc=_supertotal/_supercnts
      else
        _supervc=0
      endif
      print list="\\"," ",_supervc(10.2C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                  ;^End Condition 1.

  ENDLOOP                                                  ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                    ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                  ;^Header
Print list= "                                                   Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1          2          3          4          5          6
7          8          9       Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                  ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                   ; two-digit FTYPE.

  _tafvcheck=0                                             ;^Initialize FTYPE X checking variable.
  _tafcnts=0

  LOOP _liter5=1,9,1                                       ;^Begin Loop 10: Cycles through Lanes
for current
```

```
                                                        ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                     ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_volvmtval[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in
order to total X checking variable.
      _tafcnts=_tafcnts+_cntvmtval[_aiter4+_fiter2+_liter5]
    ENDLOOP                                               ;^End Loop 11.

  ENDLOOP                                                 ;^End Loop 10.

  if (_tafvcheck>0)                                       ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1               ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                   ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                          ; in Loop 9.
        _totftat=0                                        ;^Initialize FTYPE total X for all
ATYPE.
        _totcnts=0

      LOOP _aiter3= 100000,599999,10000                   ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_volvmtval[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
        _totcnts=_totcnts+_cntvmtval[_aiter3+_fiter2+_liter4]
      ENDLOOP                                             ;^End Loop 13.
      if (_totcnts>0)
        _totvc=_totftat/_totcnts
      else
        _totvc=0
      endif
      print list="\\"," ",_totvc(10.2C)," ", PRINTO=1
    ENDLOOP                                               ;^End Loop 12.
    if (_tafcnts>0)
      _tafvc=_tafvcheck/_tafcnts
    else
      _tafvc=0
    endif
    print list="\\"," ",_tafvc(10.2C), PRINTO=1
  endif                                                   ;^End Condition 3.

ENDLOOP                                                   ;^End Loop 9.

Print list= "-----------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                             ;^Initialize all ATYPE total X.
_supercnts=0

LOOP _liter6=1,9,1                                        ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                             ;^Initialize total X for Lanes.
  _lncnts=0

  LOOP _aiter5=100000,599999,100                          ;^Begin Loop 15: Cycles through ATYPE
and
      _lntotiter=_aiter5+_liter6                          ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_volvmtval[_lntotiter]              ; Lanes.
      _lncnts=_lncnts+_cntvmtval[_lntotiter]
  ENDLOOP                                                 ;^End Loop 15.
  if (_lncnts>0)
    _lnvc=_lntotals/_lncnts
  else
    _lnvc=0
  endif
  print list="\\"," ",_lnvc(10.2C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                       ;^Generate total X for all ATYPE.
```

```
  _supercnts=_supercnts+_lncnts
ENDLOOP                                                 ;^End Loop 14.
if (_supercnts>0)
  _supervc=_supertotal/_supercnts
else
  _supervc=0
endif
print list="\\"," ",_supervc(10.2C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                  Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                      ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                            ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                            ;^Initialize total X for all ATYPE
  _ftcnts=0

    LOOP _f1iter=1000,9900,1000                         ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                        ; get single digit FTYPE.
      _totftlns=0                                       ;^Initialize total X for all FTYPE by
all Lanes.
      _totftcnts=0

      LOOP _fiter3=_f1iter,9900,100                     ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                  ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000              ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK             ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                  ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_volvmtval[_aiter6+_fiter3+_liter7]   ; in order to generate
total X for FTYPE by ATYPE.
              _totftcnts=_totftcnts+_cntvmtval[_aiter6+_fiter3+_liter7]
            ENDLOOP                                             ;^End Loop 20.

        ENDLOOP                                         ;^End Loop 19.

      ENDLOOP                                           ;^End Loop 18.

      _fttotal=_fttotal+_totftlns                       ;^Generate total X for ATYPE.
      _ftcnts=_ftcnts+_totftcnts

      if (_totftcnts>0)
        _totftvc=_totftlns/_totftcnts
      else
        _totftvc=0
      endif
      print list="\\"," ",_totftvc(10.2C)," ", PRINTO=1
    ENDLOOP                                             ;^End Loop 17.
    if (_ftcnts>0)
      _ftvc=_fttotal/_ftcnts
    else
      _ftvc=0
    endif
```

```
  print list="\\"," ",_ftvc(10.2c), PRINTO=1
ENDLOOP                                                    ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                              ;^Initialize overall total X.
_supercnts=0

LOOP _f1iter2=1000,9900,1000                               ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                           ; to get single digit FTYPE.
  _ftotals=0                                               ;^Initialize total X by FTYPE
  _ftcnts=0

  LOOP _fiter4=_f1iter2,9900,100                           ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                        ; get all two-digit FTYPE for current
FTYPE in
                                                           ; Loop 21.
    LOOP _liter8=1,9,1                                     ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                     ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                  ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_volvmtval[_ftotiter]
        _ftcnts=_ftcnts+_cntvmtval[_ftotiter]
      ENDLOOP                                              ;^End Loop 24.

    ENDLOOP                                                ;^End Loop 23.

  ENDLOOP                                                  ;^End Loop 22.

  _supertotal=_supertotal+_ftotals                         ;^Generate overall total for all single
digit ATYPE
  _supercnts=_supercnts+_ftcnts                           ; by all single digit FTYPE.

  if (_ftcnts>0)
    _ftvc=_ftotals/_ftcnts
  else
    _ftvc=0
  endif
  print list="\\"," ",_ftvc(10.2C)," ", PRINTO=1
ENDLOOP                                                    ;^End Loop 21.
if (_supercnts>0)
  _supervc=_supertotal/_supercnts
else
  _supervc=0
endif
_vmtvolovercounts=_supervc
print list="\\"," ",_supervc(10.2C), PRINTO=1
print list=" ", PRINTO=1
;*********************************************************************
; END VMT VOLUME OVER COUNT REPORT
;*********************************************************************

;===============================================================================================
; BEGIN VHT VAL REPORT ------------ X = VHT on Links w/ Counts
;===============================================================================================
Print list=" ", PRINTO=1
Print
list="*************************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                Vehicle Hours Traveled (VHT) using Volumes on Links
with Counts                                 *", PRINTO=1
Print list="*
*", PRINTO=1
```

```
Print
list="*************************************************************************************************
**********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                          ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                         ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                        ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                             ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                         ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                     ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_volvhtval[_achkiter]
    ENDLOOP                                                ;^End Loop 3.

    if (_avcheck>0)                                        ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                           ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                        ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1        ;^Header
      Print list= "                                                  Number of Lanes per
Direction                                             ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-----------------------------------------------------------------------------------
-------------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                             ;^Begin Loop 4: Cycles through FTYPE
                                                           ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                           ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                   ;^Begin Loop 5: Cycles through Lanes
for current
         _vcheck=_vcheck+_volvhtval[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                             ;^End Loop 5.

        if (_vcheck>0)                                     ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                            ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                       ;^Initialize FTYPE total X.

          LOOP _liter2=1,9,1                               ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            print list="\\"," ",_volvhtval[_aiter+_fiter+_liter2](10.0C)," ", PRINTO=1
            _totvols=_totvols+_volvhtval[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_volvhtval[_aiter+_fiter+_liter2]
          ENDLOOP                                          ;^End Loop 6.

            print list="\\"," ",_totvols(10.0C), PRINTO=1
        endif                                              ;^End Condition 2.

      ENDLOOP                                              ;^End Loop 4.

      Print list= "-----------------------------------------------------------------------------------
-------------------------------------------------", PRINTO=1
```

```
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                    ;^Begin Loop 7: Cycles through Lanes
for
                                                            ; current ATYPE in Loop 2.
        _lntotals=0                                         ;^Initialize Lane total X.

        LOOP _aiter2=_aiter,599999,100                      ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                    ; in Loop 2 to generate Lane total X.
          _lntotiter=_aiter2+_liter3
          _lntotals=_lntotals+_volvhtval[_lntotiter]
        ENDLOOP                                             ;^End Loop 8

        print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
      ENDLOOP                                               ;^End Loop 7

      print list="\\"," ",_supertotal(10.0C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                   ;^End Condition 1.

  ENDLOOP                                                   ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                     ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                   ;^Header
Print list= "                                                    Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                   ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                    ; two-digit FTYPE.

  _tafvcheck=0                                              ;^Initialize FTYPE X checking variable.

  LOOP _liter5=1,9,1                                        ;^Begin Loop 10: Cycles through Lanes
for current
                                                            ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                         ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_volvhtval[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in
order to total X checking variable.
    ENDLOOP                                                   ;^End Loop 11.

  ENDLOOP                                                   ;^End Loop 10.

  if (_tafvcheck>0)                                         ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1                 ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                     ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                            ; in Loop 9.
        _totftat=0                                          ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                     ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_volvhtval[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                               ;^End Loop 13.

      print list="\\"," ",_totftat(10.0C)," ", PRINTO=1
```

```
    ENDLOOP                                                 ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.0C), PRINTO=1
  endif                                                     ;^End Condition 3.

ENDLOOP                                                     ;^End Loop 9.

Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                          ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                               ;^Initialize total X for Lanes.

  LOOP _aiter5=100000,599999,100                            ;^Begin Loop 15: Cycles through ATYPE
and
      _lntotiter=_aiter5+_liter6                            ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_volvhtval[_lntotiter]              ; Lanes.
  ENDLOOP                                                   ;^End Loop 15.

  print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                         ;^Generate total X for all ATYPE.

ENDLOOP                                                     ;^End Loop 14.
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                 Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                          ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                                ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                                ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                             ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                            ; get single digit FTYPE.
      _totftlns=0                                           ;^Initialize total X for all FTYPE by
all Lanes.

      LOOP _fiter3=_f1iter,9900,100                         ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                      ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                  ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK                 ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                      ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_volvhtval[_aiter6+_fiter3+_liter7]   ; in order to generate
total X for FTYPE by ATYPE.
            ENDLOOP                                                 ;^End Loop 20.

        ENDLOOP                                             ;^End Loop 19.
```

```
      ENDLOOP                                                ;^End Loop 18.

      _fttotal=_fttotal+_totftlns                            ;^Generate total X for ATYPE.

      print list="\\"," ",_totftlns(10.0C)," ", PRINTO=1
    ENDLOOP                                                  ;^End Loop 17.

  print list="\\"," ",_fttotal(10.0c), PRINTO=1
ENDLOOP                                                      ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                                ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                                 ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                             ; to get single digit FTYPE.
  _ftotals=0                                                 ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                             ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                          ; get all two-digit FTYPE for current
FTYPE in
                                                             ; Loop 21.
    LOOP _liter8=1,9,1                                       ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                       ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                    ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_volvhtval[_ftotiter]
      ENDLOOP                                                ;^End Loop 24.

    ENDLOOP                                                  ;^End Loop 23.

  ENDLOOP                                                    ;^End Loop 22.

  _supertotal=_supertotal+_ftotals                           ;^Generate overall total for all single
digit ATYPE
                                                             ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.0C)," ", PRINTO=1
ENDLOOP                                                      ;^End Loop 21.
_vhtvoloncounts=_supertotal
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ", PRINTO=1
;*********************************************************************
; END VHT VAL REPORT
;*********************************************************************

;=============================================================================================
; BEGIN VHT Count REPORT ------------ X = Count VHT on Links w/ Counts
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*************************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                Vehicle Hours Traveled (VHT) using Counts on Links
with Counts                                    *", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*************************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------
```

```
LOOP _a1iter=100000,599999,100000                          ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                         ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                        ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                             ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                         ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                     ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_cntvhtval[_achkiter]
    ENDLOOP                                                ;^End Loop 3.

    if (_avcheck>0)                                        ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                           ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                        ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1        ;^Header
      Print list= "                                                Number of Lanes per
Direction                                             ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                             ;^Begin Loop 4: Cycles through FTYPE
                                                           ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                           ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                   ;^Begin Loop 5: Cycles through Lanes
for current
          _vcheck=_vcheck+_cntvhtval[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                             ;^End Loop 5.

        if (_vcheck>0)                                     ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                            ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                       ;^Initialize FTYPE total X.

          LOOP _liter2=1,9,1                               ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            print list="\\"," ",_cntvhtval[_aiter+_fiter+_liter2](10.0C)," ", PRINTO=1
            _totvols=_totvols+_cntvhtval[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_cntvhtval[_aiter+_fiter+_liter2]
          ENDLOOP                                          ;^End Loop 6.

            print list="\\"," ",_totvols(10.0C), PRINTO=1
        endif                                              ;^End Condition 2.

      ENDLOOP                                              ;^End Loop 4.

      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                   ;^Begin Loop 7: Cycles through Lanes
for
                                                           ; current ATYPE in Loop 2.
        _lntotals=0                                        ;^Initialize Lane total X.
```

```
        LOOP _aiter2=_aiter,599999,100                    ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                  ; in Loop 2 to generate Lane total X.
          _lntotiter=_aiter2+_liter3
          _lntotals=_lntotals+_cntvhtval[_lntotiter]
        ENDLOOP                                           ;^End Loop 8

        print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
      ENDLOOP                                             ;^End Loop 7


      print list="\\"," ",_supertotal(10.0C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                 ;^End Condition 1.

  ENDLOOP                                                 ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                   ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                 ;^Header
Print list= "                                                  Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                 ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                  ; two-digit FTYPE.

  _tafvcheck=0                                            ;^Initialize FTYPE X checking variable.

  LOOP _liter5=1,9,1                                      ;^Begin Loop 10: Cycles through Lanes
for current
                                                          ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                       ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_cntvhtval[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in
order to total X checking variable.
    ENDLOOP                                                 ;^End Loop 11.

  ENDLOOP                                                 ;^End Loop 10.

  if (_tafvcheck>0)                                       ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1               ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                   ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                          ; in Loop 9.
      _totftat=0                                          ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                   ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_cntvhtval[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                             ;^End Loop 13.

      print list="\\"," ",_totftat(10.0C)," ", PRINTO=1
    ENDLOOP                                               ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.0C), PRINTO=1
  endif                                                   ;^End Condition 3.
```

```
ENDLOOP                                                 ;^End Loop 9.

Print list= "-------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                           ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                      ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                           ;^Initialize total X for Lanes.

  LOOP _aiter5=100000,599999,100                        ;^Begin Loop 15: Cycles through ATYPE
and
      _lntotiter=_aiter5+_liter6                        ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_cntvhtval[_lntotiter]            ; Lanes.
  ENDLOOP                                               ;^End Loop 15.

  print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                     ;^Generate total X for all ATYPE.

ENDLOOP                                                 ;^End Loop 14.
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                      ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                            ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                            ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                         ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                        ; get single digit FTYPE.
      _totftlns=0                                       ;^Initialize total X for all FTYPE by
all Lanes.

      LOOP _fiter3=_f1iter,9900,100                     ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                  ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000              ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK             ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                  ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_cntvhtval[_aiter6+_fiter3+_liter7]   ; in order to generate
total X for FTYPE by ATYPE.
            ENDLOOP                                             ;^End Loop 20.

        ENDLOOP                                         ;^End Loop 19.

      ENDLOOP                                           ;^End Loop 18.

      _fttotal=_fttotal+_totftlns                       ;^Generate total X for ATYPE.
```

```
      print list="\\"," ",_totftlns(10.0C)," ", PRINTO=1
    ENDLOOP                                                ;^End Loop 17.

  print list="\\"," ",_fttotal(10.0c), PRINTO=1
ENDLOOP                                                    ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                              ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                               ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                           ; to get single digit FTYPE.
  _ftotals=0                                               ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                           ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                        ; get all two-digit FTYPE for current
FTYPE in
                                                           ; Loop 21.
    LOOP _liter8=1,9,1                                     ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                     ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                  ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_cntvhtval[_ftotiter]
      ENDLOOP                                              ;^End Loop 24.

    ENDLOOP                                                ;^End Loop 23.

  ENDLOOP                                                  ;^End Loop 22.

  _supertotal=_supertotal+_ftotals                         ;^Generate overall total for all single
digit ATYPE
                                                           ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.0C)," ", PRINTO=1
ENDLOOP                                                    ;^End Loop 21.
_vhtcountsoncounts=_supertotal
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ", PRINTO=1
;*************************************************************************
; END COUNT VHT REPORT
;*************************************************************************

;=============================================================================================
; BEGIN VOLUME/COUNT VHT REPORT ------------ X = Volumes over Counts VHT on Links w/ Counts
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*********************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                VHT Volume over Count Ratios on Links with Counts
*", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*********************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                          ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1
```

```
  LOOP _aiter=_a1iter,599999,10000                          ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                         ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                              ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                          ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                      ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_vcntby[_achkiter]
    ENDLOOP                                                 ;^End Loop 3.

    if (_avcheck>0)                                         ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                            ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                         ;^Initialize ATYPE total X.
      _supercnts=0

      Print list= "Area Type ",_aat2(2.0), PRINTO=1         ;^Header
      Print list= "                                                    Number of Lanes per
Direction                                              ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                              ;^Begin Loop 4: Cycles through FTYPE
                                                            ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                            ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                    ;^Begin Loop 5: Cycles through Lanes
for current
         _vcheck=_vcheck+_vcntby[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                              ;^End Loop 5.

        if (_vcheck>0)                                      ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                             ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                        ;^Initialize FTYPE total X.
          _totcnts=0

           LOOP _liter2=1,9,1                               ;^Begin Loop 6: Cycles through Lanes
to generate ATYPE by FTYPE by Lanes total X.
            if (_cntby[_aiter+_fiter+_liter2]>0)
              _links=_volvhtval[_aiter+_fiter+_liter2]/_cntvhtval[_aiter+_fiter+_liter2]
            else
              _links=0
            endif
            print list="\\"," ",_links(10.2C)," ", PRINTO=1
            _totvols=_totvols+_volvhtval[_aiter+_fiter+_liter2]
            _totcnts=_totcnts+_cntvhtval[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_volvhtval[_aiter+_fiter+_liter2]
            _supercnts=_supercnts+_cntvhtval[_aiter+_fiter+_liter2]
          ENDLOOP                                           ;^End Loop 6.

            if (_totcnts>0)
              _totvc=_totvols/_totcnts
            else
              _totvc=0
            endif
          print list="\\"," ",_totvc(10.2C), PRINTO=1
        endif                                               ;^End Condition 2.

      ENDLOOP                                               ;^End Loop 4.
```

```
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                    ;^Begin Loop 7: Cycles through Lanes
for
                                                            ; current ATYPE in Loop 2.
        _lntotals=0                                         ;^Initialize Lane total X.
        _lncnts=0

        LOOP _aiter2=_aiter,599999,100                      ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                    ; in Loop 2 to generate Lane total X.
          _lntotiter=_aiter2+_liter3
          _lntotals=_lntotals+_volvhtval[_lntotiter]
          _lncnts=_lncnts+_cntvhtval[_lntotiter]
        ENDLOOP                                             ;^End Loop 8

        if (_lncnts>0)
          _lnvc=_lntotals/_lncnts
        else
          _lnvc=0
        endif
        print list="\\"," ",_lnvc(10.2C)," ", PRINTO=1
      ENDLOOP                                               ;^End Loop 7

      if (_supercnts>0)
        _supervc=_supertotal/_supercnts
      else
        _supervc=0
      endif
      print list="\\"," ",_supervc(10.2C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                   ;^End Condition 1.

  ENDLOOP                                                   ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                     ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                   ;^Header
Print list= "                                                    Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                   ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                    ; two-digit FTYPE.

  _tafvcheck=0                                              ;^Initialize FTYPE X checking variable.
  _tafcnts=0

  LOOP _liter5=1,9,1                                        ;^Begin Loop 10: Cycles through Lanes
for current
                                                            ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                         ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_volvhtval[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in
order to total X checking variable.
      _tafcnts=_tafcnts+_cntvhtval[_aiter4+_fiter2+_liter5]
    ENDLOOP                                                   ;^End Loop 11.

  ENDLOOP                                                   ;^End Loop 10.
```

```
  if (_tafvcheck>0)                                          ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1                  ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                      ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                             ; in Loop 9.
        _totftat=0                                           ;^Initialize FTYPE total X for all
ATYPE.
        _totcnts=0

      LOOP _aiter3= 100000,599999,10000                      ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_volvhtval[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
        _totcnts=_totcnts+_cntvhtval[_aiter3+_fiter2+_liter4]
      ENDLOOP                                                ;^End Loop 13.
      if (_totcnts>0)
        _totvc=_totftat/_totcnts
      else
        _totvc=0
      endif
      print list="\\"," ",_totvc(10.2C)," ", PRINTO=1
    ENDLOOP                                                  ;^End Loop 12.
    if (_tafcnts>0)
      _tafvc=_tafvcheck/_tafcnts
    else
      _tafvc=0
    endif
    print list="\\"," ",_tafvc(10.2C), PRINTO=1
  endif                                                      ;^End Condition 3.

ENDLOOP                                                      ;^End Loop 9.

Print list= "-------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                                ;^Initialize all ATYPE total X.
_supercnts=0

LOOP _liter6=1,9,1                                           ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                                ;^Initialize total X for Lanes.
  _lncnts=0

  LOOP _aiter5=100000,599999,100                             ;^Begin Loop 15: Cycles through ATYPE
and
      _lntotiter=_aiter5+_liter6                             ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_volvhtval[_lntotiter]                 ; Lanes.
      _lncnts=_lncnts+_cntvhtval[_lntotiter]
  ENDLOOP                                                    ;^End Loop 15.
  if (_lncnts>0)
    _lnvc=_lntotals/_lncnts
  else
    _lnvc=0
  endif
  print list="\\"," ",_lnvc(10.2C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                          ;^Generate total X for all ATYPE.
  _supercnts=_supercnts+_lncnts
ENDLOOP                                                      ;^End Loop 14.
if (_supercnts>0)
  _supervc=_supertotal/_supercnts
else
  _supervc=0
endif
print list="\\"," ",_supervc(10.2C), PRINTO=1
print list=" ","\n ", PRINTO=1
```

```
;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                  Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                          ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                                ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                                ;^Initialize total X for all ATYPE
  _ftcnts=0

    LOOP _f1iter=1000,9900,1000                             ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                            ; get single digit FTYPE.
      _totftlns=0                                           ;^Initialize total X for all FTYPE by
all Lanes.
      _totftcnts=0

      LOOP _fiter3=_f1iter,9900,100                         ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                      ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                  ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK                 ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                      ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_volvhtval[_aiter6+_fiter3+_liter7]   ; in order to generate
total X for FTYPE by ATYPE.
              _totftcnts=_totftcnts+_cntvhtval[_aiter6+_fiter3+_liter7]
            ENDLOOP                                                 ;^End Loop 20.

        ENDLOOP                                             ;^End Loop 19.

      ENDLOOP                                               ;^End Loop 18.

      _fttotal=_fttotal+_totftlns                           ;^Generate total X for ATYPE.
      _ftcnts=_ftcnts+_totftcnts

      if (_totftcnts>0)
        _totftvc=_totftlns/_totftcnts
      else
        _totftvc=0
      endif
      print list="\\"," ",_totftvc(10.2C)," ", PRINTO=1
    ENDLOOP                                                 ;^End Loop 17.
    if (_ftcnts>0)
      _ftvc=_fttotal/_ftcnts
    else
      _ftvc=0
    endif
  print list="\\"," ",_ftvc(10.2c), PRINTO=1
ENDLOOP                                                     ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize overall total X.
_supercnts=0
```

```
LOOP _f1iter2=1000,9900,1000                                ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                            ; to get single digit FTYPE.
  _ftotals=0                                                ;^Initialize total X by FTYPE
  _ftcnts=0

  LOOP _fiter4=_f1iter2,9900,100                            ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                         ; get all two-digit FTYPE for current
FTYPE in
                                                            ; Loop 21.
    LOOP _liter8=1,9,1                                      ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                      ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                   ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_volvhtval[_ftotiter]
        _ftcnts=_ftcnts+_cntvhtval[_ftotiter]
      ENDLOOP                                               ;^End Loop 24.

    ENDLOOP                                                 ;^End Loop 23.

  ENDLOOP                                                   ;^End Loop 22.

  _supertotal=_supertotal+_ftotals                          ;^Generate overall total for all single
digit ATYPE
  _supercnts=_supercnts+_ftcnts                           ; by all single digit FTYPE.

  if (_ftcnts>0)
    _ftvc=_ftotals/_ftcnts
  else
    _ftvc=0
  endif

  print list="\\"," ",_ftvc(10.2C)," ", PRINTO=1
ENDLOOP                                                     ;^End Loop 21.
if (_supercnts>0)
  _supervc=_supertotal/_supercnts
else
  _supervc=0
endif
_vhtvolovercounts=_supervc
print list="\\"," ",_supervc(10.2C), PRINTO=1
print list=" ", PRINTO=1
;*************************************************************************
; END VHT VOLUME OVER COUNT REPORT
;*************************************************************************

;=============================================================================================
; BEGIN VOLUME REPORT ------------ X = Volumes on Links w/ Counts
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*****************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                          Estimated Volumes on Links with Counts
*", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*****************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                           ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                 ; in order to get single digit ATYPE.
```

```
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                          ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                         ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                              ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                          ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                      ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_volby[_achkiter]
    ENDLOOP                                                 ;^End Loop 3.

    if (_avcheck>0)                                         ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                            ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                         ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1         ;^Header
      Print list= "                                                  Number of Lanes per
Direction                                             ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                              ;^Begin Loop 4: Cycles through FTYPE
                                                            ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                            ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                    ;^Begin Loop 5: Cycles through Lanes
for current
          _vcheck=_vcheck+_volby[_aiter+_fiter+_liter]      ; FTYPE in Loop 4 and totals X checking
variable.
       ENDLOOP                                              ;^End Loop 5.

        if (_vcheck>0)                                      ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                             ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                        ;^Initialize FTYPE total X.

          LOOP _liter2=1,9,1                                ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            print list="\\"," ",_volby[_aiter+_fiter+_liter2](10.0C)," ", PRINTO=1
            _totvols=_totvols+_volby[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_volby[_aiter+_fiter+_liter2]
          ENDLOOP                                           ;^End Loop 6.

            print list="\\"," ",_totvols(10.0C), PRINTO=1
        endif                                               ;^End Condition 2.

      ENDLOOP                                               ;^End Loop 4.

      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                    ;^Begin Loop 7: Cycles through Lanes
for
                                                            ; current ATYPE in Loop 2.
        _lntotals=0                                         ;^Initialize Lane total X.

        LOOP _aiter2=_aiter,599999,100                      ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
```

```
          if (_aiter2>_aiter+9999) BREAK                  ; in Loop 2 to generate Lane total X.
          _lntotiter=_aiter2+_liter3
          _lntotals=_lntotals+_volby[_lntotiter]
        ENDLOOP                                           ;^End Loop 8

        print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
      ENDLOOP                                             ;^End Loop 7

      print list="\\"," ",_supertotal(10.0C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                 ;^End Condition 1.

  ENDLOOP                                                 ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                   ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                 ;^Header
Print list= "                                                  Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-----------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                 ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                  ; two-digit FTYPE.

  _tafvcheck=0                                            ;^Initialize FTYPE X checking variable.

  LOOP _liter5=1,9,1                                      ;^Begin Loop 10: Cycles through Lanes
for current
                                                          ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                       ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_volby[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order to
total X checking variable.
    ENDLOOP                                                 ;^End Loop 11.

  ENDLOOP                                                 ;^End Loop 10.

  if (_tafvcheck>0)                                       ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1               ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                   ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                          ; in Loop 9.
      _totftat=0                                          ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                   ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_volby[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                             ;^End Loop 13.

      print list="\\"," ",_totftat(10.0C)," ", PRINTO=1
    ENDLOOP                                               ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.0C), PRINTO=1
  endif                                                   ;^End Condition 3.

ENDLOOP                                                   ;^End Loop 9.

Print list= "-----------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
```

```
print list="Totals", PRINTO=1

_supertotal=0                                          ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                     ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                          ;^Initialize total X for Lanes.

  LOOP _aiter5=100000,599999,100                       ;^Begin Loop 15: Cycles through ATYPE
and
      _lntotiter=_aiter5+_liter6                       ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_volby[_lntotiter]           ; Lanes.
  ENDLOOP                                              ;^End Loop 15.

  print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                    ;^Generate total X for all ATYPE.

ENDLOOP                                                ;^End Loop 14.
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                  Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                     ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                           ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                           ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                        ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                       ; get single digit FTYPE.
      _totftlns=0                                      ;^Initialize total X for all FTYPE by
all Lanes.

      LOOP _fiter3=_f1iter,9900,100                    ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                 ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000             ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK            ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                    ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_volby[_aiter6+_fiter3+_liter7]   ; in order to generate total
X for FTYPE by ATYPE.
            ENDLOOP                                               ;^End Loop 20.

        ENDLOOP                                        ;^End Loop 19.

      ENDLOOP                                          ;^End Loop 18.

      _fttotal=_fttotal+_totftlns                      ;^Generate total X for ATYPE.

      print list="\\"," ",_totftlns(10.0C)," ", PRINTO=1
    ENDLOOP                                            ;^End Loop 17.

  print list="\\"," ",_fttotal(10.0c), PRINTO=1
```

```
ENDLOOP                                                 ;^End Loop 16.

Print list= "-----------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                           ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                            ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                        ; to get single digit FTYPE.
  _ftotals=0                                            ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                        ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                     ; get all two-digit FTYPE for current
FTYPE in
                                                        ; Loop 21.
    LOOP _liter8=1,9,1                                  ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                  ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8               ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_volby[_ftotiter]
      ENDLOOP                                           ;^End Loop 24.

    ENDLOOP                                             ;^End Loop 23.

  ENDLOOP                                               ;^End Loop 22.

  _supertotal=_supertotal+_ftotals                      ;^Generate overall total for all single
digit ATYPE
                                                        ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.0C)," ", PRINTO=1
ENDLOOP                                                 ;^End Loop 21.

print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ", PRINTO=1
;*********************************************************************
; END VOLUME REPORT
;*********************************************************************

;=============================================================================================
; BEGIN Count REPORT ------------ X = Count on Links w/ Counts
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                          Observed Counts on Links with Counts
*", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                       ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                             ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                      ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                     ; in order to get two-digit ATYPE.
```

```
    _aat2=int(_aiter/10000)

    _avcheck=0                                          ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                      ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                  ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_cntby[_achkiter]
    ENDLOOP                                             ;^End Loop 3.

    if (_avcheck>0)                                     ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                        ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                     ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1     ;^Header
      Print list= "                                                 Number of Lanes per
Direction                                          ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                          ;^Begin Loop 4: Cycles through FTYPE
                                                        ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                        ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                ;^Begin Loop 5: Cycles through Lanes
for current
         _vcheck=_vcheck+_cntby[_aiter+_fiter+_liter]   ; FTYPE in Loop 4 and totals X checking
variable.
       ENDLOOP                                          ;^End Loop 5.

        if (_vcheck>0)                                  ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                         ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                    ;^Initialize FTYPE total X.

          LOOP _liter2=1,9,1                            ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            print list="\\"," ",_cntby[_aiter+_fiter+_liter2](10.0C)," ", PRINTO=1
            _totvols=_totvols+_cntby[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_cntby[_aiter+_fiter+_liter2]
          ENDLOOP                                       ;^End Loop 6.

            print list="\\"," ",_totvols(10.0C), PRINTO=1
        endif                                           ;^End Condition 2.

      ENDLOOP                                           ;^End Loop 4.

      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                ;^Begin Loop 7: Cycles through Lanes
for
                                                        ; current ATYPE in Loop 2.
        _lntotals=0                                     ;^Initialize Lane total X.

        LOOP _aiter2=_aiter,599999,100                  ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                ; in Loop 2 to generate Lane total X.
          _lntotiter=_aiter2+_liter3
          _lntotals=_lntotals+_cntby[_lntotiter]
        ENDLOOP                                         ;^End Loop 8

        print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
```

```
      ENDLOOP                                                ;^End Loop 7

      print list="\\"," ",_supertotal(10.0C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                    ;^End Condition 1.

  ENDLOOP                                                    ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                      ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                    ;^Header
Print list= "                                                     Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-----------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                    ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                     ; two-digit FTYPE.

  _tafvcheck=0                                               ;^Initialize FTYPE X checking variable.

  LOOP _liter5=1,9,1                                         ;^Begin Loop 10: Cycles through Lanes
for current
                                                             ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                          ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_cntby[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order to
total X checking variable.
    ENDLOOP                                                    ;^End Loop 11.

  ENDLOOP                                                    ;^End Loop 10.

  if (_tafvcheck>0)                                          ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1                  ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                      ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                             ; in Loop 9.
        _totftat=0                                           ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                      ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_cntby[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                                ;^End Loop 13.

      print list="\\"," ",_totftat(10.0C)," ", PRINTO=1
    ENDLOOP                                                  ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.0C), PRINTO=1
  endif                                                      ;^End Condition 3.

ENDLOOP                                                      ;^End Loop 9.

Print list= "-----------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                                ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                           ;^Begin Loop 14: Cycles through Lanes.
```

```
  _lntotals=0                                                ;^Initialize total X for Lanes.

  LOOP _aiter5=100000,599999,100                             ;^Begin Loop 15: Cycles through ATYPE
and
      _lntotiter=_aiter5+_liter6                             ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_cntby[_lntotiter]                 ; Lanes.
  ENDLOOP                                                    ;^End Loop 15.

  print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                          ;^Generate total X for all ATYPE.

ENDLOOP                                                      ;^End Loop 14.
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                  Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-----------------------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                           ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                                 ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                                 ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                              ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                             ; get single digit FTYPE.
      _totftlns=0                                            ;^Initialize total X for all FTYPE by
all Lanes.

      LOOP _fiter3=_f1iter,9900,100                          ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                       ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                   ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK                  ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                       ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_cntby[_aiter6+_fiter3+_liter7]    ; in order to generate total
X for FTYPE by ATYPE.
            ENDLOOP                                                  ;^End Loop 20.

        ENDLOOP                                              ;^End Loop 19.

      ENDLOOP                                                ;^End Loop 18.

      _fttotal=_fttotal+_totftlns                            ;^Generate total X for ATYPE.

      print list="\\"," ",_totftlns(10.0C)," ", PRINTO=1
    ENDLOOP                                                  ;^End Loop 17.

  print list="\\"," ",_fttotal(10.0c), PRINTO=1
ENDLOOP                                                      ;^End Loop 16.

Print list= "-----------------------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1
```

```
_supertotal=0                                          ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                           ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                       ; to get single digit FTYPE.
  _ftotals=0                                           ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                       ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                    ; get all two-digit FTYPE for current
FTYPE in
                                                       ; Loop 21.
    LOOP _liter8=1,9,1                                 ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                 ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8              ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_cntby[_ftotiter]
      ENDLOOP                                          ;^End Loop 24.

    ENDLOOP                                            ;^End Loop 23.

  ENDLOOP                                              ;^End Loop 22.

  _supertotal=_supertotal+_ftotals                     ;^Generate overall total for all single
digit ATYPE
                                                       ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.0C)," ", PRINTO=1
ENDLOOP                                                ;^End Loop 21.

print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ", PRINTO=1
;*********************************************************************
; END COUNT REPORT
;*********************************************************************

;=============================================================================================
; BEGIN VOLUME/COUNT REPORT ------------- X = Volumes over Counts on Links w/ Counts
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*************************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                    Volume over Count Ratios on Links with Counts
*", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*************************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                      ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                            ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                     ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                    ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                         ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                     ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
```

```
      if (_achkiter>_aiter+9999) BREAK                    ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_vcntby[_achkiter]
    ENDLOOP                                               ;^End Loop 3.

    if (_avcheck>0)                                       ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                          ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                       ;^Initialize ATYPE total X.
      _supercnts=0

      Print list= "Area Type ",_aat2(2.0), PRINTO=1       ;^Header
      Print list= "                                                  Number of Lanes per
Direction                                              ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                            ;^Begin Loop 4: Cycles through FTYPE
                                                          ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                          ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                  ;^Begin Loop 5: Cycles through Lanes
for current
          _vcheck=_vcheck+_vcntby[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                            ;^End Loop 5.

        if (_vcheck>0)                                    ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                           ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                      ;^Initialize FTYPE total X.
          _totcnts=0

           LOOP _liter2=1,9,1                              ;^Begin Loop 6: Cycles through Lanes
to generate ATYPE by FTYPE by Lanes total X.
            if (_cntby[_aiter+_fiter+_liter2]>0)
              _links=_volby[_aiter+_fiter+_liter2]/_cntby[_aiter+_fiter+_liter2]
            else
              _links=0
            endif
            print list="\\"," ",_links(10.2C)," ", PRINTO=1
            _totvols=_totvols+_volby[_aiter+_fiter+_liter2]
            _totcnts=_totcnts+_cntby[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_volby[_aiter+_fiter+_liter2]
            _supercnts=_supercnts+_cntby[_aiter+_fiter+_liter2]
          ENDLOOP                                         ;^End Loop 6.

            if (_totcnts>0)
              _totvc=_totvols/_totcnts
            else
              _totvc=0
            endif
          print list="\\"," ",_totvc(10.2C), PRINTO=1
        endif                                             ;^End Condition 2.

      ENDLOOP                                             ;^End Loop 4.

      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                  ;^Begin Loop 7: Cycles through Lanes
for
                                                          ; current ATYPE in Loop 2.
        _lntotals=0                                       ;^Initialize Lane total X.
        _lncnts=0
```

```
        LOOP _aiter2=_aiter,599999,100                    ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                  ; in Loop 2 to generate Lane total X.
          _lntotiter=_aiter2+_liter3
          _lntotals=_lntotals+_volby[_lntotiter]
          _lncnts=_lncnts+_cntby[_lntotiter]
        ENDLOOP                                           ;^End Loop 8

        if (_lncnts>0)
          _lnvc=_lntotals/_lncnts
        else
          _lnvc=0
        endif
        print list="\\"," ",_lnvc(10.2C)," ", PRINTO=1
      ENDLOOP                                             ;^End Loop 7

      if (_supercnts>0)
        _supervc=_supertotal/_supercnts
      else
        _supervc=0
      endif
      print list="\\"," ",_supervc(10.2C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                 ;^End Condition 1.

  ENDLOOP                                                 ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                   ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                 ;^Header
Print list= "                                                  Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-----------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                 ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                  ; two-digit FTYPE.

  _tafvcheck=0                                            ;^Initialize FTYPE X checking variable.
  _tafcnts=0

  LOOP _liter5=1,9,1                                      ;^Begin Loop 10: Cycles through Lanes
for current
                                                          ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                       ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_volby[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order to
total X checking variable.
      _tafcnts=_tafcnts+_cntby[_aiter4+_fiter2+_liter5]
    ENDLOOP                                                 ;^End Loop 11.

  ENDLOOP                                                 ;^End Loop 10.

  if (_tafvcheck>0)                                       ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1               ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                   ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                          ; in Loop 9.
        _totftat=0                                        ;^Initialize FTYPE total X for all
ATYPE.
        _totcnts=0
```

```
      LOOP _aiter3= 100000,599999,10000                    ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_volby[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
        _totcnts=_totcnts+_cntby[_aiter3+_fiter2+_liter4]
      ENDLOOP                                              ;^End Loop 13.
      if (_totcnts>0)
        _totvc=_totftat/_totcnts
      else
        _totvc=0
      endif
      print list="\\"," ",_totvc(10.2C)," ", PRINTO=1
    ENDLOOP                                                ;^End Loop 12.
    if (_tafcnts>0)
      _tafvc=_tafvcheck/_tafcnts
    else
      _tafvc=0
    endif
    print list="\\"," ",_tafvc(10.2C), PRINTO=1
  endif                                                    ;^End Condition 3.

ENDLOOP                                                    ;^End Loop 9.

Print list= "-------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                              ;^Initialize all ATYPE total X.
_supercnts=0

LOOP _liter6=1,9,1                                         ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                              ;^Initialize total X for Lanes.
  _lncnts=0

  LOOP _aiter5=100000,599999,100                           ;^Begin Loop 15: Cycles through ATYPE
and
      _lntotiter=_aiter5+_liter6                           ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_volby[_lntotiter]               ; Lanes.
      _lncnts=_lncnts+_cntby[_lntotiter]
  ENDLOOP                                                  ;^End Loop 15.
  if (_lncnts>0)
    _lnvc=_lntotals/_lncnts
  else
    _lnvc=0
  endif
  print list="\\"," ",_lnvc(10.2C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                        ;^Generate total X for all ATYPE.
  _supercnts=_supercnts+_lncnts
ENDLOOP                                                    ;^End Loop 14.
if (_supercnts>0)
  _supervc=_supertotal/_supercnts
else
  _supervc=0
endif
print list="\\"," ",_supervc(10.2C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                  Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
```

```
LOOP _a1iter2=100000,599999,100000                          ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                                ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                                ;^Initialize total X for all ATYPE
  _ftcnts=0

    LOOP _f1iter=1000,9900,1000                             ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                            ; get single digit FTYPE.
      _totftlns=0                                           ;^Initialize total X for all FTYPE by
all Lanes.
      _totftcnts=0

      LOOP _fiter3=_f1iter,9900,100                         ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                      ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                  ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK                 ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                      ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_volby[_aiter6+_fiter3+_liter7]   ; in order to generate total
X for FTYPE by ATYPE.
              _totftcnts=_totftcnts+_cntby[_aiter6+_fiter3+_liter7]
            ENDLOOP                                                 ;^End Loop 20.

        ENDLOOP                                             ;^End Loop 19.

      ENDLOOP                                               ;^End Loop 18.

      _fttotal=_fttotal+_totftlns                           ;^Generate total X for ATYPE.
      _ftcnts=_ftcnts+_totftcnts

      if (_totftcnts>0)
        _totftvc=_totftlns/_totftcnts
      else
        _totftvc=0
      endif
      print list="\\"," ",_totftvc(10.2C)," ", PRINTO=1
    ENDLOOP                                                 ;^End Loop 17.
    if (_ftcnts>0)
      _ftvc=_fttotal/_ftcnts
    else
      _ftvc=0
    endif
  print list="\\"," ",_ftvc(10.2c), PRINTO=1
ENDLOOP                                                     ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize overall total X.
_supercnts=0

LOOP _f1iter2=1000,9900,1000                                ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                            ; to get single digit FTYPE.
  _ftotals=0                                                ;^Initialize total X by FTYPE
  _ftcnts=0

  LOOP _fiter4=_f1iter2,9900,100                            ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                         ; get all two-digit FTYPE for current
FTYPE in
```

```
                                                        ; Loop 21.
    LOOP _liter8=1,9,1                                  ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                  ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8               ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_volby[_ftotiter]
        _ftcnts=_ftcnts+_cntby[_ftotiter]
      ENDLOOP                                           ;^End Loop 24.

    ENDLOOP                                             ;^End Loop 23.

  ENDLOOP                                               ;^End Loop 22.

  _supertotal=_supertotal+_ftotals                      ;^Generate overall total for all single
digit ATYPE
  _supercnts=_supercnts+_ftcnts                        ; by all single digit FTYPE.

  if (_ftcnts>0)
    _ftvc=_ftotals/_ftcnts
  else
    _ftvc=0
  endif

  print list="\\"," ",_ftvc(10.2C)," ", PRINTO=1
ENDLOOP                                                 ;^End Loop 21.
if (_supercnts>0)
  _supervc=_supertotal/_supercnts
else
  _supervc=0
endif
print list="\\"," ",_supervc(10.2C), PRINTO=1
print list=" ", PRINTO=1
;*************************************************************************
; END VOLUME OVER COUNT REPORT
;*************************************************************************

;=============================================================================================
; BEGIN VOLUME ON ALL LINKS ------------- X = VOLUME
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*********************************************************************************************
**********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                  Total Volume on All Links (Centroid Connectors
Excluded)                                      *", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*********************************************************************************************
**********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                       ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                             ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                      ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                     ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                          ;^Initialize ATYPE X checking variable.
```

```
    LOOP _achkiter=_aiter,599999,1                          ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                      ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_volall[_achkiter]
    ENDLOOP                                                 ;^End Loop 3.

    if (_avcheck>0)                                         ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                            ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                         ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1         ;^Header
      Print list= "                                                    Number of Lanes per
Direction                                              ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                              ;^Begin Loop 4: Cycles through FTYPE
                                                            ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                            ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                    ;^Begin Loop 5: Cycles through Lanes
for current
          _vcheck=_vcheck+_volall[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                              ;^End Loop 5.

        if (_vcheck>0 & (_fiter<5000 | _fiter>5999))        ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                             ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                        ;^Initialize FTYPE total X.

          LOOP _liter2=1,9,1                                ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            print list="\\"," ",_volall[_aiter+_fiter+_liter2](10.0C)," ", PRINTO=1
            _totvols=_totvols+_volall[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_volall[_aiter+_fiter+_liter2]
          ENDLOOP                                           ;^End Loop 6.

            print list="\\"," ",_totvols(10.0C), PRINTO=1
        endif                                               ;^End Condition 2.

      ENDLOOP                                               ;^End Loop 4.

      Print list= "------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                    ;^Begin Loop 7: Cycles through Lanes
for
                                                            ; current ATYPE in Loop 2.
        _lntotals=0                                         ;^Initialize Lane total X.

        LOOP _aiter2=_aiter,599999,100                      ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                    ; in Loop 2 to generate Lane total X.
          if (_aiter2<_aiter+5000 | _aiter2>_aiter+5999)
            _lntotiter=_aiter2+_liter3
            _lntotals=_lntotals+_volall[_lntotiter]
          endif
        ENDLOOP                                             ;^End Loop 8

        print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
      ENDLOOP                                               ;^End Loop 7
```

```
      print list="\\"," ",_supertotal(10.0C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                ;^End Condition 1.

  ENDLOOP                                                ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                  ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                ;^Header
Print list= "                                                Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                 ; two-digit FTYPE.

  _tafvcheck=0                                           ;^Initialize FTYPE X checking variable.
 if (_fft2<50 | _fft2>59)
  LOOP _liter5=1,9,1                                     ;^Begin Loop 10: Cycles through Lanes
for current
                                                         ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                      ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_volall[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order
to total X checking variable.
    ENDLOOP                                                ;^End Loop 11.

  ENDLOOP                                                ;^End Loop 10.

  if (_tafvcheck>0)                                      ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1              ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                  ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                         ; in Loop 9.
       _totftat=0                                        ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                  ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_volall[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                            ;^End Loop 13.

      print list="\\"," ",_totftat(10.0C)," ", PRINTO=1
    ENDLOOP                                              ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.0C), PRINTO=1
  endif                                                  ;^End Condition 3.
 endif
ENDLOOP                                                  ;^End Loop 9.

Print list= "------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                            ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                       ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                            ;^Initialize total X for Lanes.
```

```
  LOOP _aiter5=100000,599999,100                          ;^Begin Loop 15: Cycles through ATYPE
and
    if ((_aiter5<105000 | _aiter5>105999) &
        (_aiter5<115000 | _aiter5>115999) &
        (_aiter5<125000 | _aiter5>125999) &
        (_aiter5<135000 | _aiter5>135999) &
        (_aiter5<145000 | _aiter5>145999) &
        (_aiter5<155000 | _aiter5>155999) &
        (_aiter5<165000 | _aiter5>165999) &
        (_aiter5<175000 | _aiter5>175999) &
        (_aiter5<185000 | _aiter5>185999) &
        (_aiter5<195000 | _aiter5>195999) &
        (_aiter5<205000 | _aiter5>205999) &
        (_aiter5<215000 | _aiter5>215999) &
        (_aiter5<225000 | _aiter5>225999) &
        (_aiter5<235000 | _aiter5>235999) &
        (_aiter5<245000 | _aiter5>245999) &
        (_aiter5<255000 | _aiter5>255999) &
        (_aiter5<265000 | _aiter5>265999) &
        (_aiter5<275000 | _aiter5>275999) &
        (_aiter5<285000 | _aiter5>285999) &
        (_aiter5<295000 | _aiter5>295999) &
        (_aiter5<305000 | _aiter5>305999) &
        (_aiter5<315000 | _aiter5>315999) &
        (_aiter5<325000 | _aiter5>325999) &
        (_aiter5<335000 | _aiter5>335999) &
        (_aiter5<345000 | _aiter5>345999) &
        (_aiter5<355000 | _aiter5>355999) &
        (_aiter5<365000 | _aiter5>365999) &
        (_aiter5<375000 | _aiter5>375999) &
        (_aiter5<385000 | _aiter5>385999) &
        (_aiter5<395000 | _aiter5>395999) &
        (_aiter5<405000 | _aiter5>405999) &
        (_aiter5<415000 | _aiter5>415999) &
        (_aiter5<425000 | _aiter5>425999) &
        (_aiter5<435000 | _aiter5>435999) &
        (_aiter5<445000 | _aiter5>445999) &
        (_aiter5<455000 | _aiter5>455999) &
        (_aiter5<465000 | _aiter5>465999) &
        (_aiter5<475000 | _aiter5>475999) &
        (_aiter5<485000 | _aiter5>485999) &
        (_aiter5<495000 | _aiter5>495999) &
        (_aiter5<505000 | _aiter5>505999) &
        (_aiter5<515000 | _aiter5>515999) &
        (_aiter5<525000 | _aiter5>525999) &
        (_aiter5<535000 | _aiter5>535999) &
        (_aiter5<545000 | _aiter5>545999) &
        (_aiter5<555000 | _aiter5>555999) &
        (_aiter5<565000 | _aiter5>565999) &
        (_aiter5<575000 | _aiter5>575999) &
        (_aiter5<585000 | _aiter5>585999) &
        (_aiter5<595000 | _aiter5>595999))

      _lntotiter=_aiter5+_liter6                          ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_volall[_lntotiter]              ; Lanes.

    endif
  ENDLOOP                                                 ;^End Loop 15.

  print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                       ;^Generate total X for all ATYPE.

ENDLOOP                                                   ;^End Loop 14.
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
```

```
Print list= "                                                    Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                          ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                                ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                                ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                             ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                            ; get single digit FTYPE.
      _totftlns=0                                           ;^Initialize total X for all FTYPE by
all Lanes.
      if (_f1iter<5000 | _f1iter>5999)
      LOOP _fiter3=_f1iter,9900,100                         ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                      ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                  ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK                 ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                      ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_volall[_aiter6+_fiter3+_liter7]   ; in order to generate total
X for FTYPE by ATYPE.
            ENDLOOP                                                 ;^End Loop 20.

        ENDLOOP                                             ;^End Loop 19.

      ENDLOOP                                               ;^End Loop 18.
      endif
      _fttotal=_fttotal+_totftlns                           ;^Generate total X for ATYPE.

      print list="\\"," ",_totftlns(10.0C)," ", PRINTO=1
    ENDLOOP                                                 ;^End Loop 17.

  print list="\\"," ",_fttotal(10.0c), PRINTO=1
ENDLOOP                                                     ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                                ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                            ; to get single digit FTYPE.
  _ftotals=0                                                ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                            ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                         ; get all two-digit FTYPE for current
FTYPE in
    if (_f1iter2<5000 | _f1iter2>5999)                                          ;
Loop 21.
    LOOP _liter8=1,9,1                                      ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                      ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                   ; to generate total X by single digit
FTYPE.
```

```
        _ftotals=_ftotals+_volall[_ftotiter]
      ENDLOOP                                                ;^End Loop 24.

    ENDLOOP                                                  ;^End Loop 23.
    endif
  ENDLOOP                                                    ;^End Loop 22.
  _supertotal=_supertotal+_ftotals                           ;^Generate overall total for all single
digit ATYPE
                                                             ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.0C)," ", PRINTO=1
ENDLOOP                                                      ;^End Loop 21.
_totalvolumes=_supertotal
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ", PRINTO=1
;*********************************************************************
; END VOLUME ON ALL LINKS REPORT
;*********************************************************************
'

;=============================================================================================
; BEGIN VOLUME PERCENTAGES ON ALL LINKS ------------- X = VOLUME
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*********************************************************************************************
**********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                Volume Percentages on All Links (Centroid Connectors
Excluded)                                    *", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*********************************************************************************************
**********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------
_supersuper=0
LOOP _supera= 100000,599999,10000                            ;^Begin Loops Pre-1 through Pre-3:
Cycles through all non-centroid
  LOOP _superf= 1000,9999,100                                ; connector links to generate overall
total X.
   if (_superf<5000 | _superf>5999)
     LOOP _superl=1,9,1
       _supersuper=_supersuper+_volall[_supera+_superf+_superl]/100 ;^Divide by 100 to get
pecentages and not ratios in later computations.
     ENDLOOP
   endif
  ENDLOOP                                                    ;End Loops Pre-3 through Pre-1.
ENDLOOP

LOOP _a1iter=100000,599999,100000                            ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                  ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                           ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                          ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                               ;^Initialize ATYPE X checking variable.



    LOOP _achkiter=_aiter,599999,1                           ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                       ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_volall[_achkiter]
    ENDLOOP                                                  ;^End Loop 3.
```

```
    if (_avcheck>0)                                          ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                             ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                          ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1          ;^Header
      Print list= "                                                    Number of Lanes per
Direction                                                 ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                               ;^Begin Loop 4: Cycles through FTYPE
                                                             ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                             ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                     ;^Begin Loop 5: Cycles through Lanes
for current
         _vcheck=_vcheck+_volall[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                               ;^End Loop 5.

        if (_vcheck>0 & (_fiter<5000 | _fiter>5999))         ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                              ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                         ;^Initialize FTYPE total X.

          LOOP _liter2=1,9,1                                 ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            print list="\\"," ",(_volall[_aiter+_fiter+_liter2]/_supersuper)(10.2C)," ",
PRINTO=1
            _totvols=_totvols+_volall[_aiter+_fiter+_liter2]
            _supertotal=_supertotal+_volall[_aiter+_fiter+_liter2]
          ENDLOOP                                            ;^End Loop 6.

            print list="\\"," ",(_totvols/_supersuper)(10.2C), PRINTO=1
        endif                                                ;^End Condition 2.

      ENDLOOP                                                ;^End Loop 4.

      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                     ;^Begin Loop 7: Cycles through Lanes
for
                                                             ; current ATYPE in Loop 2.
        _lntotals=0                                          ;^Initialize Lane total X.

        LOOP _aiter2=_aiter,599999,100                       ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                     ; in Loop 2 to generate Lane total X.
          if (_aiter2<_aiter+5000 | _aiter2>_aiter+5999)
            _lntotiter=_aiter2+_liter3
            _lntotals=_lntotals+_volall[_lntotiter]
          endif
        ENDLOOP                                              ;^End Loop 8

        print list="\\"," ",(_lntotals/_supersuper)(10.2C)," ", PRINTO=1
      ENDLOOP                                                ;^End Loop 7

      print list="\\"," ",(_supertotal/_supersuper)(10.2C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                    ;^End Condition 1.

  ENDLOOP                                                    ;^End Loop 2.
```

```
  print list=" ", PRINTO=1
ENDLOOP                                                 ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1               ;^Header
Print list= "                                                Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                               ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                ; two-digit FTYPE.

  _tafvcheck=0                                          ;^Initialize FTYPE X checking variable.
 if (_fft2<50 | _fft2>59)
  LOOP _liter5=1,9,1                                    ;^Begin Loop 10: Cycles through Lanes
for current
                                                        ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                     ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_volall[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order
to total X checking variable.
    ENDLOOP                                               ;^End Loop 11.

  ENDLOOP                                               ;^End Loop 10.

  if (_tafvcheck>0)                                     ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1             ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                 ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                        ; in Loop 9.
        _totftat=0                                      ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                 ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_volall[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                           ;^End Loop 13.

      print list="\\"," ",(_totftat/_supersuper)(10.2C)," ", PRINTO=1
    ENDLOOP                                             ;^End Loop 12.

    print list="\\"," ",(_tafvcheck/_supersuper)(10.2C), PRINTO=1
  endif                                                 ;^End Condition 3.
 endif
ENDLOOP                                                 ;^End Loop 9.

Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                           ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                      ;^Begin Loop 14: Cycles through Lanes.


  _lntotals=0                                           ;^Initialize total X for Lanes.

  LOOP _aiter5=100000,599999,100                        ;^Begin Loop 15: Cycles through ATYPE
and
    if ((_aiter5<105000 | _aiter5>105999) &
        (_aiter5<115000 | _aiter5>115999) &
```

```
        (_aiter5<125000 | _aiter5>125999) &
        (_aiter5<135000 | _aiter5>135999) &
        (_aiter5<145000 | _aiter5>145999) &
        (_aiter5<155000 | _aiter5>155999) &
        (_aiter5<165000 | _aiter5>165999) &
        (_aiter5<175000 | _aiter5>175999) &
        (_aiter5<185000 | _aiter5>185999) &
        (_aiter5<195000 | _aiter5>195999) &
        (_aiter5<205000 | _aiter5>205999) &
        (_aiter5<215000 | _aiter5>215999) &
        (_aiter5<225000 | _aiter5>225999) &
        (_aiter5<235000 | _aiter5>235999) &
        (_aiter5<245000 | _aiter5>245999) &
        (_aiter5<255000 | _aiter5>255999) &
        (_aiter5<265000 | _aiter5>265999) &
        (_aiter5<275000 | _aiter5>275999) &
        (_aiter5<285000 | _aiter5>285999) &
        (_aiter5<295000 | _aiter5>295999) &
        (_aiter5<305000 | _aiter5>305999) &
        (_aiter5<315000 | _aiter5>315999) &
        (_aiter5<325000 | _aiter5>325999) &
        (_aiter5<335000 | _aiter5>335999) &
        (_aiter5<345000 | _aiter5>345999) &
        (_aiter5<355000 | _aiter5>355999) &
        (_aiter5<365000 | _aiter5>365999) &
        (_aiter5<375000 | _aiter5>375999) &
        (_aiter5<385000 | _aiter5>385999) &
        (_aiter5<395000 | _aiter5>395999) &
        (_aiter5<405000 | _aiter5>405999) &
        (_aiter5<415000 | _aiter5>415999) &
        (_aiter5<425000 | _aiter5>425999) &
        (_aiter5<435000 | _aiter5>435999) &
        (_aiter5<445000 | _aiter5>445999) &
        (_aiter5<455000 | _aiter5>455999) &
        (_aiter5<465000 | _aiter5>465999) &
        (_aiter5<475000 | _aiter5>475999) &
        (_aiter5<485000 | _aiter5>485999) &
        (_aiter5<495000 | _aiter5>495999) &
        (_aiter5<505000 | _aiter5>505999) &
        (_aiter5<515000 | _aiter5>515999) &
        (_aiter5<525000 | _aiter5>525999) &
        (_aiter5<535000 | _aiter5>535999) &
        (_aiter5<545000 | _aiter5>545999) &
        (_aiter5<555000 | _aiter5>555999) &
        (_aiter5<565000 | _aiter5>565999) &
        (_aiter5<575000 | _aiter5>575999) &
        (_aiter5<585000 | _aiter5>585999) &
        (_aiter5<595000 | _aiter5>595999))

      _lntotiter=_aiter5+_liter6                          ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_volall[_lntotiter]              ; Lanes.

    endif
  ENDLOOP                                                 ;^End Loop 15.

  print list="\\"," ",(_lntotals/_supersuper)(10.2C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                       ;^Generate total X for all ATYPE.

ENDLOOP                                                   ;^End Loop 14.
print list="\\"," ",(_supertotal/_supersuper)(10.2C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                    Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
```

```
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                          ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                                ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                                ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                             ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                            ; get single digit FTYPE.
      _totftlns=0                                           ;^Initialize total X for all FTYPE by
all Lanes.
      if (_f1iter<5000 | _f1iter>5999)
      LOOP _fiter3=_f1iter,9900,100                         ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                      ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                  ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK                 ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                      ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_volall[_aiter6+_fiter3+_liter7]   ; in order to generate total
X for FTYPE by ATYPE.
            ENDLOOP                                                 ;^End Loop 20.

        ENDLOOP                                             ;^End Loop 19.

      ENDLOOP                                               ;^End Loop 18.
      endif
      _fttotal=_fttotal+_totftlns                           ;^Generate total X for ATYPE.

      print list="\\"," ",(_totftlns/_supersuper)(10.2C)," ", PRINTO=1
    ENDLOOP                                                 ;^End Loop 17.

  print list="\\"," ",(_fttotal/_supersuper)(10.2c), PRINTO=1
ENDLOOP                                                     ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                                ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                            ; to get single digit FTYPE.
  _ftotals=0                                                ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                            ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                         ; get all two-digit FTYPE for current
FTYPE in
    if (_f1iter2<5000 | _f1iter2>5999)                                          ;
Loop 21.
    LOOP _liter8=1,9,1                                      ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                      ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                   ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_volall[_ftotiter]
      ENDLOOP                                               ;^End Loop 24.

    ENDLOOP                                                 ;^End Loop 23.
```

```
    endif
  ENDLOOP                                                ;^End Loop 22.
  _supertotal=_supertotal+_ftotals                       ;^Generate overall total for all single
digit ATYPE
                                                         ; by all single digit FTYPE.
  print list="\\"," ",(_ftotals/_supersuper)(10.2C)," ", PRINTO=1
ENDLOOP                                                  ;^End Loop 21.

print list="\\"," ",(_supertotal/_supersuper)(10.2C), PRINTO=1
print list=" ", PRINTO=1
;*********************************************************************
; END VOLUME PERCENTAGES ON ALL LINKS REPORT
;*********************************************************************

;=============================================================================================
; BEGIN VMT ALL LINKS REPORT ------------ X = VMT ON ALL LINKS
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*************************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                        VMT on All Links (Centroid Connectors
Excluded)                                           *", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*************************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                        ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                              ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                       ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                      ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                           ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                       ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                   ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_vmtall[_achkiter]
    ENDLOOP                                              ;^End Loop 3.

    if (_avcheck>0)                                      ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                         ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                      ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1      ;^Header
      Print list= "                                                Number of Lanes per
Direction                                              ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                           ;^Begin Loop 4: Cycles through FTYPE
                                                         ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                         ;^Initialize FTYPE X checking variable.
```

```
      LOOP _liter=1,9,1                                    ;^Begin Loop 5: Cycles through Lanes
for current
         _vcheck=_vcheck+_vmtall[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
      ENDLOOP                                              ;^End Loop 5.

       if (_vcheck>0 & (_fiter<5000 | _fiter>5999))        ;^Begin Condition 2: If current FTYPE
in Loop 4
         _fft2=int(_fiter/100)                             ; has X>0 continue to report X. Else
skip FTYPE.
         print list= _fft2(2.0),"    ", PRINTO=1
         _totvols=0                                        ;^Initialize FTYPE total X.

         LOOP _liter2=1,9,1                                ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
           print list="\\"," ",_vmtall[_aiter+_fiter+_liter2](10.0C)," ", PRINTO=1
           _totvols=_totvols+_vmtall[_aiter+_fiter+_liter2]
           _supertotal=_supertotal+_vmtall[_aiter+_fiter+_liter2]
         ENDLOOP                                           ;^End Loop 6.

           print list="\\"," ",_totvols(10.0C), PRINTO=1
       endif                                               ;^End Condition 2.

     ENDLOOP                                               ;^End Loop 4.

     Print list= "-------------------------------------------------------------------------------
-------------------------------------------------", PRINTO=1
     print list="Totals", PRINTO=1

     LOOP _liter3=1,9,1                                    ;^Begin Loop 7: Cycles through Lanes
for
                                                           ; current ATYPE in Loop 2.
       _lntotals=0                                         ;^Initialize Lane total X.

       LOOP _aiter2=_aiter,599999,100                      ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
         if (_aiter2>_aiter+9999) BREAK                    ; in Loop 2 to generate Lane total X.
         if (_aiter2<_aiter+5000 | _aiter2>_aiter+5999)
           _lntotiter=_aiter2+_liter3
           _lntotals=_lntotals+_vmtall[_lntotiter]
         endif
       ENDLOOP                                             ;^End Loop 8

       print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
     ENDLOOP                                               ;^End Loop 7

     print list="\\"," ",_supertotal(10.0C), PRINTO=1
     print list=" ", PRINTO=1
   endif                                                   ;^End Condition 1.

  ENDLOOP                                                  ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                    ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                  ;^Header
Print list= "                                                   Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                  ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                   ; two-digit FTYPE.

  _tafvcheck=0                                             ;^Initialize FTYPE X checking variable.
 if (_fft2<50 | _fft2>59)
```

```
  LOOP _liter5=1,9,1                                        ;^Begin Loop 10: Cycles through Lanes
for current
                                                            ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                         ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_vmtall[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order
to total X checking variable.
    ENDLOOP                                                   ;^End Loop 11.

  ENDLOOP                                                   ;^End Loop 10.

  if (_tafvcheck>0)                                         ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1                 ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                     ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                            ; in Loop 9.
        _totftat=0                                          ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                     ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_vmtall[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                               ;^End Loop 13.

      print list="\\"," ",_totftat(10.0C)," ", PRINTO=1
    ENDLOOP                                                 ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.0C), PRINTO=1
  endif                                                     ;^End Condition 3.
 endif
ENDLOOP                                                     ;^End Loop 9.

Print list= "-------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                          ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                               ;^Initialize total X for Lanes.

  LOOP _aiter5=100000,599999,100                            ;^Begin Loop 15: Cycles through ATYPE
and
    if ((_aiter5<105000 | _aiter5>105999) &
        (_aiter5<115000 | _aiter5>115999) &
        (_aiter5<125000 | _aiter5>125999) &
        (_aiter5<135000 | _aiter5>135999) &
        (_aiter5<145000 | _aiter5>145999) &
        (_aiter5<155000 | _aiter5>155999) &
        (_aiter5<165000 | _aiter5>165999) &
        (_aiter5<175000 | _aiter5>175999) &
        (_aiter5<185000 | _aiter5>185999) &

        (_aiter5<195000 | _aiter5>195999) &
        (_aiter5<205000 | _aiter5>205999) &
        (_aiter5<215000 | _aiter5>215999) &
        (_aiter5<225000 | _aiter5>225999) &
        (_aiter5<235000 | _aiter5>235999) &
        (_aiter5<245000 | _aiter5>245999) &
        (_aiter5<255000 | _aiter5>255999) &
        (_aiter5<265000 | _aiter5>265999) &
        (_aiter5<275000 | _aiter5>275999) &
        (_aiter5<285000 | _aiter5>285999) &
        (_aiter5<295000 | _aiter5>295999) &
        (_aiter5<305000 | _aiter5>305999) &
        (_aiter5<315000 | _aiter5>315999) &
```

```
        (_aiter5<325000 | _aiter5>325999) &
        (_aiter5<335000 | _aiter5>335999) &
        (_aiter5<345000 | _aiter5>345999) &
        (_aiter5<355000 | _aiter5>355999) &
        (_aiter5<365000 | _aiter5>365999) &
        (_aiter5<375000 | _aiter5>375999) &
        (_aiter5<385000 | _aiter5>385999) &
        (_aiter5<395000 | _aiter5>395999) &
        (_aiter5<405000 | _aiter5>405999) &
        (_aiter5<415000 | _aiter5>415999) &
        (_aiter5<425000 | _aiter5>425999) &
        (_aiter5<435000 | _aiter5>435999) &
        (_aiter5<445000 | _aiter5>445999) &
        (_aiter5<455000 | _aiter5>455999) &
        (_aiter5<465000 | _aiter5>465999) &
        (_aiter5<475000 | _aiter5>475999) &
        (_aiter5<485000 | _aiter5>485999) &
        (_aiter5<495000 | _aiter5>495999) &
        (_aiter5<505000 | _aiter5>505999) &
        (_aiter5<515000 | _aiter5>515999) &
        (_aiter5<525000 | _aiter5>525999) &
        (_aiter5<535000 | _aiter5>535999) &
        (_aiter5<545000 | _aiter5>545999) &
        (_aiter5<555000 | _aiter5>555999) &
        (_aiter5<565000 | _aiter5>565999) &
        (_aiter5<575000 | _aiter5>575999) &
        (_aiter5<585000 | _aiter5>585999) &
        (_aiter5<595000 | _aiter5>595999))

      _lntotiter=_aiter5+_liter6                          ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_vmtall[_lntotiter]              ; Lanes.

    endif
  ENDLOOP                                                 ;^End Loop 15.

  print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                       ;^Generate total X for all ATYPE.

ENDLOOP                                                   ;^End Loop 14.
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                        ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                              ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                              ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                           ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                          ; get single digit FTYPE.
      _totftlns=0                                         ;^Initialize total X for all FTYPE by
all Lanes.
      if (_f1iter<5000 | _f1iter>5999)
      LOOP _fiter3=_f1iter,9900,100                       ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                    ; for current single digit FTYPE in
Loop 17.
```

```
        LOOP _aiter6=_a1iter2,599999,10000                ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK               ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                    ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_vmtall[_aiter6+_fiter3+_liter7]   ; in order to generate total
X for FTYPE by ATYPE.
            ENDLOOP                                               ;^End Loop 20.

        ENDLOOP                                           ;^End Loop 19.


      ENDLOOP                                             ;^End Loop 18.
      endif
      _fttotal=_fttotal+_totftlns                         ;^Generate total X for ATYPE.

      print list="\\"," ",_totftlns(10.0C)," ", PRINTO=1
    ENDLOOP                                               ;^End Loop 17.

  print list="\\"," ",_fttotal(10.0c), PRINTO=1
ENDLOOP                                                   ;^End Loop 16.

Print list= "-----------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                             ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                              ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                          ; to get single digit FTYPE.
  _ftotals=0                                              ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                          ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                       ; get all two-digit FTYPE for current
FTYPE in
    if (_f1iter2<5000 | _f1iter2>5999)                                                    ;
Loop 21.
    LOOP _liter8=1,9,1                                    ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                    ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                 ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_vmtall[_ftotiter]
      ENDLOOP                                             ;^End Loop 24.

    ENDLOOP                                               ;^End Loop 23.
    endif
  ENDLOOP                                                 ;^End Loop 22.
  _supertotal=_supertotal+_ftotals                        ;^Generate overall total for all single
digit ATYPE
                                                          ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.0C)," ", PRINTO=1
ENDLOOP                                                   ;^End Loop 21.
_totalvmt=_supertotal
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ", PRINTO=1
;*********************************************************************
; END VMT ALL LINKS REPORT
;*********************************************************************

;=============================================================================================
; BEGIN VHT ALL LINKS REPORT ------------- X = VHT ON ALL LINKS
;=============================================================================================
Print list=" ", PRINTO=1
```

```
Print
list="*************************************************************************************************
**********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                        VHT on All Links (Centroid Connectors
Excluded)                                           *", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*************************************************************************************************
**********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------

LOOP _a1iter=100000,599999,100000                          ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                         ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                        ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                             ;^Initialize ATYPE X checking variable.

    LOOP _achkiter=_aiter,599999,1                         ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                     ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_vhtall[_achkiter]
    ENDLOOP                                                ;^End Loop 3.

    if (_avcheck>0)                                        ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                           ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                        ;^Initialize ATYPE total X.

      Print list= "Area Type ",_aat2(2.0), PRINTO=1        ;^Header
      Print list= "                                                Number of Lanes per
Direction                                             ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                             ;^Begin Loop 4: Cycles through FTYPE
                                                           ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                           ;^Initialize FTYPE X checking variable.

       LOOP _liter=1,9,1                                   ;^Begin Loop 5: Cycles through Lanes
for current
          _vcheck=_vcheck+_vhtall[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                             ;^End Loop 5.

        if (_vcheck>0 & (_fiter<5000 | _fiter>5999))       ;^Begin Condition 2: If current FTYPE
in Loop 4
           _fft2=int(_fiter/100)                           ; has X>0 continue to report X. Else
skip FTYPE.
           print list= _fft2(2.0),"    ", PRINTO=1
           _totvols=0                                      ;^Initialize FTYPE total X.

           LOOP _liter2=1,9,1                              ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
             print list="\\"," ",_vhtall[_aiter+_fiter+_liter2](10.0C)," ", PRINTO=1
             _totvols=_totvols+_vhtall[_aiter+_fiter+_liter2]
             _supertotal=_supertotal+_vhtall[_aiter+_fiter+_liter2]
```

```
          ENDLOOP                                          ;^End Loop 6.

            print list="\\"," ",_totvols(10.0C), PRINTO=1
        endif                                              ;^End Condition 2.

      ENDLOOP                                              ;^End Loop 4.

      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                   ;^Begin Loop 7: Cycles through Lanes
for
                                                           ; current ATYPE in Loop 2.
        _lntotals=0                                        ;^Initialize Lane total X.

        LOOP _aiter2=_aiter,599999,100                     ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                   ; in Loop 2 to generate Lane total X.
          if (_aiter2<_aiter+5000 | _aiter2>_aiter+5999)
            _lntotiter=_aiter2+_liter3
            _lntotals=_lntotals+_vhtall[_lntotiter]
          endif
        ENDLOOP                                            ;^End Loop 8

        print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
      ENDLOOP                                              ;^End Loop 7

      print list="\\"," ",_supertotal(10.0C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                  ;^End Condition 1.

  ENDLOOP                                                  ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                    ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                  ;^Header
Print list= "                                                   Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                  ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                   ; two-digit FTYPE.

  _tafvcheck=0                                             ;^Initialize FTYPE X checking variable.
 if (_fft2<50 | _fft2>59)
  LOOP _liter5=1,9,1                                       ;^Begin Loop 10: Cycles through Lanes
for current
                                                           ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                        ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_vhtall[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order
to total X checking variable.

    ENDLOOP                                                  ;^End Loop 11.

  ENDLOOP                                                  ;^End Loop 10.

  if (_tafvcheck>0)                                        ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1                ; has X>0 continue to report X. Else
skip FTYPE.
```

```
    LOOP _liter4= 1,9,1                                     ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                            ; in Loop 9.
        _totftat=0                                          ;^Initialize FTYPE total X for all
ATYPE.

      LOOP _aiter3= 100000,599999,10000                     ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_vhtall[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
      ENDLOOP                                               ;^End Loop 13.

      print list="\\"," ",_totftat(10.0C)," ", PRINTO=1
    ENDLOOP                                                 ;^End Loop 12.

    print list="\\"," ",_tafvcheck(10.0C), PRINTO=1
  endif                                                     ;^End Condition 3.
 endif
ENDLOOP                                                     ;^End Loop 9.

Print list= "-----------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize all ATYPE total X.

LOOP _liter6=1,9,1                                          ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                               ;^Initialize total X for Lanes.

  LOOP _aiter5=100000,599999,100                            ;^Begin Loop 15: Cycles through ATYPE
and
    if ((_aiter5<105000 | _aiter5>105999) &
        (_aiter5<115000 | _aiter5>115999) &
        (_aiter5<125000 | _aiter5>125999) &
        (_aiter5<135000 | _aiter5>135999) &
        (_aiter5<145000 | _aiter5>145999) &
        (_aiter5<155000 | _aiter5>155999) &
        (_aiter5<165000 | _aiter5>165999) &
        (_aiter5<175000 | _aiter5>175999) &
        (_aiter5<185000 | _aiter5>185999) &
        (_aiter5<195000 | _aiter5>195999) &
        (_aiter5<205000 | _aiter5>205999) &
        (_aiter5<215000 | _aiter5>215999) &
        (_aiter5<225000 | _aiter5>225999) &
        (_aiter5<235000 | _aiter5>235999) &
        (_aiter5<245000 | _aiter5>245999) &
        (_aiter5<255000 | _aiter5>255999) &
        (_aiter5<265000 | _aiter5>265999) &
        (_aiter5<275000 | _aiter5>275999) &
        (_aiter5<285000 | _aiter5>285999) &
        (_aiter5<295000 | _aiter5>295999) &
        (_aiter5<305000 | _aiter5>305999) &
        (_aiter5<315000 | _aiter5>315999) &
        (_aiter5<325000 | _aiter5>325999) &
        (_aiter5<335000 | _aiter5>335999) &
        (_aiter5<345000 | _aiter5>345999) &
        (_aiter5<355000 | _aiter5>355999) &
        (_aiter5<365000 | _aiter5>365999) &
        (_aiter5<375000 | _aiter5>375999) &
        (_aiter5<385000 | _aiter5>385999) &
        (_aiter5<395000 | _aiter5>395999) &
        (_aiter5<405000 | _aiter5>405999) &
        (_aiter5<415000 | _aiter5>415999) &
        (_aiter5<425000 | _aiter5>425999) &
        (_aiter5<435000 | _aiter5>435999) &
        (_aiter5<445000 | _aiter5>445999) &
        (_aiter5<455000 | _aiter5>455999) &
        (_aiter5<465000 | _aiter5>465999) &
        (_aiter5<475000 | _aiter5>475999) &
        (_aiter5<485000 | _aiter5>485999) &
```

```
        (_aiter5<495000 | _aiter5>495999) &
        (_aiter5<505000 | _aiter5>505999) &
        (_aiter5<515000 | _aiter5>515999) &
        (_aiter5<525000 | _aiter5>525999) &
        (_aiter5<535000 | _aiter5>535999) &
        (_aiter5<545000 | _aiter5>545999) &
        (_aiter5<555000 | _aiter5>555999) &
        (_aiter5<565000 | _aiter5>565999) &
        (_aiter5<575000 | _aiter5>575999) &
        (_aiter5<585000 | _aiter5>585999) &
        (_aiter5<595000 | _aiter5>595999))

      _lntotiter=_aiter5+_liter6                          ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_vhtall[_lntotiter]              ; Lanes.

    endif
  ENDLOOP                                                 ;^End Loop 15.

  print list="\\"," ",_lntotals(10.0C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                       ;^Generate total X for all ATYPE.

ENDLOOP                                                   ;^End Loop 14.
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                  Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                        ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                              ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                              ;^Initialize total X for all ATYPE

    LOOP _f1iter=1000,9900,1000                           ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                          ; get single digit FTYPE.
      _totftlns=0                                         ;^Initialize total X for all FTYPE by
all Lanes.
      if (_f1iter<5000 | _f1iter>5999)
      LOOP _fiter3=_f1iter,9900,100                       ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                    ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK               ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                    ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_vhtall[_aiter6+_fiter3+_liter7]   ; in order to generate total
X for FTYPE by ATYPE.
            ENDLOOP                                               ;^End Loop 20.

        ENDLOOP                                           ;^End Loop 19.

      ENDLOOP                                             ;^End Loop 18.
      endif
      _fttotal=_fttotal+_totftlns                         ;^Generate total X for ATYPE.
```

```
      print list="\\"," ",_totftlns(10.0C)," ", PRINTO=1
    ENDLOOP                                              ;^End Loop 17.

  print list="\\"," ",_fttotal(10.0c), PRINTO=1
ENDLOOP                                                  ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                            ;^Initialize overall total X.

LOOP _f1iter2=1000,9900,1000                             ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                         ; to get single digit FTYPE.
  _ftotals=0                                             ;^Initialize total X by FTYPE

  LOOP _fiter4=_f1iter2,9900,100                         ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                      ; get all two-digit FTYPE for current
FTYPE in
    if (_f1iter2<5000 | _f1iter2>5999)                                                ;
Loop 21.
    LOOP _liter8=1,9,1                                   ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                   ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_vhtall[_ftotiter]
      ENDLOOP                                            ;^End Loop 24.

    ENDLOOP                                              ;^End Loop 23.
    endif
  ENDLOOP                                                ;^End Loop 22.
  _supertotal=_supertotal+_ftotals                       ;^Generate overall total for all single
digit ATYPE
                                                         ; by all single digit FTYPE.
  print list="\\"," ",_ftotals(10.0C)," ", PRINTO=1
ENDLOOP                                                  ;^End Loop 21.
_totalvht=_supertotal
print list="\\"," ",_supertotal(10.0C), PRINTO=1
print list=" ", PRINTO=1
;*************************************************************************
; END VHT ALL LINKS REPORT
;*************************************************************************

;=============================================================================================
; BEGIN FREE FLOW SPEED REPORT ------------ X = Free Flow Speeds
;=============================================================================================
Print list=" ", PRINTO=1
Print
list="*********************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                                Original Speed (MPH)
*", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*********************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------
LOOP _a1iter=100000,599999,100000                        ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                              ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1
```

```
  LOOP _aiter=_a1iter,599999,10000                          ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                         ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                              ;^Initialize ATYPE X checking variable.
    _avdist=0

    LOOP _achkiter=_aiter,599999,1                          ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                      ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_wffspd[_achkiter]
    ENDLOOP                                                 ;^End Loop 3.

    if (_avcheck>0)                                         ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                            ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                         ;^Initialize ATYPE total X.
      _superdist=0

      Print list= "Area Type ",_aat2(2.0), PRINTO=1         ;^Header
      Print list= "                                                    Number of Lanes per
Direction                                              ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                              ;^Begin Loop 4: Cycles through FTYPE
                                                            ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                            ;^Initialize FTYPE X checking variable.
       _vdist=0

       LOOP _liter=1,9,1                                    ;^Begin Loop 5: Cycles through Lanes
for current
         _vcheck=_vcheck+_wffspd[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                              ;^End Loop 5.

        if (_vcheck>0 & (_fiter<5000 | _fiter>5999))        ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                             ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                        ;^Initialize FTYPE total X.
          _totdist=0

          LOOP _liter2=1,9,1                                ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            if (_dmiles[_aiter+_fiter+_liter2]>0)
              _spdspd=_wffspd[_aiter+_fiter+_liter2]/_dmiles[_aiter+_fiter+_liter2]
            else
              _spdspd=0
            endif
            print list="\\"," ",_spdspd(10.2C)," ", PRINTO=1
            _totvols=_totvols+_wffspd[_aiter+_fiter+_liter2]
            _totdist=_totdist+_dmiles[_aiter+_fiter+_liter2]
           _supertotal=_supertotal+_wffspd[_aiter+_fiter+_liter2]
           _superdist=_superdist+_dmiles[_aiter+_fiter+_liter2]

          ENDLOOP                                           ;^End Loop 6
            if (_totdist>0)
              _totspd=_totvols/_totdist
            else
              _totspd=0
            endif
            print list="\\"," ",_totspd(10.2C), PRINTO=1
       endif                                                ;^End Condition 2.
```

```
      ENDLOOP                                                ;^End Loop 4.


      Print list= "-----------------------------------------------------------------------------
-------------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1

      LOOP _liter3=1,9,1                                     ;^Begin Loop 7: Cycles through Lanes
for
                                                             ; current ATYPE in Loop 2.
        _lntotals=0                                          ;^Initialize Lane total X.
        _lndist=0

        LOOP _aiter2=_aiter,599999,100                       ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                     ; in Loop 2 to generate Lane total X.
          if (_aiter2<_aiter+5000 | _aiter2>_aiter+5999)
            _lntotiter=_aiter2+_liter3
            _lntotals=_lntotals+_wffspd[_lntotiter]
            _lndist=_lndist+_dmiles[_lntotiter]
          endif
        ENDLOOP                                              ;^End Loop 8

        if (_lndist>0)
          _lnspd=_lntotals/_lndist
        else
          _lnspd=0
        endif
        print list="\\"," ",_lnspd(10.2C)," ", PRINTO=1
      ENDLOOP                                                ;^End Loop 7

      if (_superdist>0)
        _superspd=_supertotal/_superdist
      else
        _superspd=0
      endif
      print list="\\"," ",_superspd(10.2C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                    ;^End Condition 1.

  ENDLOOP                                                    ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                      ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                    ;^Header
Print list= "                                                    Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1          2          3          4          5          6
7          8          9       Totals", PRINTO=1
Print list= "-----------------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                    ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                     ; two-digit FTYPE.

  _tafvcheck=0                                               ;^Initialize FTYPE X checking variable.
  _tafvdist=0

 if (_fft2<50 | _fft2>59)
  LOOP _liter5=1,9,1                                         ;^Begin Loop 10: Cycles through Lanes
for current
                                                             ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                          ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_wffspd[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order
to total X checking variable.
      _tafvdist=_tafvdist+_dmiles[_aiter4+_fiter2+_liter5]
```

```
    ENDLOOP                                                  ;^End Loop 11.

  ENDLOOP                                                   ;^End Loop 10.

  if (_tafvcheck>0)                                         ;^Begin Condition 3: If current FTYPE
in Loop 9
    print list= _fft2(2.0),"    ", PRINTO=1                 ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                     ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                            ; in Loop 9.
        _totftat=0                                          ;^Initialize FTYPE total X for all
ATYPE.
        _totftatdist=0

      LOOP _aiter3= 100000,599999,10000                     ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_wffspd[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
        _totftatdist=_totftatdist+_dmiles[_aiter3+_fiter2+_liter4]
      ENDLOOP                                               ;^End Loop 13.

      if (_totftatdist>0)
        _totftatspd=_totftat/_totftatdist
      else
        _totftatspd=0
      endif
      print list="\\"," ",_totftatspd(10.2C)," ", PRINTO=1
    ENDLOOP                                                 ;^End Loop 12.

    if (_tafvdist>0)
      _tafvspd=_tafvcheck/_tafvdist
    else
      _tafvspd=0
    endif
    print list="\\"," ",_tafvspd(10.2C), PRINTO=1
  endif                                                     ;^End Condition 3.
 endif
ENDLOOP                                                     ;^End Loop 9.

Print list= "-------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize all ATYPE total X.
_superdist=0

LOOP _liter6=1,9,1                                          ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                               ;^Initialize total X for Lanes.
  _lndist=0

  LOOP _aiter5=100000,599999,100                            ;^Begin Loop 15: Cycles through ATYPE
and
    if ((_aiter5<105000 | _aiter5>105999) &
        (_aiter5<115000 | _aiter5>115999) &
        (_aiter5<125000 | _aiter5>125999) &
        (_aiter5<135000 | _aiter5>135999) &
        (_aiter5<145000 | _aiter5>145999) &
        (_aiter5<155000 | _aiter5>155999) &
        (_aiter5<165000 | _aiter5>165999) &
        (_aiter5<175000 | _aiter5>175999) &
        (_aiter5<185000 | _aiter5>185999) &
        (_aiter5<195000 | _aiter5>195999) &
        (_aiter5<205000 | _aiter5>205999) &
        (_aiter5<215000 | _aiter5>215999) &
        (_aiter5<225000 | _aiter5>225999) &
        (_aiter5<235000 | _aiter5>235999) &
        (_aiter5<245000 | _aiter5>245999) &
        (_aiter5<255000 | _aiter5>255999) &
```

```
        (_aiter5<265000 | _aiter5>265999) &
        (_aiter5<275000 | _aiter5>275999) &
        (_aiter5<285000 | _aiter5>285999) &
        (_aiter5<295000 | _aiter5>295999) &
        (_aiter5<305000 | _aiter5>305999) &
        (_aiter5<315000 | _aiter5>315999) &
        (_aiter5<325000 | _aiter5>325999) &
        (_aiter5<335000 | _aiter5>335999) &
        (_aiter5<345000 | _aiter5>345999) &
        (_aiter5<355000 | _aiter5>355999) &
        (_aiter5<365000 | _aiter5>365999) &
        (_aiter5<375000 | _aiter5>375999) &
        (_aiter5<385000 | _aiter5>385999) &
        (_aiter5<395000 | _aiter5>395999) &
        (_aiter5<405000 | _aiter5>405999) &
        (_aiter5<415000 | _aiter5>415999) &
        (_aiter5<425000 | _aiter5>425999) &
        (_aiter5<435000 | _aiter5>435999) &
        (_aiter5<445000 | _aiter5>445999) &
        (_aiter5<455000 | _aiter5>455999) &
        (_aiter5<465000 | _aiter5>465999) &
        (_aiter5<475000 | _aiter5>475999) &
        (_aiter5<485000 | _aiter5>485999) &
        (_aiter5<495000 | _aiter5>495999) &
        (_aiter5<505000 | _aiter5>505999) &
        (_aiter5<515000 | _aiter5>515999) &
        (_aiter5<525000 | _aiter5>525999) &
        (_aiter5<535000 | _aiter5>535999) &
        (_aiter5<545000 | _aiter5>545999) &
        (_aiter5<555000 | _aiter5>555999) &
        (_aiter5<565000 | _aiter5>565999) &
        (_aiter5<575000 | _aiter5>575999) &
        (_aiter5<585000 | _aiter5>585999) &
        (_aiter5<595000 | _aiter5>595999))

      _lntotiter=_aiter5+_liter6                          ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_wffspd[_lntotiter]              ; Lanes.
      _lndist=_lndist+_dmiles[_lntotiter]

    endif
  ENDLOOP                                                 ;^End Loop 15.

  if (_lndist>0)
    _lnspd=_lntotals/_lndist
  else
    _lnspd=0
  endif
  print list="\\"," ",_lnspd(10.2C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                       ;^Generate total X for all ATYPE.
  _superdist=_superdist+_lndist

ENDLOOP                                                   ;^End Loop 14.
if (_superdist>0)
  _superspd=_supertotal/_superdist
else
  _superspd=0
endif
print list="\\"," ",_superspd(10.2C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                  Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
```

```
LOOP _a1iter2=100000,599999,100000                          ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                                ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                                ;^Initialize total X for all ATYPE
  _ftdist=0

    LOOP _f1iter=1000,9900,1000                             ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                            ; get single digit FTYPE.
      _totftlns=0                                           ;^Initialize total X for all FTYPE by
all Lanes.
      _totftlnsdist=0
      if (_f1iter<5000 | _f1iter>5999)
      LOOP _fiter3=_f1iter,9900,100                         ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                      ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000                  ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK                 ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                      ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_wffspd[_aiter6+_fiter3+_liter7]   ; in order to generate total
X for FTYPE by ATYPE.
              _totftlnsdist=_totftlnsdist+_dmiles[_aiter6+_fiter3+_liter7]
            ENDLOOP                                                 ;^End Loop 20.

        ENDLOOP                                             ;^End Loop 19.

      ENDLOOP                                               ;^End Loop 18.
      endif
      _fttotal=_fttotal+_totftlns                           ;^Generate total X for ATYPE.
      _ftdist=_ftdist+_totftlnsdist

      if (_totftlnsdist>0)
        _totftlnsspd=_totftlns/_totftlnsdist
      else
        _totftlnsspd=0
      endif
      print list="\\"," ",_totftlnsspd(10.2C)," ", PRINTO=1
    ENDLOOP                                                 ;^End Loop 17.

  if (_ftdist>0)
    _ftspd=_fttotal/_ftdist
  else
    _ftspd=0
  endif
  print list="\\"," ",_ftspd(10.2c), PRINTO=1
ENDLOOP                                                     ;^End Loop 16.

Print list= "-------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                               ;^Initialize overall total X.
_superdist=0

LOOP _f1iter2=1000,9900,1000                                ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                            ; to get single digit FTYPE.
  _ftotals=0                                                ;^Initialize total X by FTYPE
  _ftdist=0

  LOOP _fiter4=_f1iter2,9900,100                            ;^Begin Loop 22: Cycles through FTYPE
by 1 to
```

```
    if (_fiter4>_f1iter2+999) BREAK                         ; get all two-digit FTYPE for current
FTYPE in
    if (_f1iter2<5000 | _f1iter2>5999)                                                  ;
Loop 21.
    LOOP _liter8=1,9,1                                      ;^Begin Loop 23: Cycles through Lanes.

      LOOP _aiter7=100000,599999,10000                      ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                   ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_wffspd[_ftotiter]
        _ftdist=_ftdist+_dmiles[_ftotiter]
      ENDLOOP                                               ;^End Loop 24.

    ENDLOOP                                                 ;^End Loop 23.
    endif
  ENDLOOP                                                   ;^End Loop 22.
  _supertotal=_supertotal+_ftotals                          ;^Generate overall total for all single
digit ATYPE
  _superdist=_superdist+_ftdist                             ; by all single digit FTYPE.

  if (_ftdist>0)
    _ftspd=_ftotals/_ftdist
  else
    _ftspd=0
  endif
  print list="\\"," ",_ftspd(10.2C)," ", PRINTO=1
ENDLOOP                                                     ;^End Loop 21.

if (_superdist>0)
  _superspd=_supertotal/_superdist
else
  _superspd=0
endif
_totalffspd=_superspd
print list="\\"," ",_superspd(10.2C), PRINTO=1
print list=" ", PRINTO=1
;*************************************************************************
; END FREE FLOW SPEED REPORT
;*************************************************************************

;=========================================================================================
; BEGIN CONGESTED SPEED REPORT ------------ X = Congested Speeds
;=========================================================================================
Print list=" ", PRINTO=1
Print
list="*****************************************************************************************
**********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                                 Congested Speed (MPH)
*", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*****************************************************************************************
**********************************", PRINTO=1
Print list=" ", PRINTO=1
;-----------------2-DIGIT FACILITY TYPES BY 2-DIGIT AREA TYPES--------------------
LOOP _a1iter=100000,599999,100000                           ;^Begin Loop 1: Cycles through Area
Types (ATYPE) by 10
  _aat1=int(_a1iter/100000)                                 ; in order to get single digit ATYPE.
  print list= "Area Type ",_aat1(1.0),"x Range:",
           "\n ", PRINTO=1

  LOOP _aiter=_a1iter,599999,10000                          ;^Begin Loop 2: Cycles through ATYPE by
1
    if (_aiter>_a1iter+99999) BREAK                         ; in order to get two-digit ATYPE.
    _aat2=int(_aiter/10000)

    _avcheck=0                                              ;^Initialize ATYPE X checking variable.
```

```
    _avdist=0

    LOOP _achkiter=_aiter,599999,1                          ;^Begin Loop 3: Cycles through Lanes
and Facility Types (FTYPE)
      if (_achkiter>_aiter+9999) BREAK                      ; for current ATYPE in Loop 2 and
totals X checking variable.
      _avcheck=_avcheck+_wcgspd[_achkiter]
    ENDLOOP                                                 ;^End Loop 3.

    if (_avcheck>0)                                         ;^Begin Condition 1: If current ATYPE
in Loop 2
                                                            ; has X>0 continue to report X. Else
skip ATYPE.
      _supertotal=0                                         ;^Initialize ATYPE total X.
      _superdist=0

      Print list= "Area Type ",_aat2(2.0), PRINTO=1         ;^Header
      Print list= "                                                    Number of Lanes per
Direction                                              ", PRINTO=1
      Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1

      LOOP _fiter=100,9900,100                              ;^Begin Loop 4: Cycles through FTYPE
                                                            ; by 1 in order to get two-digit FTYPE.
       _vcheck=0                                            ;^Initialize FTYPE X checking variable.
       _vdist=0

       LOOP _liter=1,9,1                                    ;^Begin Loop 5: Cycles through Lanes
for current
         _vcheck=_vcheck+_wcgspd[_aiter+_fiter+_liter]    ; FTYPE in Loop 4 and totals X
checking variable.
       ENDLOOP                                              ;^End Loop 5.

        if (_vcheck>0 & (_fiter<5000 | _fiter>5999))        ;^Begin Condition 2: If current FTYPE
in Loop 4
          _fft2=int(_fiter/100)                             ; has X>0 continue to report X. Else
skip FTYPE.
          print list= _fft2(2.0),"    ", PRINTO=1
          _totvols=0                                        ;^Initialize FTYPE total X.
          _totdist=0

          LOOP _liter2=1,9,1                                ;^Begin Loop 6: Cycles through Lanes to
generate ATYPE by FTYPE by Lanes total X.
            if (_dmiles[_aiter+_fiter+_liter2]>0)
              _spdspd=_wcgspd[_aiter+_fiter+_liter2]/_dmiles[_aiter+_fiter+_liter2]
            else
              _spdspd=0
            endif
            print list="\\"," ",_spdspd(10.2C)," ", PRINTO=1
            _totvols=_totvols+_wcgspd[_aiter+_fiter+_liter2]
            _totdist=_totdist+_dmiles[_aiter+_fiter+_liter2]
           _supertotal=_supertotal+_wcgspd[_aiter+_fiter+_liter2]
           _superdist=_superdist+_dmiles[_aiter+_fiter+_liter2]

          ENDLOOP                                           ;^End Loop 6
            if (_totdist>0)
              _totspd=_totvols/_totdist
            else
              _totspd=0
            endif
            print list="\\"," ",_totspd(10.2C), PRINTO=1
        endif                                               ;^End Condition 2.

      ENDLOOP                                               ;^End Loop 4.

      Print list= "-------------------------------------------------------------------------------
-----------------------------------------------", PRINTO=1
      print list="Totals", PRINTO=1
```

```
      LOOP _liter3=1,9,1                                    ;^Begin Loop 7: Cycles through Lanes
for
                                                            ; current ATYPE in Loop 2.
        _lntotals=0                                         ;^Initialize Lane total X.
        _lndist=0

        LOOP _aiter2=_aiter,599999,100                      ;^Begin Loop 8: Cycles through FTYPE
for current ATYPE
          if (_aiter2>_aiter+9999) BREAK                    ; in Loop 2 to generate Lane total X.
          if (_aiter2<_aiter+5000 | _aiter2>_aiter+5999)
            _lntotiter=_aiter2+_liter3
            _lntotals=_lntotals+_wcgspd[_lntotiter]
            _lndist=_lndist+_dmiles[_lntotiter]
          endif
        ENDLOOP                                             ;^End Loop 8

        if (_lndist>0)
          _lnspd=_lntotals/_lndist
        else
          _lnspd=0
        endif
        print list="\\"," ",_lnspd(10.2C)," ", PRINTO=1
      ENDLOOP                                               ;^End Loop 7

      if (_superdist>0)
        _superspd=_supertotal/_superdist
      else
        _superspd=0
      endif
      print list="\\"," ",_superspd(10.2C), PRINTO=1
      print list=" ", PRINTO=1
    endif                                                   ;^End Condition 1.

  ENDLOOP                                                   ;^End Loop 2.

  print list=" ", PRINTO=1
ENDLOOP                                                     ;^End Loop 1.

;-----------------2-DIGIT FACILITY TYPES BY TOTAL AREA TYPES--------------------

Print list= "Total Area Types ", PRINTO=1                   ;^Header
Print list= "                                                    Number of Lanes per Direction
", PRINTO=1
Print list= "FType         1           2           3           4           5           6
7           8           9       Totals", PRINTO=1
Print list= "-----------------------------------------------------------------------------------------------
----------------------------------------", PRINTO=1

LOOP _fiter2=100,9900,100                                   ;^Begin Loop 9: Cycles through FTYPES
to get
  _fft2=int(_fiter2/100)                                    ; two-digit FTYPE.

  _tafvcheck=0                                              ;^Initialize FTYPE X checking variable.
  _tafvdist=0

 if (_fft2<50 | _fft2>59)
  LOOP _liter5=1,9,1                                        ;^Begin Loop 10: Cycles through Lanes
for current
                                                            ; FTYPE in Loop 9.
    LOOP _aiter4= 100000,599999,10000                         ;^Begin Loop 11: Cycles through ATYPE
for
      _tafvcheck=_tafvcheck+_wcgspd[_aiter4+_fiter2+_liter5] ; current Lanes and FTYPE in order
to total X checking variable.
      _tafvdist=_tafvdist+_dmiles[_aiter4+_fiter2+_liter5]
    ENDLOOP                                                   ;^End Loop 11.

  ENDLOOP                                                   ;^End Loop 10.

  if (_tafvcheck>0)                                         ;^Begin Condition 3: If current FTYPE
in Loop 9
```

```
    print list= _fft2(2.0),"    ", PRINTO=1                ; has X>0 continue to report X. Else
skip FTYPE.

    LOOP _liter4= 1,9,1                                    ;^Begin Loop 12: Cycles through Lanes
for current FTYPE
                                                           ; in Loop 9.
        _totftat=0                                         ;^Initialize FTYPE total X for all
ATYPE.
        _totftatdist=0

      LOOP _aiter3= 100000,599999,10000                    ;^Begin Loop 13: Cycles through ATYPE
for current Lanes in Loop 12
        _totftat=_totftat+_wcgspd[_aiter3+_fiter2+_liter4] ; in order to generate total X for
FTYPE by Lane for all ATYPE.
        _totftatdist=_totftatdist+_dmiles[_aiter3+_fiter2+_liter4]
      ENDLOOP                                              ;^End Loop 13.

      if (_totftatdist>0)
        _totftatspd=_totftat/_totftatdist
      else
        _totftatspd=0
      endif
      print list="\\"," ",_totftatspd(10.2C)," ", PRINTO=1
    ENDLOOP                                                ;^End Loop 12.

    if (_tafvdist>0)
      _tafvspd=_tafvcheck/_tafvdist
    else
      _tafvspd=0
    endif
    print list="\\"," ",_tafvspd(10.2C), PRINTO=1
  endif                                                    ;^End Condition 3.
 endif
ENDLOOP                                                    ;^End Loop 9.

Print list= "---------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                              ;^Initialize all ATYPE total X.
_superdist=0

LOOP _liter6=1,9,1                                         ;^Begin Loop 14: Cycles through Lanes.

  _lntotals=0                                              ;^Initialize total X for Lanes.
  _lndist=0

  LOOP _aiter5=100000,599999,100                           ;^Begin Loop 15: Cycles through ATYPE
and
    if ((_aiter5<105000 | _aiter5>105999) &
        (_aiter5<115000 | _aiter5>115999) &
        (_aiter5<125000 | _aiter5>125999) &
        (_aiter5<135000 | _aiter5>135999) &
        (_aiter5<145000 | _aiter5>145999) &
        (_aiter5<155000 | _aiter5>155999) &
        (_aiter5<165000 | _aiter5>165999) &
        (_aiter5<175000 | _aiter5>175999) &
        (_aiter5<185000 | _aiter5>185999) &
        (_aiter5<195000 | _aiter5>195999) &
        (_aiter5<205000 | _aiter5>205999) &
        (_aiter5<215000 | _aiter5>215999) &
        (_aiter5<225000 | _aiter5>225999) &
        (_aiter5<235000 | _aiter5>235999) &
        (_aiter5<245000 | _aiter5>245999) &
        (_aiter5<255000 | _aiter5>255999) &
        (_aiter5<265000 | _aiter5>265999) &
        (_aiter5<275000 | _aiter5>275999) &
        (_aiter5<285000 | _aiter5>285999) &
        (_aiter5<295000 | _aiter5>295999) &
        (_aiter5<305000 | _aiter5>305999) &
        (_aiter5<315000 | _aiter5>315999) &
```

```
        (_aiter5<325000 | _aiter5>325999) &
        (_aiter5<335000 | _aiter5>335999) &
        (_aiter5<345000 | _aiter5>345999) &
        (_aiter5<355000 | _aiter5>355999) &
        (_aiter5<365000 | _aiter5>365999) &
        (_aiter5<375000 | _aiter5>375999) &
        (_aiter5<385000 | _aiter5>385999) &
        (_aiter5<395000 | _aiter5>395999) &
        (_aiter5<405000 | _aiter5>405999) &
        (_aiter5<415000 | _aiter5>415999) &
        (_aiter5<425000 | _aiter5>425999) &
        (_aiter5<435000 | _aiter5>435999) &
        (_aiter5<445000 | _aiter5>445999) &
        (_aiter5<455000 | _aiter5>455999) &
        (_aiter5<465000 | _aiter5>465999) &
        (_aiter5<475000 | _aiter5>475999) &
        (_aiter5<485000 | _aiter5>485999) &
        (_aiter5<495000 | _aiter5>495999) &
        (_aiter5<505000 | _aiter5>505999) &
        (_aiter5<515000 | _aiter5>515999) &
        (_aiter5<525000 | _aiter5>525999) &
        (_aiter5<535000 | _aiter5>535999) &
        (_aiter5<545000 | _aiter5>545999) &
        (_aiter5<555000 | _aiter5>555999) &
        (_aiter5<565000 | _aiter5>565999) &
        (_aiter5<575000 | _aiter5>575999) &
        (_aiter5<585000 | _aiter5>585999) &
        (_aiter5<595000 | _aiter5>595999))

      _lntotiter=_aiter5+_liter6                          ; FTYPE in order to generate total X
for
      _lntotals=_lntotals+_wcgspd[_lntotiter]              ; Lanes.
      _lndist=_lndist+_dmiles[_lntotiter]

    endif
  ENDLOOP                                                 ;^End Loop 15.

  if (_lndist>0)
    _lnspd=_lntotals/_lndist
  else
    _lnspd=0
  endif
  print list="\\"," ",_lnspd(10.2C)," ", PRINTO=1
  _supertotal=_supertotal+_lntotals                       ;^Generate total X for all ATYPE.
  _superdist=_superdist+_lndist

ENDLOOP                                                   ;^End Loop 14.
if (_superdist>0)
  _superspd=_supertotal/_superdist
else
  _superspd=0
endif
print list="\\"," ",_superspd(10.2C), PRINTO=1
print list=" ","\n ", PRINTO=1

;---------------1-DIGIT FACILITY TYPES BY 1-DIGIT AREA TYPES SUMMARY----------------

Print list= "Total Summary Area Types by Facility Types ", PRINTO=1 ;^Header
Print list= "                                                    Single Digit Facility Types
", PRINTO=1
Print list= "AType         1x          2x          3x          4x          5x          6x
7x          8x          9x      Totals", PRINTO=1
Print list= "-------------------------------------------------------------------------------------------
-----------------------------------------", PRINTO=1

LOOP _a1iter2=100000,599999,100000                        ;^Begin Loop 16: Cycles through ATYPE
by 10 to
  _aat1=int(_a1iter2/100000)                              ; get single digit ATYPE.
  print list= _aat1(1.0),"x","    ", PRINTO=1

  _fttotal=0                                              ;^Initialize total X for all ATYPE
```

```
  _ftdist=0

    LOOP _f1iter=1000,9900,1000                          ;^Begin Loop 17: Cycles through FTYPE
by 10 to
                                                         ; get single digit FTYPE.
      _totftlns=0                                        ;^Initialize total X for all FTYPE by
all Lanes.
      _totftlnsdist=0
      if (_f1iter<5000 | _f1iter>5999)
      LOOP _fiter3=_f1iter,9900,100                      ;^Begin Loop 18: Cycles through two-
digit FTYPE
        if (_fiter3>_f1iter+999) BREAK                   ; for current single digit FTYPE in
Loop 17.

        LOOP _aiter6=_a1iter2,599999,10000               ;^Begin Loop 19: Cycles through two-
digit ATYPE
          if (_aiter6>_a1iter2+99999) BREAK              ; for current single digit ATYPE in
Loop 16.

            LOOP _liter7=1,9,1                                    ;^Begin Loop 20: Cycles
through Lanes for current FTYPE and ATYPE
              _totftlns=_totftlns+_wcgspd[_aiter6+_fiter3+_liter7]   ; in order to generate total
X for FTYPE by ATYPE.
              _totftlnsdist=_totftlnsdist+_dmiles[_aiter6+_fiter3+_liter7]
            ENDLOOP                                              ;^End Loop 20.

        ENDLOOP                                          ;^End Loop 19.

      ENDLOOP                                            ;^End Loop 18.
      endif
      _fttotal=_fttotal+_totftlns                        ;^Generate total X for ATYPE.
      _ftdist=_ftdist+_totftlnsdist

      if (_totftlnsdist>0)
        _totftlnsspd=_totftlns/_totftlnsdist
      else
        _totftlnsspd=0
      endif
      print list="\\"," ",_totftlnsspd(10.2C)," ", PRINTO=1
    ENDLOOP                                              ;^End Loop 17.

  if (_ftdist>0)
    _ftspd=_fttotal/_ftdist
  else
    _ftspd=0
  endif
  print list="\\"," ",_ftspd(10.2c), PRINTO=1
ENDLOOP                                                  ;^End Loop 16.

Print list= "---------------------------------------------------------------------------------
----------------------------------------", PRINTO=1
print list="Totals", PRINTO=1

_supertotal=0                                            ;^Initialize overall total X.
_superdist=0

LOOP _f1iter2=1000,9900,1000                             ;^Begin Loop 21: Cycles through FTYPE
by 10
                                                         ; to get single digit FTYPE.
  _ftotals=0                                             ;^Initialize total X by FTYPE
  _ftdist=0

  LOOP _fiter4=_f1iter2,9900,100                         ;^Begin Loop 22: Cycles through FTYPE
by 1 to
    if (_fiter4>_f1iter2+999) BREAK                      ; get all two-digit FTYPE for current
FTYPE in
    if (_f1iter2<5000 | _f1iter2>5999)                                          ;
Loop 21.
    LOOP _liter8=1,9,1                                   ;^Begin Loop 23: Cycles through Lanes.
```

```
      LOOP _aiter7=100000,599999,10000                    ;^Begin Loop 24: Cycles through ATYPE
in order
        _ftotiter=_aiter7+_fiter4+_liter8                 ; to generate total X by single digit
FTYPE.
        _ftotals=_ftotals+_wcgspd[_ftotiter]
        _ftdist=_ftdist+_dmiles[_ftotiter]
      ENDLOOP                                             ;^End Loop 24.

    ENDLOOP                                               ;^End Loop 23.
    endif
  ENDLOOP                                                 ;^End Loop 22.
  _supertotal=_supertotal+_ftotals                        ;^Generate overall total for all single
digit ATYPE
  _superdist=_superdist+_ftdist                           ; by all single digit FTYPE.

  if (_ftdist>0)
    _ftspd=_ftotals/_ftdist
  else
    _ftspd=0
  endif
  print list="\\"," ",_ftspd(10.2C)," ", PRINTO=1
ENDLOOP                                                   ;^End Loop 21.

if (_superdist>0)
  _superspd=_supertotal/_superdist
else
  _superspd=0
endif
_totalcgspd=_superspd
print list="\\"," ",_superspd(10.2C), PRINTO=1
print list=" ", PRINTO=1
;*************************************************************************
; END CONGESTED SPEED REPORT
;*************************************************************************

;=========================================================================================
; BEGIN SCREENLINE SUMMARY REPORT ------------- X = SCREENLINE Volume over Count
;=========================================================================================
Print list=" ", PRINTO=1
Print
list="*****************************************************************************************
***********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                             Screenline Volume over Count
*", PRINTO=1
Print list="*
*", PRINTO=1
Print
list="*****************************************************************************************
***********************************", PRINTO=1
Print list=" ", PRINTO=1

LOOP _sliter=1,99,1
  if (_slvol[_sliter]>0)
    Print list= "Screenline ",_sliter(2.0)," Volume/Count Ratio:           ",
(_slvol[_sliter]/_slcnt[_sliter])(4.2),
      "Screenline ",_sliter(2.0)," Volume:           ", _slvol[_sliter](10.0C),
      "Screenline ",_sliter(2.0)," Count:           ", _slcnt[_sliter](10.0C), PRINTO=1
   if (_sliter/5=int(_sliter/5)) Print list= " ", PRINTO=1

    if (_sliter/5=int(_sliter/5)) Print list= " ", PRINTO=1
  endif
ENDLOOP
;*************************************************************************
; END SCREENLINE SUMMARY REPORT
;*************************************************************************

;=========================================================================================
; BEGIN SUMMARY REPORT
;=========================================================================================
```

```
Print list=" ", PRINTO=1
Print
list="*************************************************************************************************
**********************************", PRINTO=1
Print list="*
*", PRINTO=1
Print list="*                                                                Overall Summary
*", PRINTO=1
Print list="*
*", PRINTO=1
Print list=" ", PRINTO=1

print list= " Total Number of Links:         ",_numlinks(10.0C),
      "\n", " Total Lane Miles:              ",_lanemiles(10.2C),
      "\n", " Total Directional Miles:       ",_dirmiles(10.2C),
      "\n", " Total VMT using Volumes:       ",_vmtvoloncounts(10.0C), "    (Links With Counts)",
      "\n", " Total VMT using Counts:        ",_vmtcountsoncounts(10.0C), "    (Links With
Counts)",
      "\n", " Total VMT Volume over Counts:  ",_vmtvolovercounts(10.2C), "    (Links With
Counts)",
      "\n", " Total VHT using Volumes:       ",_vhtvoloncounts(10.0C), "    (Links With Counts)",
      "\n", " Total VHT using Counts:        ",_vhtcountsoncounts(10.C), "    (Links With
Counts)",
      "\n", " Total VHT Volume over Counts:  ",_vhtvolovercounts(10.2C), "    (Links With
Counts)",
      "\n", " Total Volumes All Links:       ",_totalvolumes(10.0C),
      "\n", " Total VMT All Links:           ",_totalvmt(10.0C),
      "\n", " Total VHT All Links:           ",_totalvht(10.0C),
      "\n", " Original Speed (MPH):          ",_totalffspd(10.2C),
      "\n", " Congested Speed (MPH):         ",_totalcgspd(10.2C),
  PRINTO=1
;~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Print list=" ", PRINTO=2
Print
list="*************************************************************************************************
**********************************", PRINTO=2
Print list="*
*", PRINTO=2
Print list="*                                                                Overall Summary
*", PRINTO=2
Print list="*
*", PRINTO=2
Print
list="*************************************************************************************************
**********************************", PRINTO=2
Print list=" ", PRINTO=2

print list= " Total Number of Links:         ",_numlinks(10.0C),
      "\n", " Total Lane Miles:              ",_lanemiles(10.2C),
      "\n", " Total Directional Miles:       ",_dirmiles(10.2C),
      "\n", " Total VMT using Volumes:       ",_vmtvoloncounts(10.0C), "    (Links With Counts)",
      "\n", " Total VMT using Counts:        ",_vmtcountsoncounts(10.0C), "    (Links With
Counts)",
      "\n", " Total VMT Volume over Counts:  ",_vmtvolovercounts(10.2C), "    (Links With
Counts)",
      "\n", " Total VHT using Volumes:       ",_vhtvoloncounts(10.0C), "    (Links With Counts)",
      "\n", " Total VHT using Counts:        ",_vhtcountsoncounts(10.C), "    (Links With
Counts)",
      "\n", " Total VHT Volume over Counts:  ",_vhtvolovercounts(10.2C), "    (Links With
Counts)",
      "\n", " Total Volumes All Links:       ",_totalvolumes(10.0C),
      "\n", " Total VMT All Links:           ",_totalvmt(10.0C),
      "\n", " Total VHT All Links:           ",_totalvht(10.0C),
      "\n", " Original Speed (MPH):          ",_totalffspd(10.2C),
      "\n", " Congested Speed (MPH):         ",_totalcgspd(10.2C),
  PRINTO=2

ENDPROCESS

ENDRUN
```

Appendix E: Input and Output Network Format

Input Network Format (HNET20{YEAR}.NET)

Note: {YEAR} represents the last two digits of the scenario year. The file name will be HNET2010.NET if it is base year 2010 scenario or HNET2040.NET if it is 2040 Existing plus Committed scenario.

Attribute List for HNET20{YEAR}.NET

Link Attributes

A – A node
B – B node
SCRN – FSUTMS screenline code
DIR – Direction code (0=two-way, 1=one-way)
FTYPE – FSUTMS two-digit facility type. It also should be noted that any link present in the network with FTYPE=0 will not be carried through the model.
ATYPE – FSUTMS two-digit area type
LANES – Directional number of lanes
ROAD_NAME_ – Street name
ROAD_NAME2 – Alternate street name
TYPE – Represents if it is a U.S., state or county road if applicable
RCIFCLASS – RCI functional classification
DISTANCE – Link length in miles
BK_LNS – Bike lanes code (0 = no bike lanes, 1 = in street bike lanes, 2 = wide buffers for biking, 3 = off-street multipurpose facilities)
MOCF – Model output conversion factor that is found from FDOT Traffic Info DVD
AADT07 – Year 2007 two-way average annual daily traffic estimate, only for links where the count was available. For I-75 this is the sum of both directions.
COUNT07 – Directional traffic count with MOCF applied. This is used when VC (volume-to-count ratio) is calculated in the output network.
AADT10 – Year 2010 two-way average annual daily traffic estimate, only for links where the count was available. For I-75 this is the sum of both directions.
COUNT10 – Directional traffic count with MOCF applied. This is used when VC (volume-to-count ratio) is calculated in the output network.

Node Attributes

N – Node number
X – X coordinate
Y – Y coordinate
PNRDESCRIP – Bus park-and-ride lot description (text)
PNRSVCAREA – Maximum park-and-ride service area (highway access distance), in miles.
PARKINGSPA – Number of park-and-ride lot parking spaces. This value is optional because the model does not constrain the auto access mode by the number of spaces.
PNRTERMTIM – Park-and-ride terminal time (walk time from the auto to the bus stop).
KNRTERMTIM – Kiss-and-ride (auto drop-off) terminal time (walk time from the auto to the bus stop).
AMUSEFLAG – Flag to turn the lot on or off for the AM or peak network. If “1”, the lot is used, if “0”, the model ignores the lot.
AMPNRCOST – Cost in cents to park for AM (peak) park-and-ride trips.
MDUSEFLAG – Flag to turn the lot on or off for the MD or off-peak network. If “1”, the lot is used, if “0”, the model ignores the lot.

MDPNRCOST – Cost in cents to park for MD (off-peak) park-and-ride trips

Output Network Format (COMBINEDLOADED.NET)

Note: All the input attributes that were included in the input network of HNET20{YEAR}.NET are carried over to the output network.

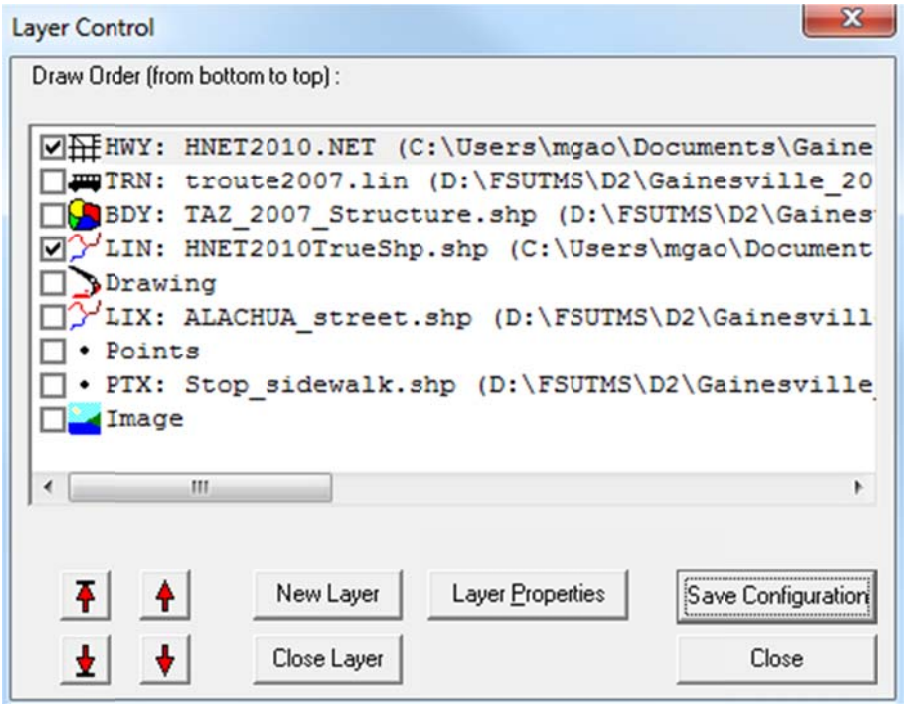
Attribute List for COMBINEDLOADED.NET

NONMOTORVOL – Total nonmotorized volumes
CGSPEED – Congested speed
CGTIME – Congested travel time (minutes)
SELZONE_MOTOR – Select zone volumes if ZoneData{YEAR}.DBF included the value of one in the SELECTZONE attribute.
UF_MOTOR – Light plus heavy vehicles with a UF trip end
LIGHTVEHICLES – Total light vehicles
HEAVYTRUCKS – Total heavy trucks
MOTORIZEDVOL – Light vehicles plus heavy trucks (MOTORIZEDVOL is most important because it is directional assigned auto volume that is used for highway evaluation)
VMT – Total motorized vehicle miles of travel.
VHT – Total motorized vehicle hours of travel.
PEDESTRIANS – Pedestrian volumes.
BICYCLISTS – Bike volumes.
VOL_CAP – Motorized volume/ (FSUTMS LOS C capacity)
DAILYCAPE– Daily FSUTMS LOS E capacity
VOL_CAPE – Motorized volume/ (FSUTMS LOS E capacity)
TranVol – Total transit volume (daily persons)
VC – 2010 Volume-to-Count Ratio (VC=MOTORIZEDVOL/COUNT10) This is only available in the base year 2010 scenario.
CONFAC – percentage of daily traffic occurring in the peak hour from VFACTORS.
CAPACITY – Hourly link capacity from the FSUTMS Speed-Capacity table, multiplied by the number of lanes
DAILYCAP – Daily capacity for roadway assignment
SPEED – Free-flow speed from the FSUTMS Speed-Capacity table. If needed, free-flow travel time in minutes can be calculated as: TIME=60*DISTANCE/SPEED
WALKTIME – Travel time in minutes for walk trips at 2.5 miles per hour.
BK_SPD – Bicycle speed
BK_TIME – Bicycle travel time in minutes

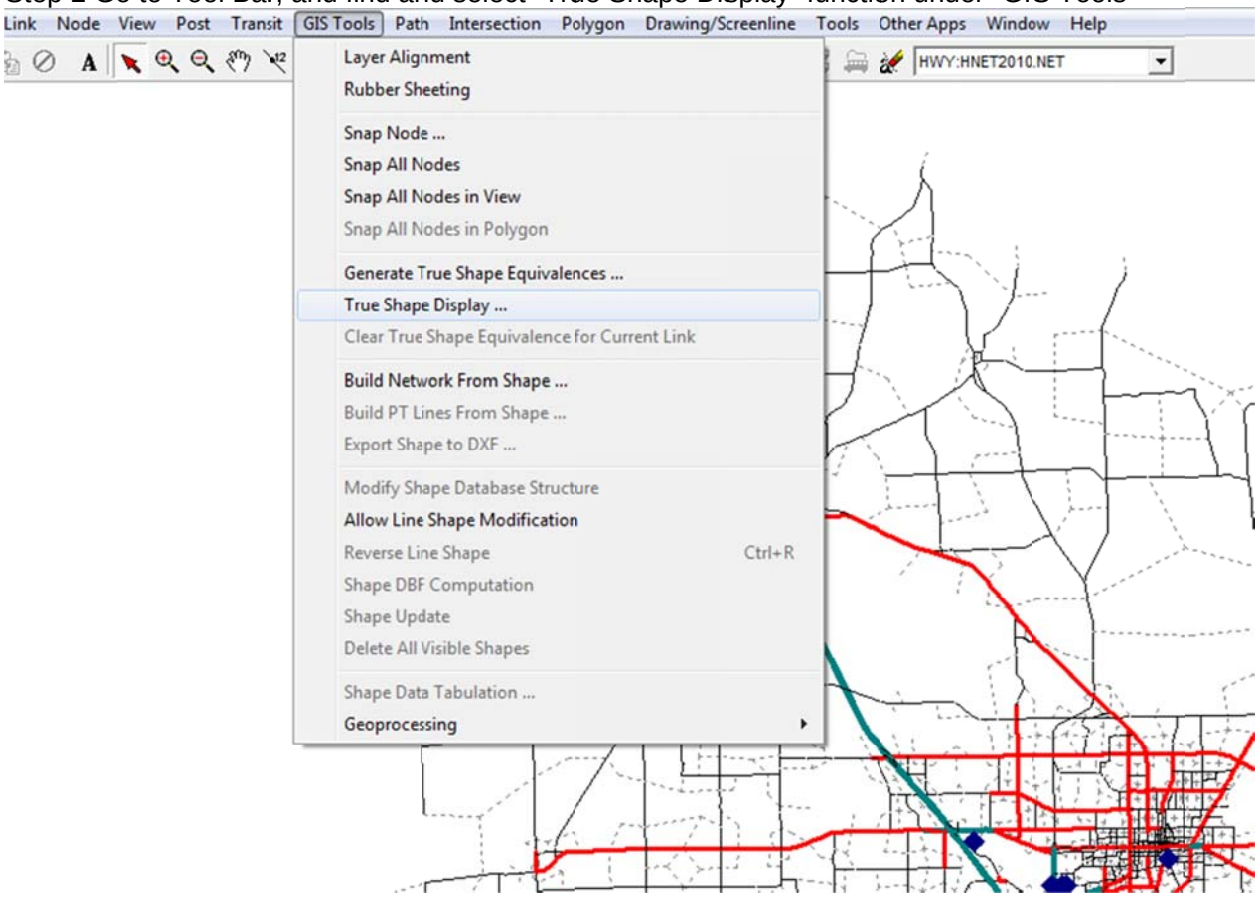
Notes Regarding True Shape Display of Networks

HNET20{YEAR}.NET and COMBINEDLOADED.NET in the Gainesville MTPO 2010 can be shown with True Shapefile Display in Cube software to be shown with curved line shapes. Please use True Shape polyline GIS shapefile which is available in model data in the following file location.
…\Gainesville_2007_2035\Media\Street\HNET2010TrueShp.shp

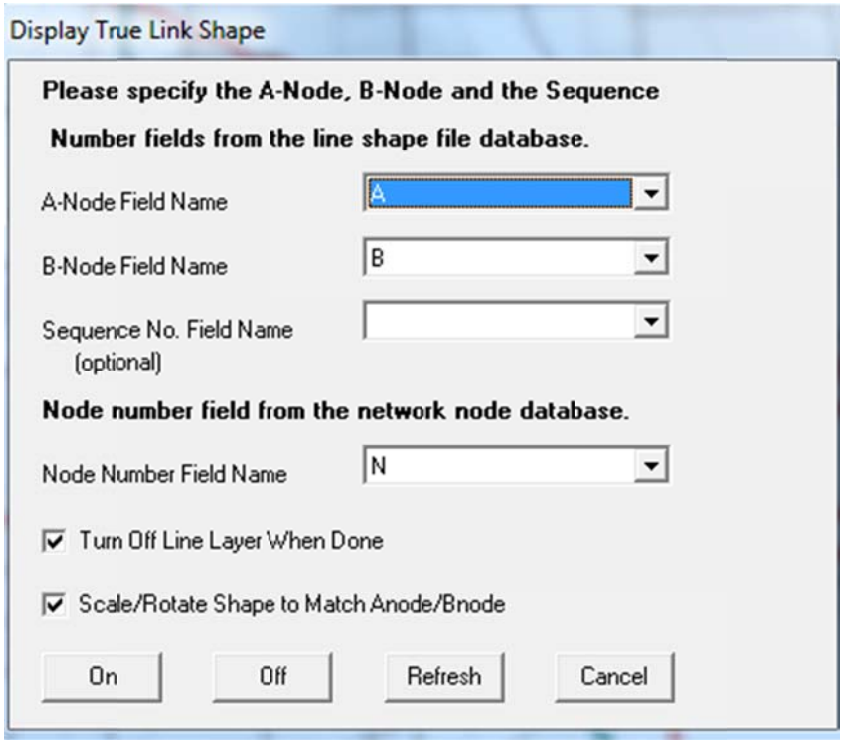
Step 1. Make sure that True Shape GIS shapefile is correctly selected and overlaid underneath the input or output network, as shown in the next screenshot



Step 2 Go to Tool Bar, and find and select “True Shape Display” function under “GIS Tools”



Step 3 “A” should be selected for A-Node, “B” for B-Node and “N” for Node Number. Click Ok.



Now, the network should be displayed with curved shapes instead of straight line shapes.

Appendix F: Glossary and Abbreviations

(Source: FSUTMS CUBE Comprehensive Workshop Front Matter Documentation – April 2010)

Access – Connectivity between a TAZ and the network. Access can be distinguished between highway and transit networks, and between automobile and pedestrian modes.
Advanced Traffic Management Systems (ATMS) -ATMS is the application of information and telecommunications technologies to the management of freeway and surface street facilities to maximize the use of existing roadway capacity, improve safety, reduce congestion, and provide predictable services
Advanced Traveler Information Systems (ATIS) - The collection, aggregation and dissemination of information to assist surface transportation travelers in moving from an origin to a destination.
Advanced Public Transportation Systems (APTS) - The use of information and communication technologies to improve the performance of transit services and level of service provided to customers.
Alightings - The number of persons getting off a transit vehicle.
Area Type - Network link code representing the type of land use in the area.
Attraction - The desirability of a zone. For non-home-based trips, attractions in a zone can be considered synonymous with trip destinations in that zone.
Auto Occupancy Rate - Average number of persons per vehicle.
Best Path - One of many paths between a specific origin and destination pair in a transit network determined to be the most efficient means of traveling from the origin to the destination. The default transit path methodology used in Florida.
Boardings - The number of persons getting on a transit vehicle.
Calibration - A process where models are adjusted to simulate trip-making characteristics of households in the model study area to match observed traffic activity in the study area.
Capacity - The maximum number of vehicles that can pass over a given section of a lane or roadway in one direction (or in both directions for a two-lane or three-lane highway). It is the maximum rate of flow that has a reasonable expectation of occurring. The terms “capacity” and “possible capacity”are synonymous. In the absence of a time modifier, capacity is an hourly volume. In expressing capacity, it is essential to state the prevailing roadway and traffic conditions under which the capacity is applicable. The capacity would not normally be exceeded without changing one or more of the conditions that prevail.
Centroid - Centroids are nodes used to identify the center of activity within a traffic analysis zone.
Centroid Connector - The Centroid Connector connects the traffic analysis zone centroid to the surrounding network links.
Cordon Line - An imaginary line encircling a study area. Traffic counts, travel origins and destinations, and other traffic data are collected at the locations where the imaginary line intersects the roads entering and leaving the study area. Used in modeling to estimate traffic entering and exiting the study area.
Commercial Vehicle Operations (CVO) - ITS technologies that uniquely support commercial vehicle operations to promote safe, economical, and efficient truck transportation.
Cube Voyager - A modeling software, developed by Citilabs, used as a modeling engine for the Florida Standard Model.
Demand - A desire for travel from an origin to a destination. Demand is not a fixed amount of travel, but a function of level of service.

Destination - Location to which trips are made, variously identified as a zone of specified area (in aggregate travel forecasting) or a location with a specified "attraction power," measured by things such as employees (for work trips) or square feet of sales area (for shopping trips).
Desire Line - Lines on a map representing the number of trips between zones. The thicker the line, the larger the number of trips.
EE Trips - External-External trips represent trips that travel through but have both trip ends outside of the model study area.
Facility Type - A network link code representing the type of service a roadway provides, such as principal arterial, minor arterial, collector, etc. The facility type does not always match the functional classification, as the facility type is used for modeling purposes only to simulate actual conditions.
Friction Factors (F-Factors, FF) - Reflects the regional sensitivities toward certain trip lengths for certain trip purposes. For example, home-based shopping trips may tend to be shorter than home-based work trips. Used to modify impedance during trip distribution.
Gravity Model - A mathematical model of trip distribution based on the premise that trips produced in any given area will distribute themselves in accordance with the accessibility of other areas and the opportunities they offer.
Headway - The amount of wait time between arrivals at a given transit stop for a given transit line.
Highway-Only Model - A model that only includes a roadway network thereby excluding transit.
Home-Based Trip - A trip with one end at the residence of the person making the trip.
HOV Trips - High Occupancy Vehicle trips, or carpool trips, represent the number of trips with usually two or more persons in the vehicle, including the driver.
Impedance - More general than Friction Factors, impedance shows the effect that various levels of time and cost will have on travel between zones. Impedance can include various types of time (walking, waiting, riding, etc.) and cost (fares, operating costs, tolls, parking costs, etc.). Other factors, such as comfort, convenience, personal safety, etc., may also be included.
IE Trips - Internal-External trips represent trips that have one end inside the model study area and one end outside the model study area.
II Trips - Internal-Internal trips represent trips that have both ends inside the model study area.
Incident Management Systems - These systems manage both predicted and unexpected incidents so that the impact to the transportation network and traveler safety is minimized. Incident management involves five major phases. These are incident detection, incident verification, incident response, incident clearance, and queue dissipation.
Intelligent Transportation Systems (ITS) - The application of information and telecommunications technologies to the management and operation of transportation systems.
IntelliDrive/Vehicle-Infrastructure Integration (VII) - The establishment of vehicle to vehicle and vehicle to roadside communication capability nationwide to enable a number of new services that provides significant safety, mobility, and commercial benefits.
Intrazonal Trip - A trip with both its origin and destination in the same zone.
Kiss-and-Ride (KNR) - A type of transit trip characterized by a transit rider being dropped off at a transit station by automobile and boarding a transit line.
Level of Service (LOS) - Multidimensional characteristics of the transportation service provided that are usually identified specifically by the location of the origin and destination of a trip and that are divided into those that are quantifiable (travel time, travel cost, number of transfers) and those that are difficult to quantify (comfort, mode image).
Link - A basic component of a network representing a segment of roadway. This component is a primary unit of analysis and carries data pertaining to roadway characteristics, traffic volumes, and performance measures.

Managed Lanes - Managed lanes help maximize the use of existing highway capacity by using price and/or occupancy restrictions to manage the number of vehicles traveling on them. Managed lanes maintain volumes consistent with acceptable levels of service even during peak travel periods.
Micro-coding - A transit modeling technique used to introduce a higher level of detail at transit stations by separating access points between modes and introducing links connecting them. Allows a more realistic representation of transferring between modes.
Mode Choice - Mode choice models calculate which trips will use the highway network and which will use the transit network. The model predicts how the trips will be divided among variable modes of travel.
Mode of Travel - Means of travel such as auto driver, vehicle passenger, mass transit passenger, walking or bicycle.
Nested Logit Model (NLM) - Analytical form for demand modeling that is suited to modeling of multiple travel choice situations by grouping different modes of travel according to their likelihood for direct competition.
Network - Set of nodes and connecting links that represent transportation facilities in an area. Attributes normally associated with links are distances, levels of service, capacities, and volumes.
Node - A point where two links join in a network, usually representing a decision point for route choice but sometimes indicating only a change in some important link attribute.
Occupancy Model - Converts person trips to vehicle trips using auto occupancy factors.
Origin - The location of the beginning of a trip or the zone in which a trip begins.
Park-and-Ride (PNR) - A type of transit trip characterized by the act of parking at a transit station and boarding a transit line.
Path - A set of links representing a possible route between an origin and a destination. There can be a number of paths between any specific origin and destination pair.
Peak Period - The period during which the maximum amount of travel occurs. This may be one or more hours. Generally, there is a morning peak and an afternoon peak and traffic assignments may be made for each period.
Productions - The number of home-based trip ends in the zone of residence. For all non-home based trips, productions are synonymous with origins.
Ramp Metering - The application of signal control devices to regulate the number of and/or how vehicles merge into the freeway mainline lanes with the objective in most cases to balance flow and demand.
Ridership - Number of individuals using a transit line. Used as an assessment of a transit line's attractiveness.
RMSE - Root Mean Square Error is a measure of total error defined as the square root of the sum of the variance and the square of the bias. It assumes that larger forecast errors are of greater importance than smaller ones; hence they are given a more than proportionate penalty.
Road-Weather Information Systems (RWIS) - RWIS provides information to travelers and also to agencies for better deployment of resources. They use combinations of weather information services and data collected from environmental sensors.
Screenline - An imaginary line, usually along a physical barrier such as a river or railroad tracks, splitting the study area into parts. Traffic counts and possibly interviews are conducted along this line, and the crossings are compared to those calculated from the home interview data as a check of survey accuracy. Crossing may also be compared with model estimates as part of calibration.
Selected Link Analysis - Traces the entire length of each trip passing through a particular link or set of links along the network to determine where such trips are coming from and going to.
Selected Zone Analysis - Traces the entire length of each trip traveling to or from a particular zone or set of zones.

Shortest Path - A path representing the least cost option of traveling between any specific origin and destination pair.
Signal Preemption - Traffic signal preemption is a type of system that allows the normal operation of traffic lights to be preempted, often to assist emergency vehicles. The most common use of these systems is to provide emergency vehicles priority by changing traffic signals in the path of the vehicle to green and stopping conflicting traffic.
Smart work zones (SWZ) - SWZ are automated systems that provide real-time information on work zone traffic conditions. In recent years, transportation agencies across the nation have deployed portable ITS technologies to monitor traffic and manage mobility and safety during construction and maintenance of highways.
Socioeconomic Data - Demographic data, such as household, population, and employment characteristics, that are input into the model to determine the impact on trip-making patterns.
SOV Trips - Single Occupancy Vehicle trips, or drive-alone trips, represent the number of trips with only one person in the vehicle, including the driver.
Special Generators - Concentrations of activities of such size or unusual nature to warrant special consideration in trip generation analysis.
Station - A node in the transit network that offers an opportunity for automobile access. FSUTMS
Stop Node - A node along a transit line that represents an opportunity for boardings and alightings.
Study Area Boundary - The area that is expected to take on urban characteristics in the next 20 to 30 years (by the end of the planning period).
TAZ - Traffic Analysis Zone - a small geographic area that serves as the primary unit of analysis in a travel forecasting model.
Traffic Count - The observed number of trips collected at a specific location. Used to assist with model validation.
Transit Legs - Distinct units of a transit line representing a segment from one stop to the next. Transit paths are built by assessing the relative costs of available transit legs.
Transit Line - A collection of transit stops arranged into a route along which public transport vehicles travel. A system of interacting transit lines is a transit network
Transit Signal Priority - Transit Signal Priority (TSP) is an operational strategy that facilitates the movement of in-service transit vehicles through traffic signal controlled intersections. Signal priority modifies the normal signal operation process to better accommodate transit vehicles.
Transportation Model - A mathematical description of a transportation system's characteristics including traffic volumes, and use, roadway type and population. After a mathematical relationship is established, the model is used to predict traffic volumes based on anticipated changes in the other characteristics.
Trip Assignment - The process of determining route or routes of travel and allocating the zoneto-zone trips to these routes.
Trip Distribution - The process by which the movement of trips between zones is estimated. The data for each distribution may be measured or estimated by a growth factor process, or by synthetic model.
Trip End - Either a trip origin or a trip destination.
Trip Generation - A general term describing the analysis and application of the relationships that exist among the trip makers, the urban area, and trip making. It is used to determine the number of trip ends in any part of the urban area.
Trip Purpose - The reason for making a trip, normally one of several possible purposes. Each trip may have a purpose at each end; (e.g., home to work) or may be classified by the purpose at the non-home end (e.g. home to shop).
Trip Table - A table showing trips between zones -- either directionally or total two-way. The

trips may be separated by mode, by purpose, by time period, by vehicle type, or other classification.
Trip Rate - The average number of trips per household for specific trip purposes. In Florida, trip rates are usually applied by household size and auto availability within each zone by trip purpose.
Validation - The procedure used to adjust models to simulate base year traffic conditions. A preliminary step that must be undertaken before models may be reasonably used to forecast future traffic conditions.
VHT - Vehicle hours of travel.
VMT - Vehicle miles of travel.
Volume-to-Capacity Ratio - The number of trips simulated in the model divided by the capacity of the link. A volume-to-capacity ratio of 1.0 represents 100 percent of the capacity.
Volume-to-Count Ratio - The number of trips simulated in the model divided by the count on the link. A volume-to-count ratio of 1.0 represents an exact match between the simulated volumes and the observed counts. Typically assessed only during validation.

ACRONYMS (Sourced from FDOT Project Forecasting Handbook 2002)
ADT Average Daily Traffic
AADT Annual Average Daily Traffic
D Directional traffic split
D30 Proportion of traffic in the peak direction for the 30th highest hour
DHV Design Hour Volume
DDHV Directional Design Hour Volume
DHT Design Hour Truck Percentage
ESAL Equivalent Single Axle Load
FDOT Florida Department of Transportation
FHWA Federal Highway Administration
FM Financial Management
FPI Financial Project Identifier
FSUTMS Florida Standard Urban Transportation Model Structure computer program
HCM Highway Capacity Manual
K30 Ratio of DHV to AADT for the 30th highest hour
Lf Lane Factor
LGCP Local Government Comprehensive Plan
LOS Level of Service
MOCF Model Output Conversion Factor
MPO Metropolitan Planning Organization
PD&E Project Development and Environment
PHF Peak Hour Factor
PTMS Portable Traffic Monitoring Site
PSWADT Peak Season Weekday Average Daily Traffic
RCI Roadway Characteristics Inventory database
SF Seasonal Factor
T Truck Factor
TCI Traffic Characteristics Inventory database
TTMS Telemetric Traffic Monitoring Site
V/C Volume to Capacity Ratio
WPA Work Program Administration
WPI Work Program Item (First 6 digits of FPI)

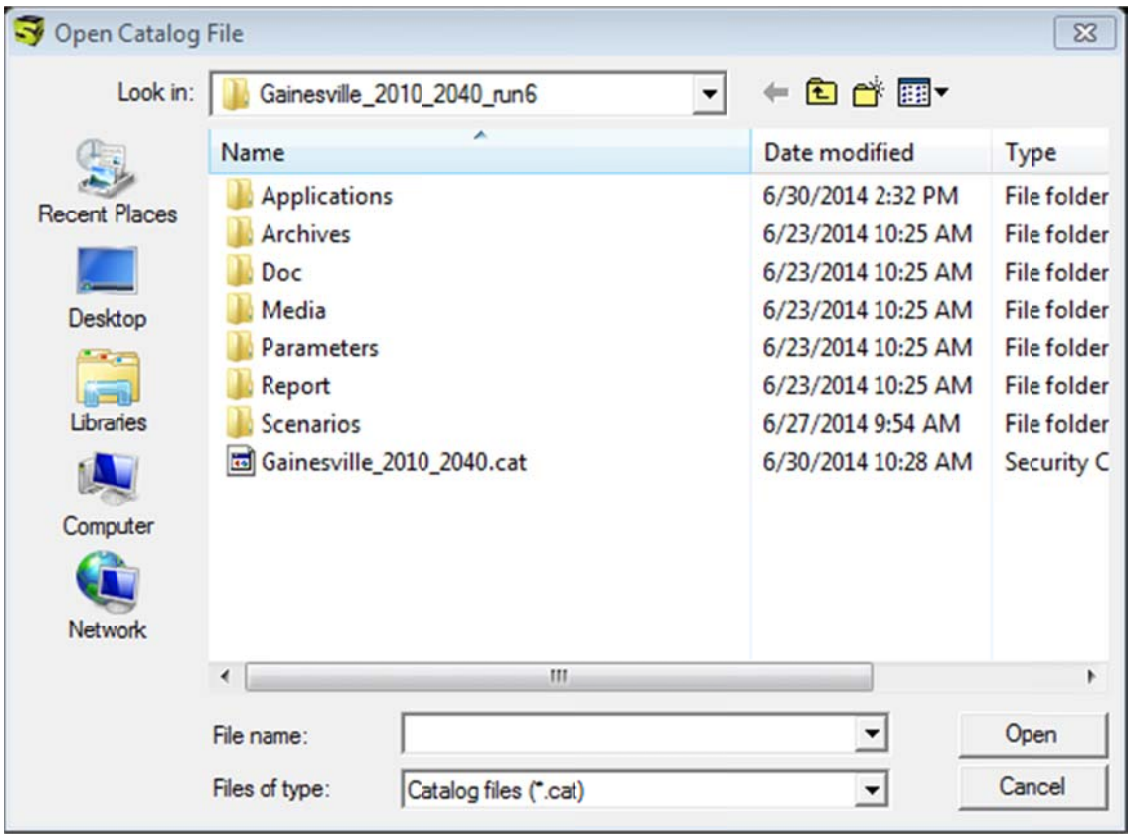
Appendix G: Scenario Manager / Running the Model

1. To run the Alachua County model, you first have to open up the Cube Application window by navigating to it or clicking the Cube desktop icon

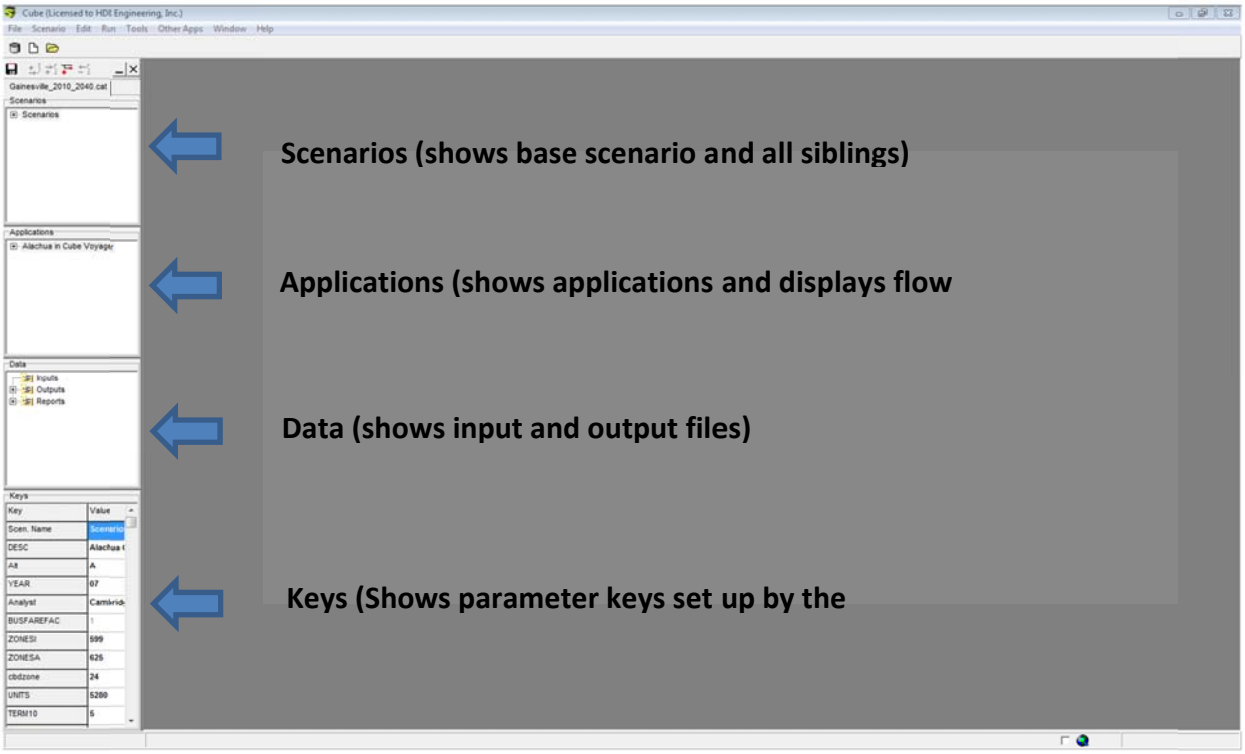
2. This brings up a dialog asking for the catalog location of the model.

3. Navigate to the location for the catalog on your computer/network and open it.

The second way to open the model is to double click Gainesville_2010_2040.cat in Windows Explorer.

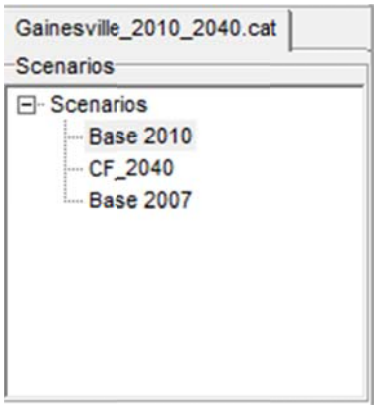


4. This brings up the Gainesville model application window.

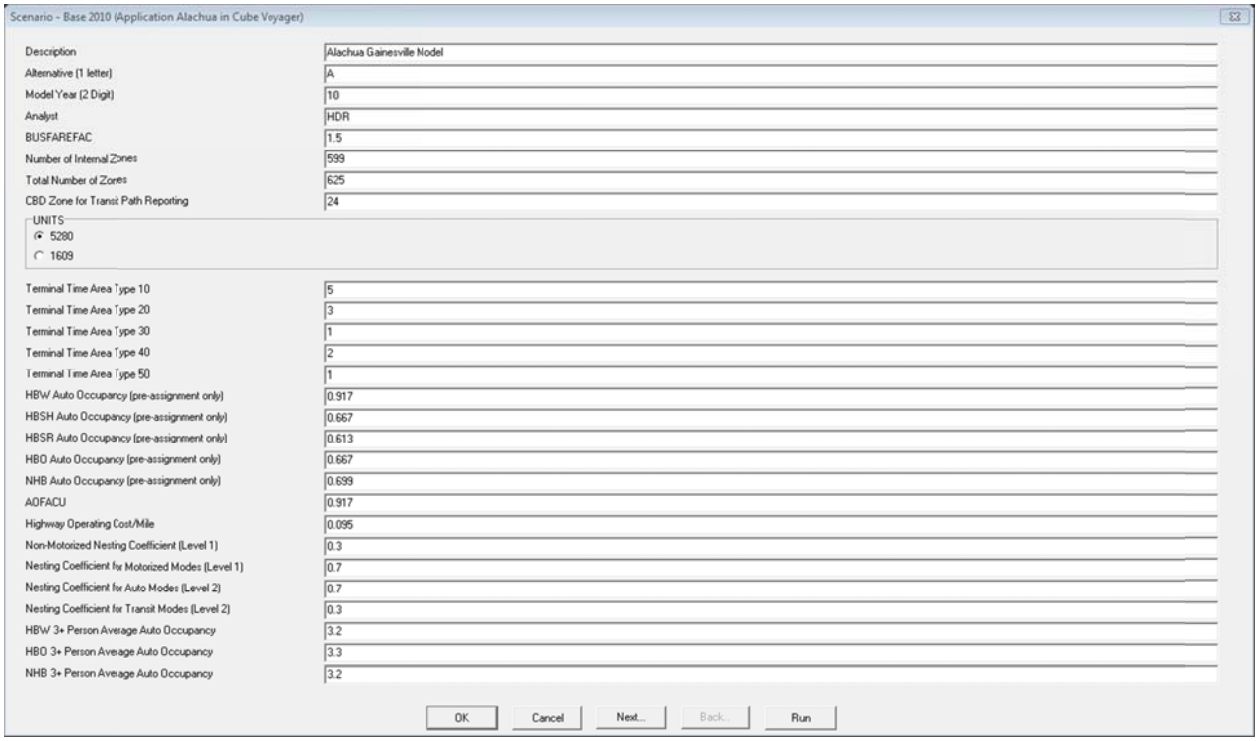


The figure above shows the various parts of the Cube catalog application window.

5. To run a particular scenario, for example the Base Year**,** you would select **Base 2010 in the Scenarios section of the catalog.**



When a scenario is double-clicked, the Scenario dialog box is displayed as illustrated below.

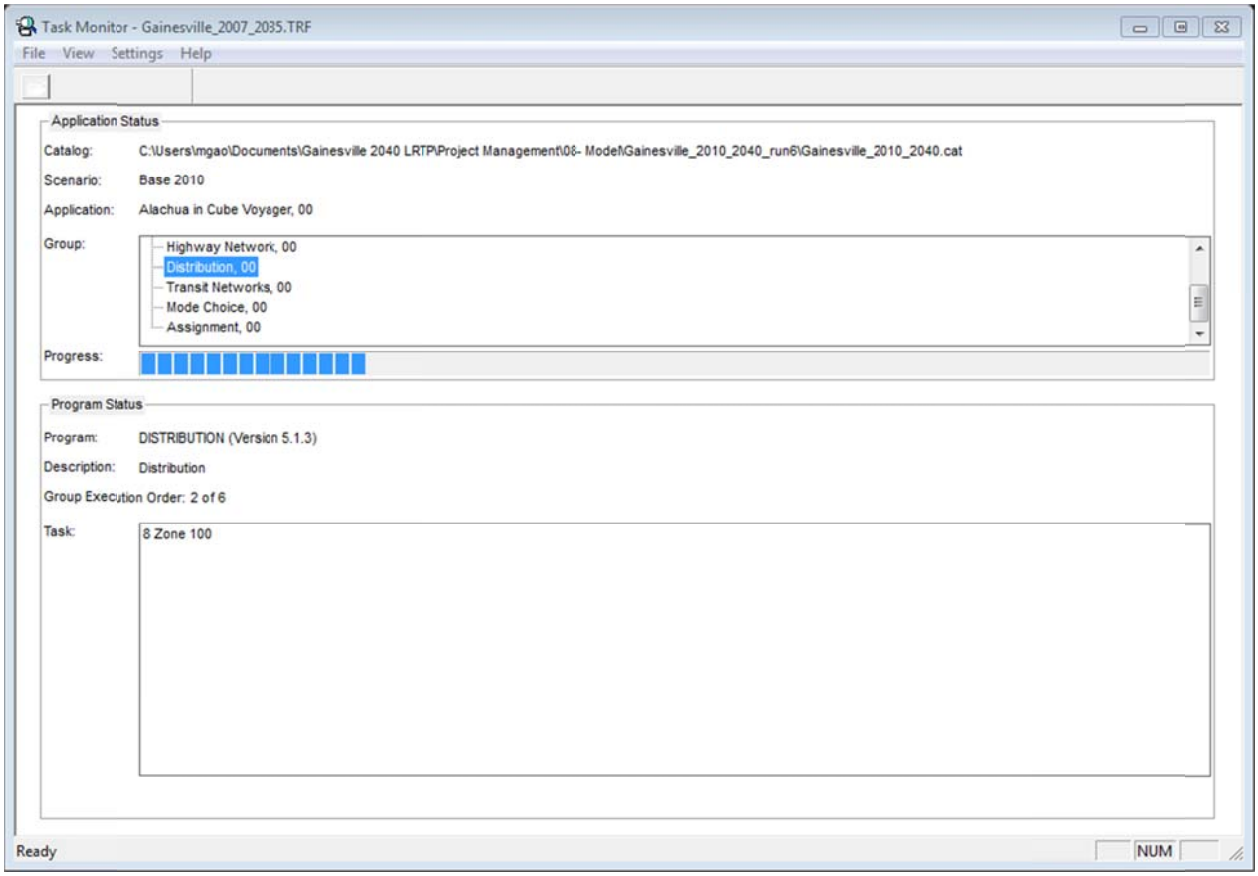


This dialog box allows you to change model runtime options and set model parameters. These parameters are stored as Cube Catalog Keys which are variables which are referenced in the model script during the relevant model processing phase. The Catalog Key values can also be observed in Part 4 of the Catalog File diagram above.

6. To run the model with the indicated variables, simply press **Run** and then **OK** and the model will be launched. When the model run is completed, press **OK.** You may then analyze the results. The **Applications** section of the Catalog file shows the model processes and may be used to open the Cube Application Flowchart for a specific step or for the overall model.

The **Data** section of the Catalog file shows the input files, output files and any reports generated by the model run processes.

For further details on the Scenario Manager and running FSUTMS models, you may refer to the FSUTMS Comprehensive Modeling Workshops held periodically throughout the year in various locations across the state.



Year 2040 Long Range Transportation Plan Update Planning Team

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