AirSage Flagler BRT Corridor Analysis

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1. Introduction

The main goal of this step is to import AirSage zonal trip data into Southeast Regional Planning Model (SERPM) 6.5 model, and perform an existing condition analysis of the network. To perform future analysis, the Flagler corridor should be updated with the BRT line.

In transportation planning, Traffic Analysis Zones (TAZs) is the unit of geography most commonly used in conventional transportation planning models. Each TAZ has detailed information on Socio-Economic Data (SED), employment data, etc. Based on the model characteristics, trips are generated and then distributed between different TAZs, and then mode choice and trip assignment steps define the exact way each person perform the trip.

In conventional planning, the number of trips generated and attracted by each zone is a function of TAZ data, and the number of trips distributed between two zones, is a function of distance between two zones, number of trips generated by origin zone and number of attraction trips produced by destination zone. However, new technologies are now being used in transportation planning steps. One of the attractive methods being introduced in recent years which can help transportation planning is using cellphone data information to track person's move between TAZs, and define their trip origin and destination. This technology can eliminate two first steps of four step modeling (trip generation and distribution), while producing more precise and realistic origin destination matrices.

For modelling Flagler BRT corridor, SERPM 6.5 model is updated using most recent cellphone data (2016). For this purpose, Miami-Dade County (MDC) was divided into 40 zones, based on 2010 original TAZs. This 40-zones will be called parent TAZs (PTAZs) in the remaining part of this report. Miami-Dade County is composed of 1,504 TAZs in SERPM 6.5 model, which details can be seen in **Appendix A** of this report. It is tried to develop PTAZs in Flagler corridor oriented method, by that PTAZs close to Flagler corridor are relatively small and PTAZs far from the corridor (north and south of MDC) are relatively large. PTAZ shape can be seen in **Appendix A** of this report. Two following acronyms are being used several times in this report:

TAZ: The zones defined in SERPM model (4,284 zones in South Florida and 1,506 in MDC) are called as TAZ in this report

PTAZ: the defined 40 zones which actually include 1,504 Miami-Dade County TAZs are called as Parent TAZ (PTAZ) in this report.

2. Data Collection

AirSage trip data collection was used on MDC area, covering a population of 4,000,000 for April 2016. Three classes of Home-based Work, Home-based Other and None-home Based Other were collected in this effort, as 24-hour total, AM Peak (7am to 10am) and PM Peak (4pm to 7pm). Figure 1 shows a portion of data collected by AirSage, which are HBW 24-hr trips between some of the PTAZs, toward Flagler corridor.

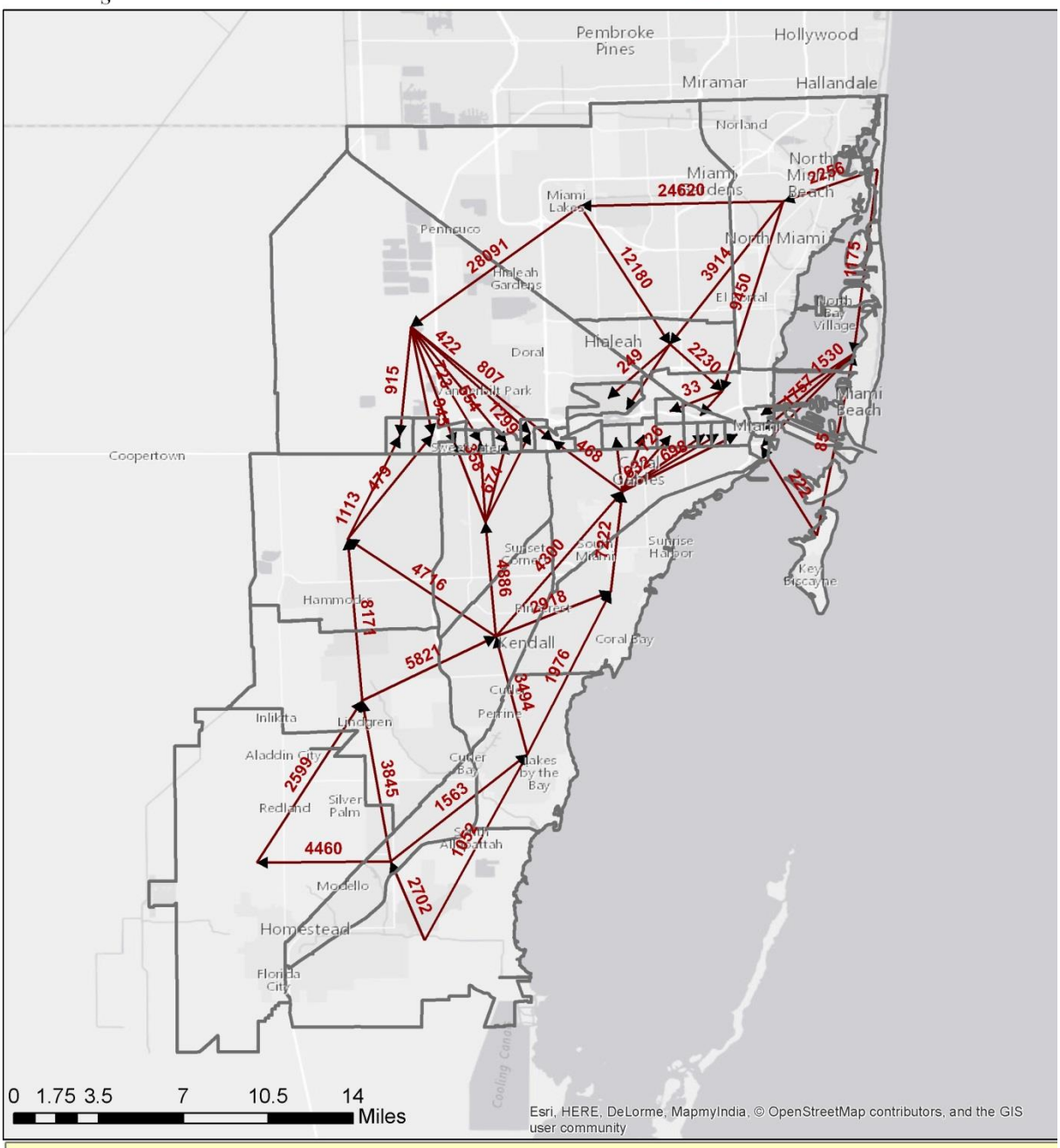
3. Methodology

Southeast Regional Planning Model (SERPM) 6.5.4 will be used for this step. SERPM is a multimodal covering the three urban areas of Southeast Florida – Palm Beach, Broward and Miami-Dade Counties. SERPM 6.5.4 is using the Cube-Voyager (CV) and TRBBUILD as the modeling platform for highway and transit level estimation (FDOT, 2008).

SERPM 6.5 is divided into three time of day;

1. AM-Peak Period (6:30-9:30 am)
2. PM-Peak Period (3:30-6:30 pm)
3. Off-peak Period (9:30 am – 3:30 pm, 6:30 pm – 6:30 am)

For detailed information on the modeling methodology of SERPM, SERPM 6.5 and SERPM 6.5.4 technical reports can be used. **Error! Reference source not found.** shows the basic SERPM 6.5.4 modeling flowchart. As it can be seen, main steps of model are generation, distribution, mode choice and trip assignment. Figure 3, illustrates CALTRAN sub-model box has been added to SERPM 6.5 model. The goal of this sub-model is to convert AirSage trip data to Origin-Destination matrices, which will be used in remaining steps of model (mode choice and assignment).



HBW Daily Trips between Some of the PTAZs

Figure 1. HBW Daily Trips Collected by Airsage for Some of the PTAZs

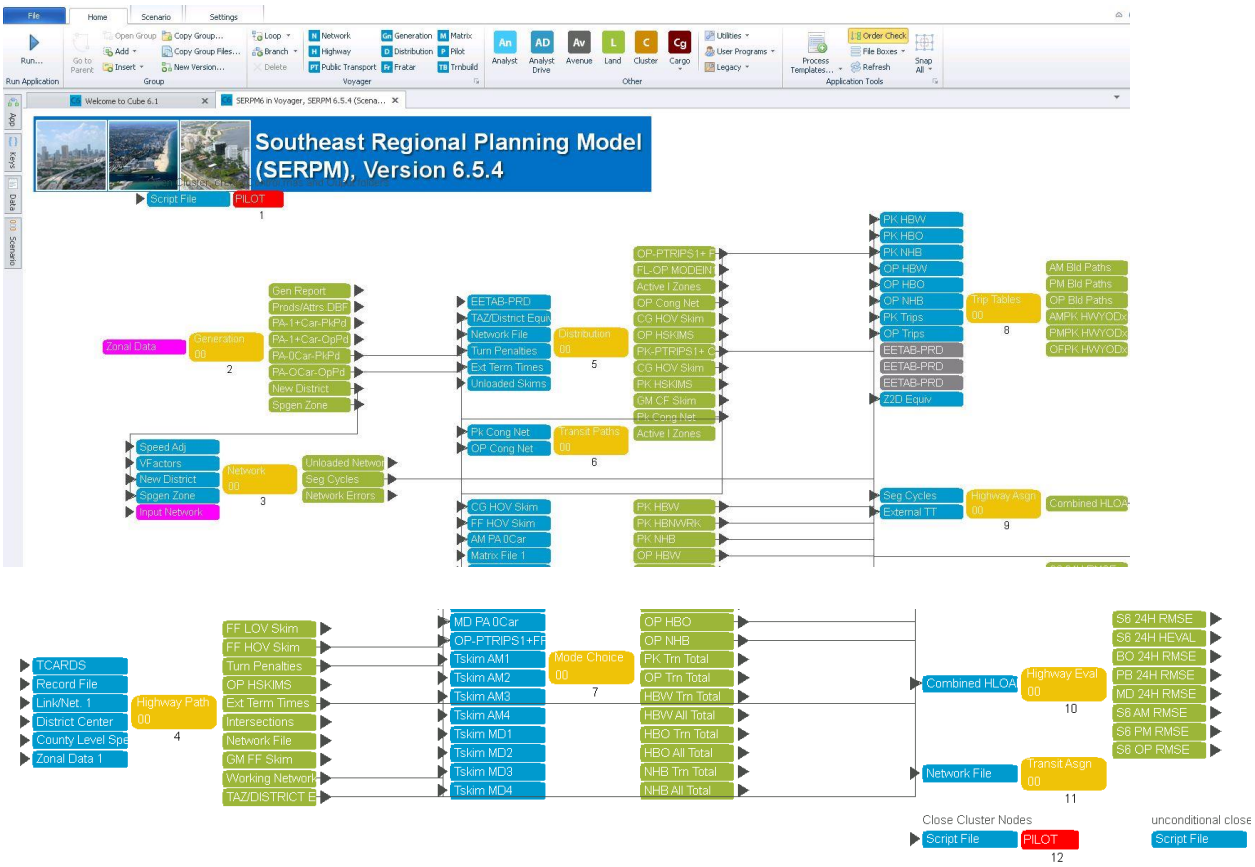


Figure 2. Base SERPM 6.5.4 Modeling Flowchart

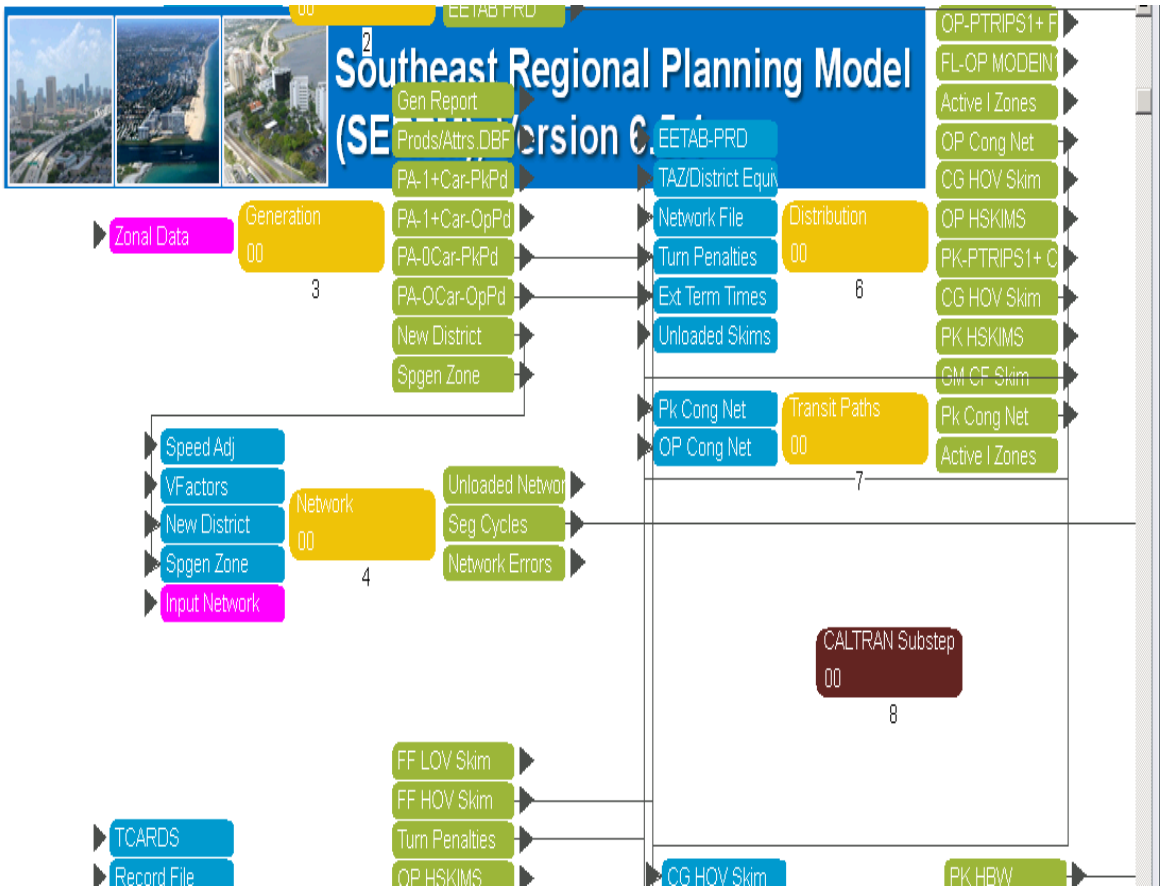


Figure 3. Sub-Model Added to Incorporate AirSage Cellphone Trips

Before using Cube, the raw data should be divided into three main classes (HBW, NHB, HBO), for peak period and off-peak period. To simplifying the provided explanations in this report, a sample O-D trip will be selected, and analyses will be shown on that sample as an example. The AirSage data shows number of Home-Based Work (HBW) trips by residents at PM peak period between zones 13 and 15 is as Table 1 (these zones are selected randomly just to providing example for descriptions):

Table 1. PM Peak HBW Trips between Origins 13 and 15

Origin Zone	Destination Zone	Counts
15	13	106.37
13	15	504.23

Remaining steps have been done in Cube software.

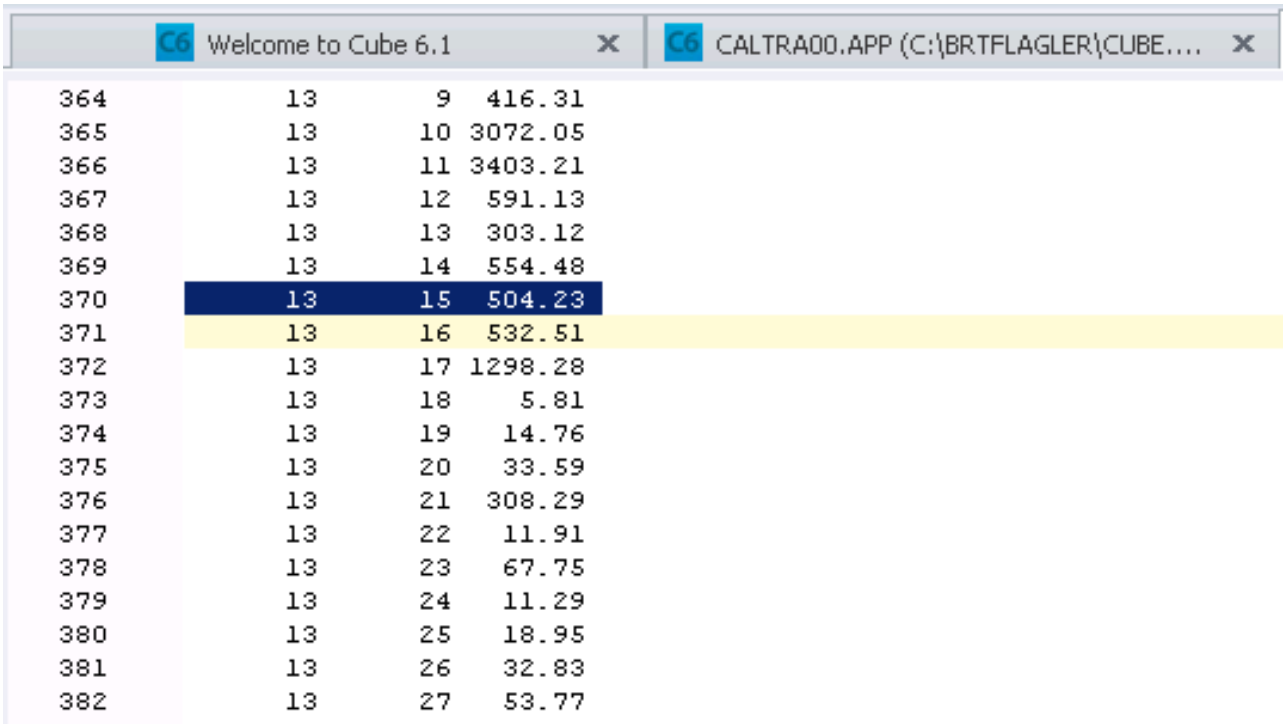
3.1.Read raw AirSage data to data-base file (DBF) format

Steps 1 to 6 of the CALTRAN sub-model are assigned to reading raw data from six following databases to convert them to DBF format:

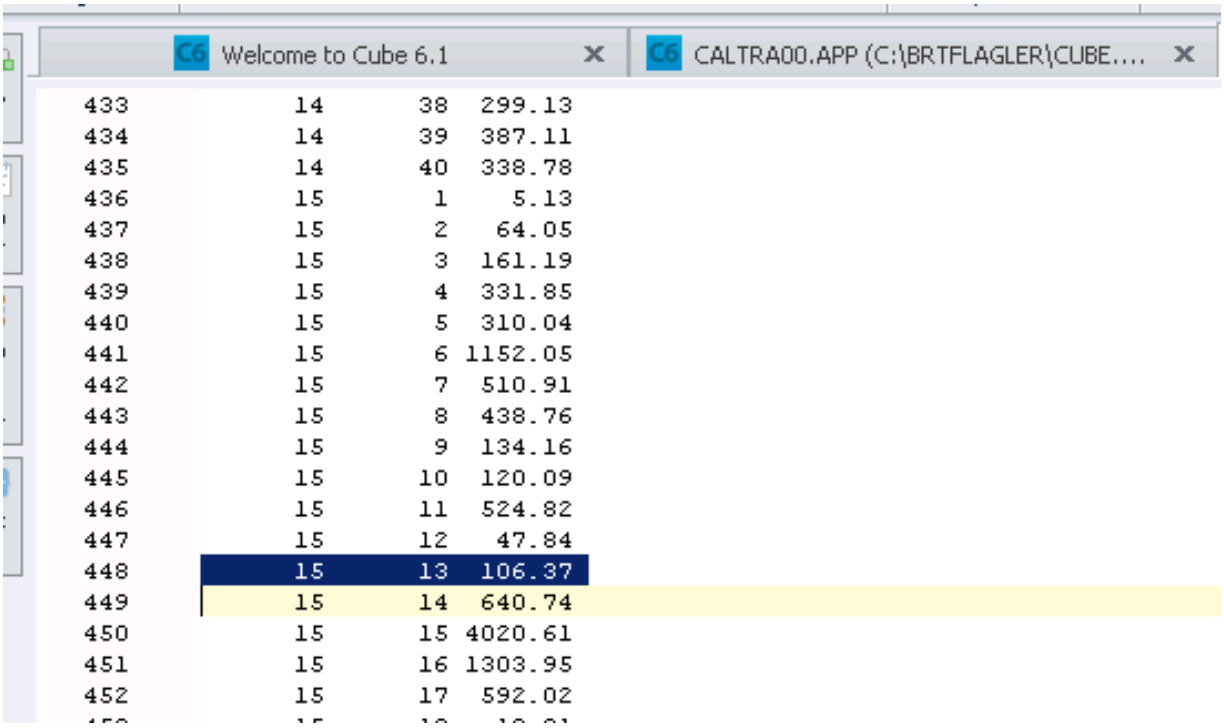
- ✓ Peak period NHB
- ✓ Peak period HBW
- ✓ Peak period HBO
- ✓ Off-peak period NHB
- ✓ Off-peak period HBW
- ✓ Off-peak period HBO

The peak periods are extracted directly from the PM collected data by AirSage. To find the Off-peak period data, 24-hour data collected by AirSage will be multiplied by a factor to represent the off-peak counts. The factor is selected to be 5.5% (by that, it means average hourly off-peak traffic is equal to 5.5% of 24-hour traffic). The factor is based on an existing hourly continuous count report from latest release of Florida Transportation Information CD (FTI 2014), for a random station in Miami-Dade County, which can be seen in **Appendix B**. Percent of trips between 12pm to 1pm is selected as representative of the off-peak trips.

According to Figure 4, 504.23 and 106.37 trips are going from zone 13 to 15 and vise-versa in PM peak as HBW trips, which were also shown in Table 1. The sample outputs of steps 1 to 6 can be seen in Figure 5



364	13	9	416.31
365	13	10	3072.05
366	13	11	3403.21
367	13	12	591.13
368	13	13	303.12
369	13	14	554.48
370	13	15	504.23
371	13	16	532.51
372	13	17	1298.28
373	13	18	5.81
374	13	19	14.76
375	13	20	33.59
376	13	21	308.29
377	13	22	11.91
378	13	23	67.75
379	13	24	11.29
380	13	25	18.95
381	13	26	32.83
382	13	27	53.77



433	14	38	299.13
434	14	39	387.11
435	14	40	338.78
436	15	1	5.13
437	15	2	64.05
438	15	3	161.19
439	15	4	331.85
440	15	5	310.04
441	15	6	1152.05
442	15	7	510.91
443	15	8	438.76
444	15	9	134.16
445	15	10	120.09
446	15	11	524.82
447	15	12	47.84
448	15	13	106.37
449	15	14	640.74
450	15	15	4020.61
451	15	16	1303.95
452	15	17	592.02

Figure 4. Raw Trip Data (HBW)

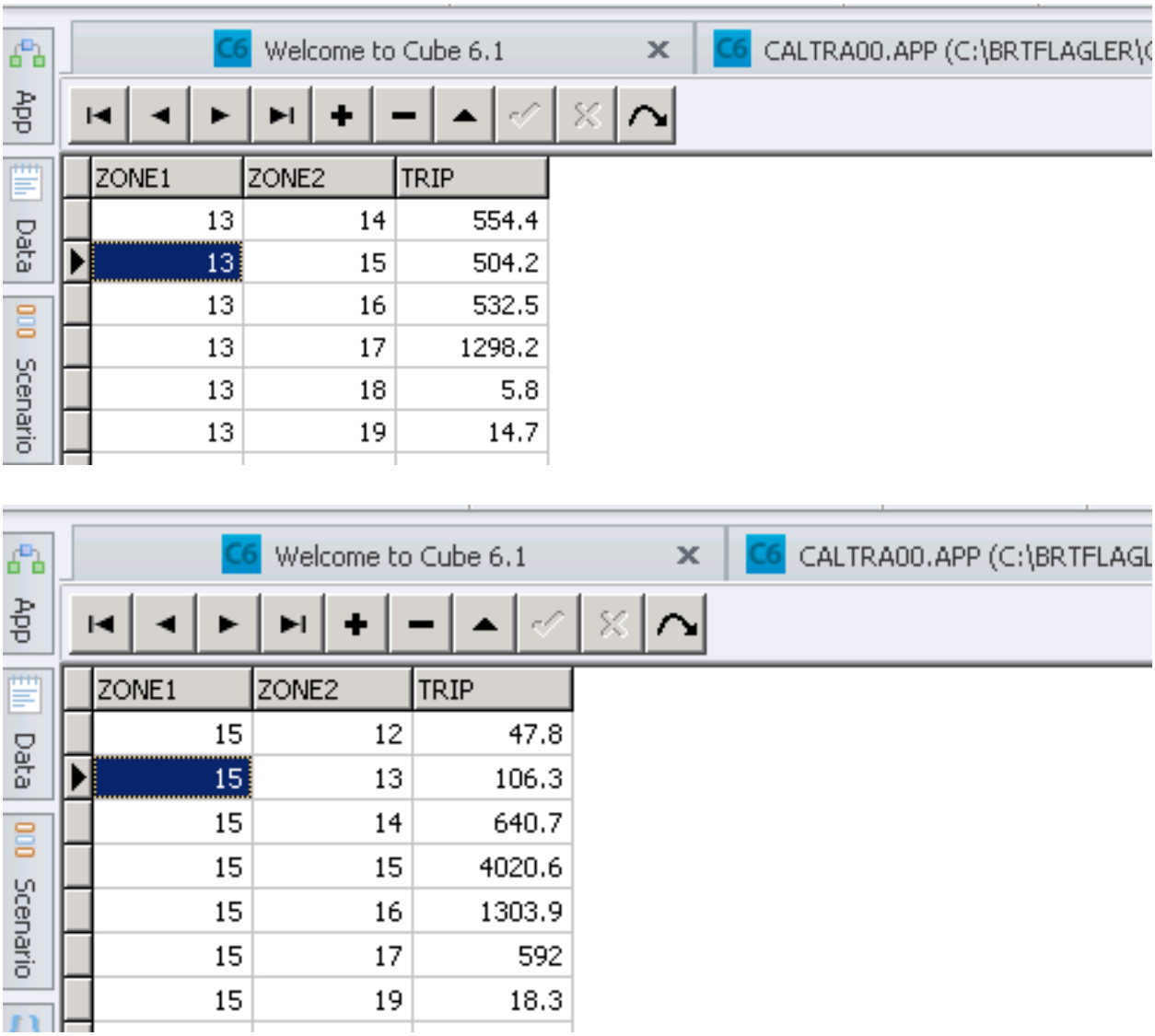
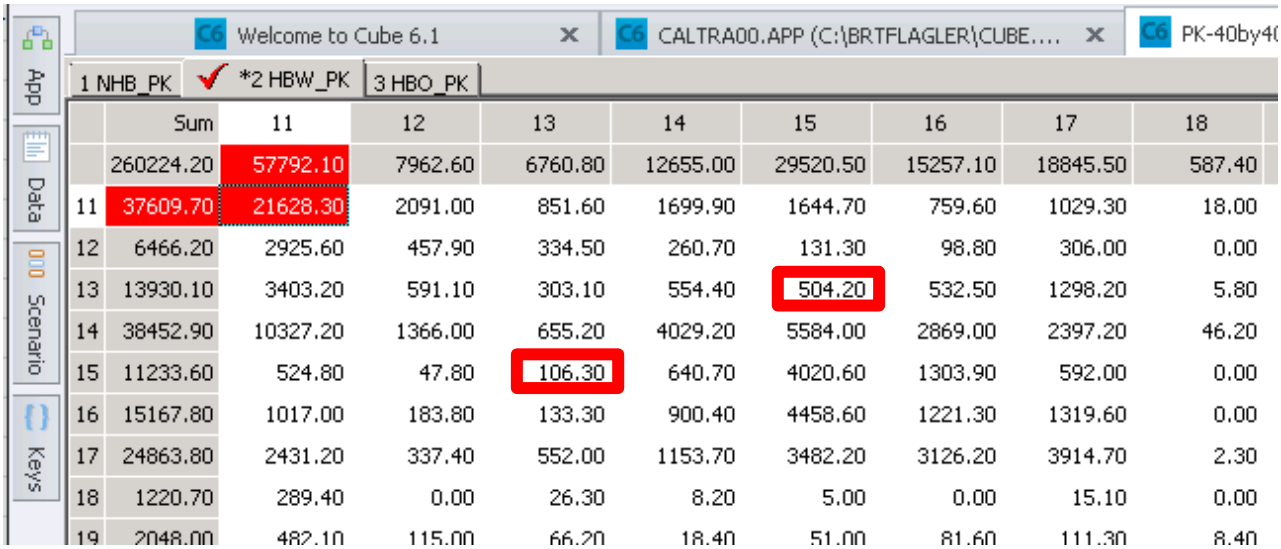


Figure 5. Output of Reading Raw data to DBF files

3.2.Converting DBF files to 40 by 40 matrices

Previous step converted the raw data into 6 DBF files, including peak and off-peak HBW, NHB and HBO trips between 40 PTAZs. Step 7 of sub-model will convert DBF files into two Peak and Off-peak Origin –Destination matrices. Figure 6 shows a part of this step output. Same matrix will be generated for all other five input DBFs. Trips between PTAZs 13 and 15 are shown by red rectangular.



	Sum	11	12	13	14	15	16	17	18
	260224.20	57792.10	7962.60	6760.80	12655.00	29520.50	15257.10	18845.50	587.40
11	37609.70	21628.30	2091.00	851.60	1699.90	1644.70	759.60	1029.30	18.00
12	6466.20	2925.60	457.90	334.50	260.70	131.30	98.80	306.00	0.00
13	13930.10	3403.20	591.10	303.10	554.40	504.20	532.50	1298.20	5.80
14	38452.90	10327.20	1366.00	655.20	4029.20	5584.00	2869.00	2397.20	46.20
15	11233.60	524.80	47.80	106.30	640.70	4020.60	1303.90	592.00	0.00
16	15167.80	1017.00	183.80	133.30	900.40	4458.60	1221.30	1319.60	0.00
17	24863.80	2431.20	337.40	552.00	1153.70	3482.20	3126.20	3914.70	2.30
18	1220.70	289.40	0.00	26.30	8.20	5.00	0.00	15.10	0.00
19	2048.00	482.10	115.00	66.20	18.40	51.00	81.60	111.30	8.40

Figure 6. HBW Peak Period 40x40 Origin-Destination Matrix

3.3.Expanding 40x40 matrix to SERPM TAZs

This step uses the RENUMBER function to expand 40x40 matrix generated in step 7 to 4284x4284 matrix which will be used by SERPM 6.5.4. Based on Cube software manual, RENUMBER function causes the program to assign new zone numbers to all values in the output matrices (CITILABS, 2014). To do this step, a look up table is required to show what percent of trips from zone 1 should be assigned to zone 2.

Here, we assumed that trips to each PTAZ can be divided equally to TAZs which composes that PTAZ. This means, based on comparing two shape files of TAZs and parent TAZs, for example the PTAZ number 15 is constructed from 132 TAZs and PTAZ 13 is constructed from 55 TAZs. So, the whole trips from PTAZ 13 to PTAZ 15 will be divided by 132x55 and distributed into all those 132 original TAZs. Figure 7 shows PTAZ 15 and its related TAZs, shown in red.

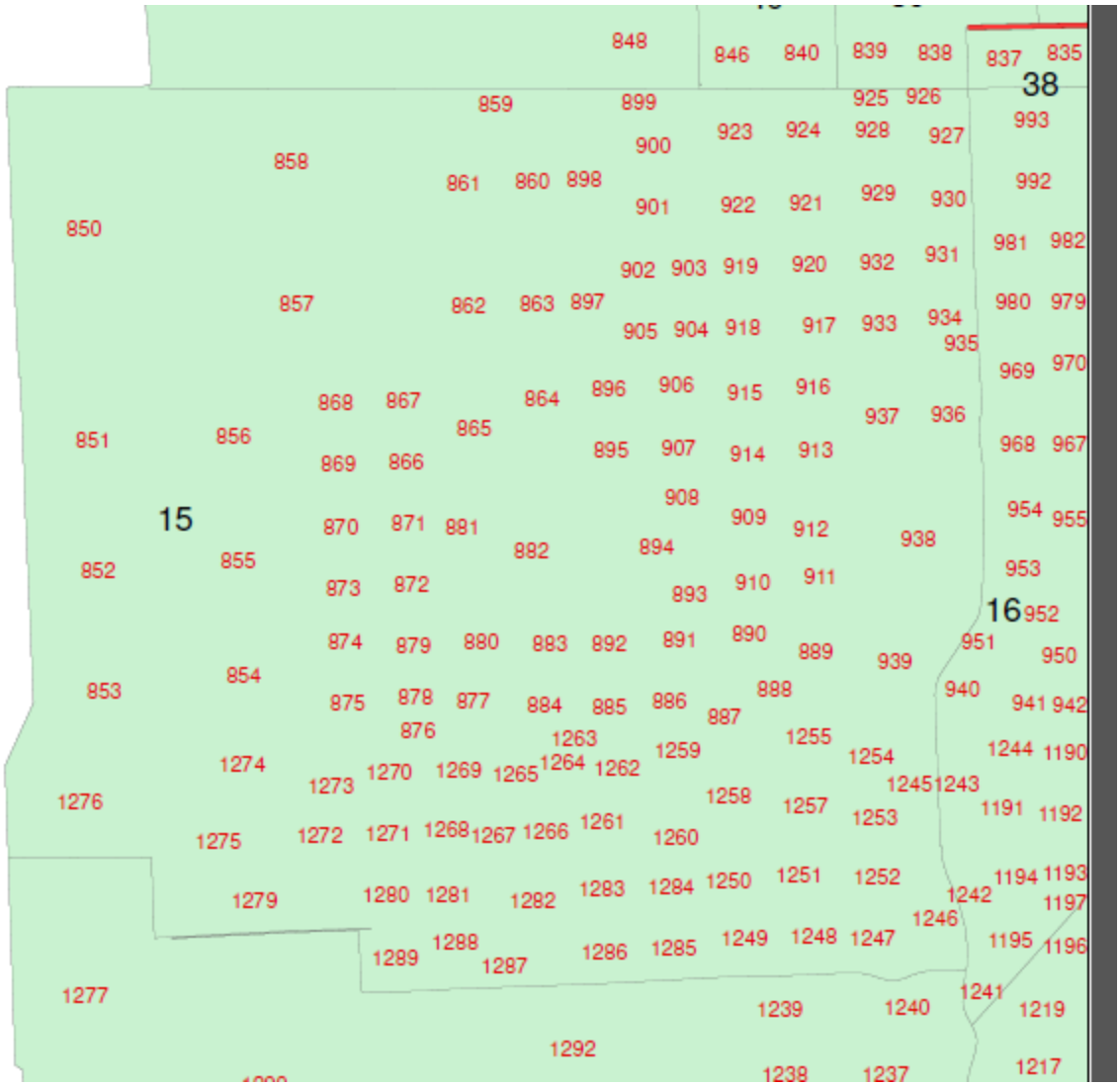
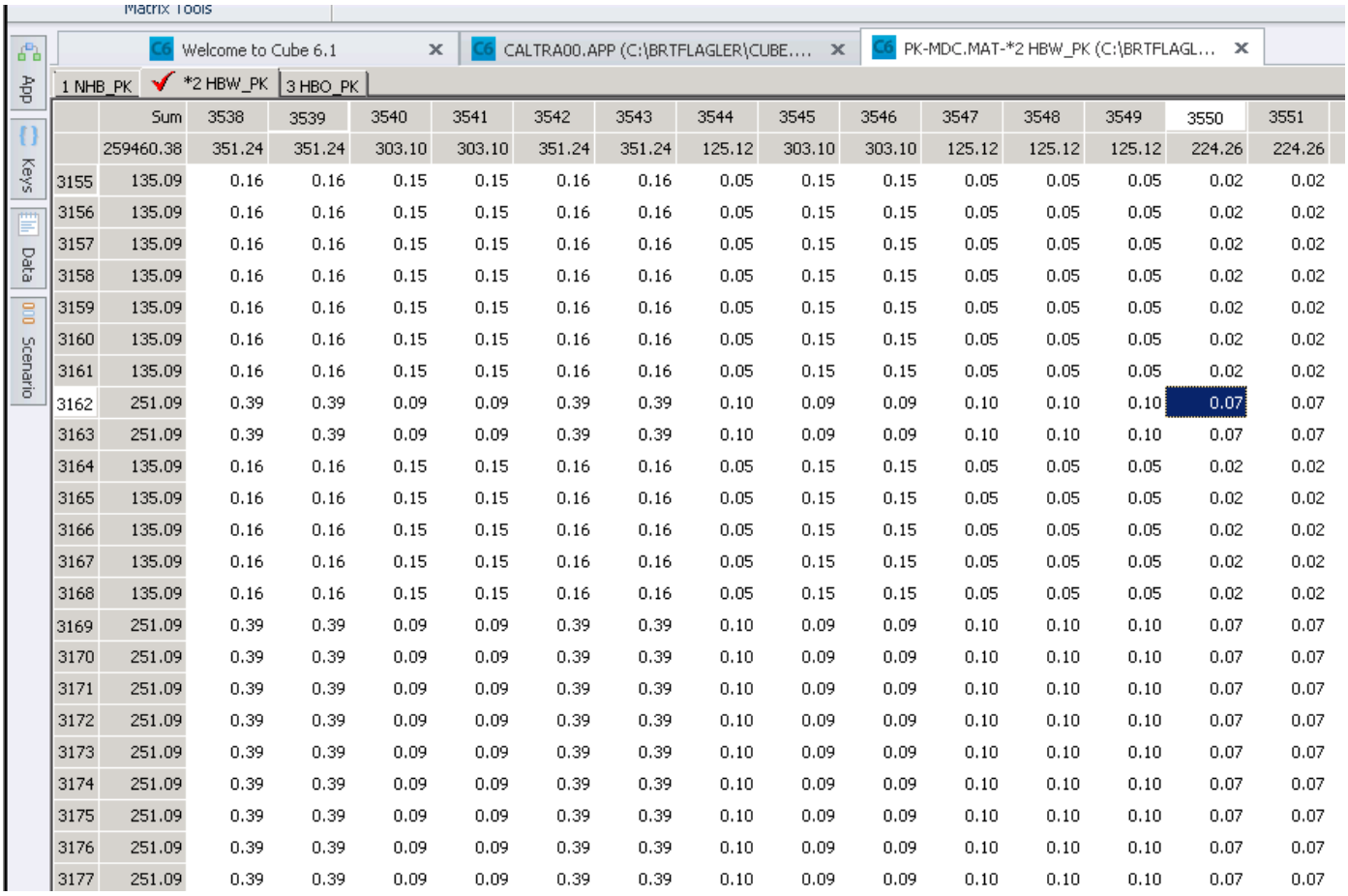


Figure 7. PTAZ 15 and Related TAZs

Considering TAZ 462 is located in PTAZ 13 and TAZ 850 is located in PTAZ 15 (these information can be found in SERPM 6.5 zonal data, or 2010 original south Florida shape file database), in the expanded matrix, a number of 0.07 trips (which is 504.20/(55*132)) should be seen in the O-D matrix between TAZ 462 and TAZ 850, in peak period and for HBW trips. TAZ 462 in MDC is TAZ 3162 in SERPM and TAZ 850 is TAZ 3550. Figure 8 shows trips between two mentioned zones (3162 to 3550).



	Sum	3538	3539	3540	3541	3542	3543	3544	3545	3546	3547	3548	3549	3550	3551
	259460.38	351.24	351.24	303.10	303.10	351.24	351.24	125.12	303.10	303.10	125.12	125.12	125.12	224.26	224.26
3155	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3156	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3157	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3158	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3159	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3160	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3161	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3162	251.09	0.39	0.39	0.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3163	251.09	0.39	0.39	0.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3164	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3165	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3166	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3167	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3168	135.09	0.16	0.16	0.15	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3169	251.09	0.39	0.39	0.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3170	251.09	0.39	0.39	0.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3171	251.09	0.39	0.39	0.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3172	251.09	0.39	0.39	0.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3173	251.09	0.39	0.39	0.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3174	251.09	0.39	0.39	0.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3175	251.09	0.39	0.39	0.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3176	251.09	0.39	0.39	0.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3177	251.09	0.39	0.39	0.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07

Figure 8. Expanded Matrix

3.4.Dividing three main classes to other trip purposes

Step 9 of this sub-model is scripted to consider other trip purposes. SERPM 6.5.4 mode choice and assignment needs trips to be classified into following purposes:

1. HBW: Home-Based Work person trips
2. HBSH: Home-Based Shopping person trips
3. HBSR: Home-Based Social Recreation person trips
4. HBSCALL: Home-Based School person trips
5. HBUNIV: Home-Based College/University person trips
6. HBO: Home-Based Other person trips
7. NHBW: Non-Home-Based Work person trips
8. NHBO: Non-Home-Based Other person trips

9. AIRPORT: Airport person trips
10. TRK4: 4-Tiered Commercial vehicle trips
11. TRKSU: Single Unit Commercial vehicle trips
12. TRKCOMB Combinations Commercial vehicle trips

Since the AirSage data is provided only in three main classes of HBW, NHB and HBO, some assumptions is required to distribute each main class into 12 mentioned subclasses. Here, it is assumed that trips are distributed to subclasses from main classes based on SERPM 6.5.4 predicted subclasses trips ratio. This means, the number of each subclass is read from base 2005 SERPM 6.5.4 model run. These trips can be seen in Table 2. Since AirSage has HBW data, there is no need for any distribution factor for this class. However, two other main classes of NHB and HBO should be distributed into their subclasses. AirSage data of HBO will be assigned to HBSH, HBSR, HBSCALL, HBUNIV and HBO, based on the factors shown in Table 2. AirSage NHB trips will be distributed into two subclasses of NHBW and NHBO based on Table 2. Four other subclasses will be used without any conversion factor.

Table 2. SERPM 6.5.4, 2005 Number of Trips for Each Subclass Purpose

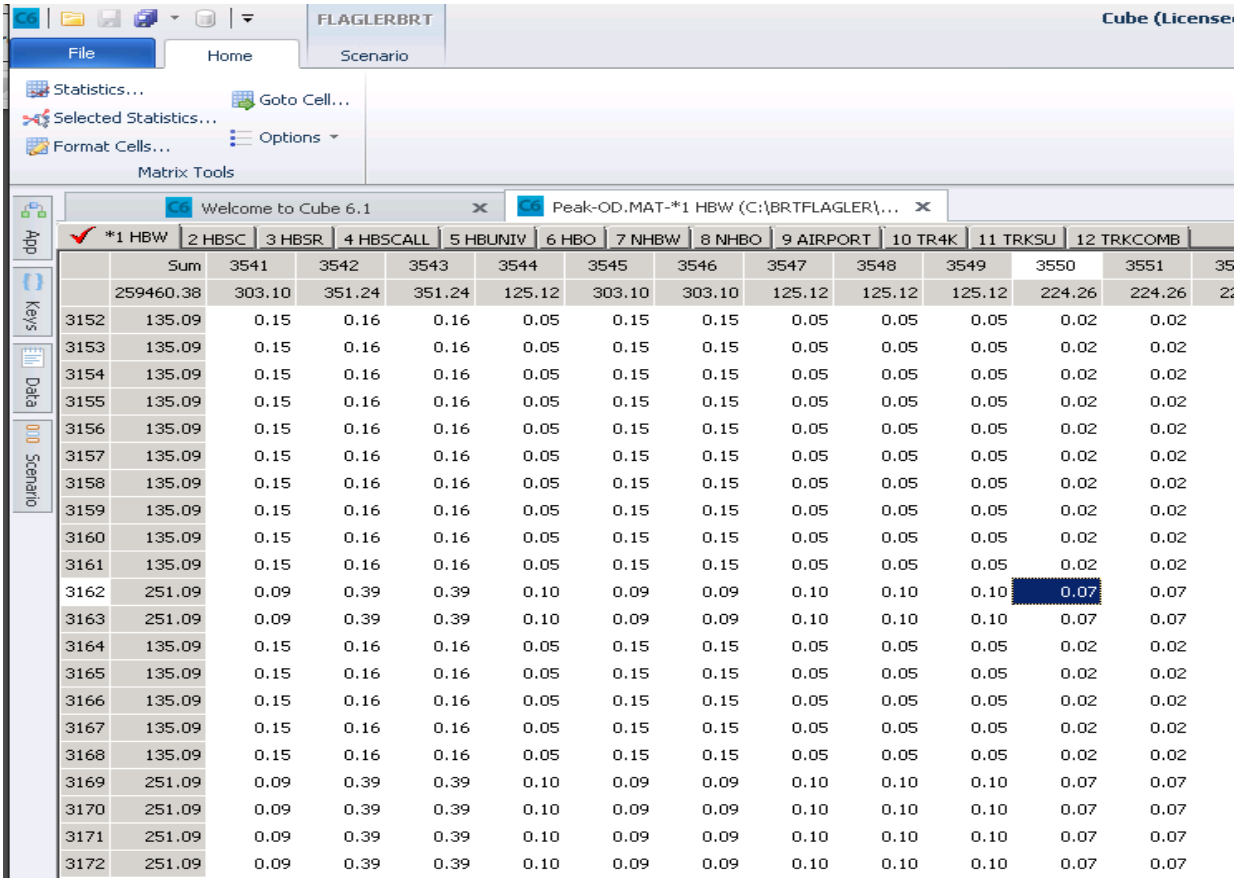
SERPM 6.5.4 (2005) Trip Tables Data					
Peak			Off-Peak		
Purpose	Number	Percent in Main Class	Purpose	Number	Percent in Main Class
HBW	2,119,366.64	1.00	HBW	1,856,874.54	1.00
HBSH	694,158.11	0.18	HBSH	1,333,866.27	0.21
HBSR	573,286.71	0.15	HBSR	1,085,012.07	0.17
HBSCALL	882,635.00	0.23	HBSCALL	806,580.00	0.13
HBUNV	314,328.52	0.08	HBUNV	287,263.65	0.05
HBO	1,439,362.63	0.37	HBO	2,726,724.59	0.44
NHBW	582,593.02	0.42	NHBW	1,107,601.19	0.33
NHBO	799,066.64	0.58	NHBO	2,235,171.00	0.67
AIRPORT	59,405.41	1.00	AIRPORT	119,731.59	1.00
TRK4	88,358.22	1.00	TRK4	140,322.89	1.00
TRKSU	218,245.73	1.00	TRKSU	262,345.55	1.00
TRKCOMB	59,602.83	1.00	TRKCOMB	106,227.43	1.00

3.5.Add trips of two other counties, truck, airport

So far detailed subclass trips of MDC for HBW, NHB and HBO trip purposes are obtained. These data should be combined with SERPM 6.5.4 data for two other counties and also Truck and Airport trips. Growths factor should be applied on two other counties and Airport and Truck data to form final Origin-Destination Matrices, because these trips are based on 2005 data. An existing historical data in Broward County was selected to find a reasonable growth factor, which can be seen in **Appendix C** of this report. Based on the analysis, a Compound Annual Growth Factor of 0.69% can be used.

$$(1 + 0.0069)^{(2016-2005)} = 1.079$$

Since HBW factor is equal to 1, there is no change for trips between the sample TAZs. Figure 9 confirms this statement.



	Sum	3541	3542	3543	3544	3545	3546	3547	3548	3549	3550	3551
	259460.38	303.10	351.24	351.24	125.12	303.10	303.10	125.12	125.12	125.12	224.26	224.26
3152	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3153	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3154	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3155	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3156	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3157	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3158	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3159	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3160	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3161	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3162	251.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3163	251.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3164	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3165	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3166	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3167	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3168	135.09	0.15	0.16	0.16	0.05	0.15	0.15	0.05	0.05	0.05	0.02	0.02
3169	251.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3170	251.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3171	251.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07
3172	251.09	0.09	0.39	0.39	0.10	0.09	0.09	0.10	0.10	0.10	0.07	0.07

Figure 9. Expanded Matrix after Adding Subclass Trip Purposes

The output of this step forms the final O-D matrices, which will be used in Mode Choice and Traffic Assignment parts of SERPM 6.5.4. The remaining of the model is exactly SERPM 6.5.4 without any other modifications.

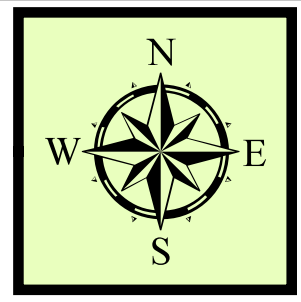
REFERENCES

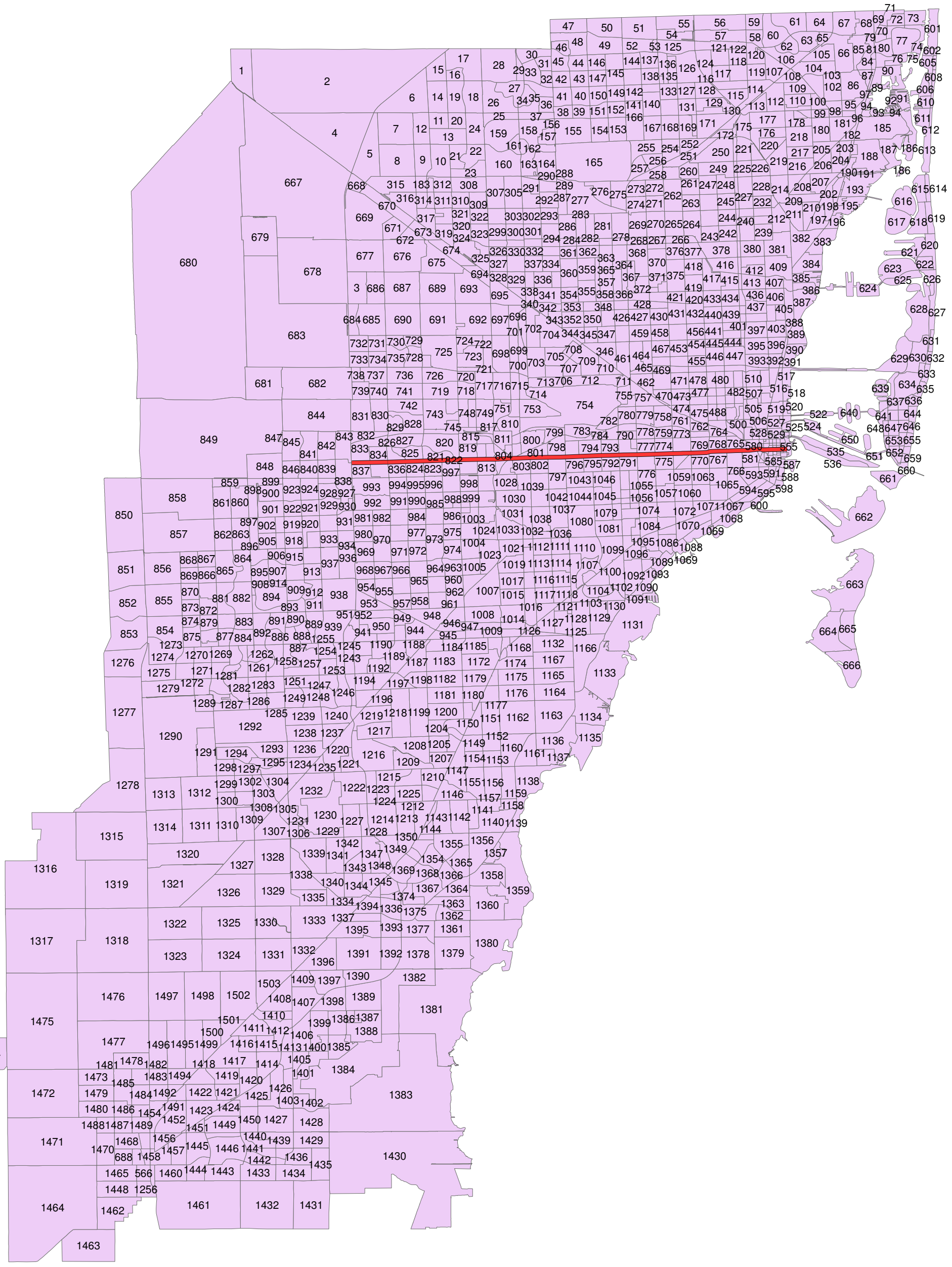
1. CITILABS. 2014. Cube Voyager Reference Guide, version 6.1.1. 2014.
2. FDOT. 2008. Southeast Regional Planning Model 6.5 (2005 and 2030 Models), Technical Report 3, Model Application Guidelines. The Corradino Group. Florida Department of Transportation, 2008.

APPENDIX A

Original TAZs and PTAZs

Miami-Dade County 2010 Regional TAZs





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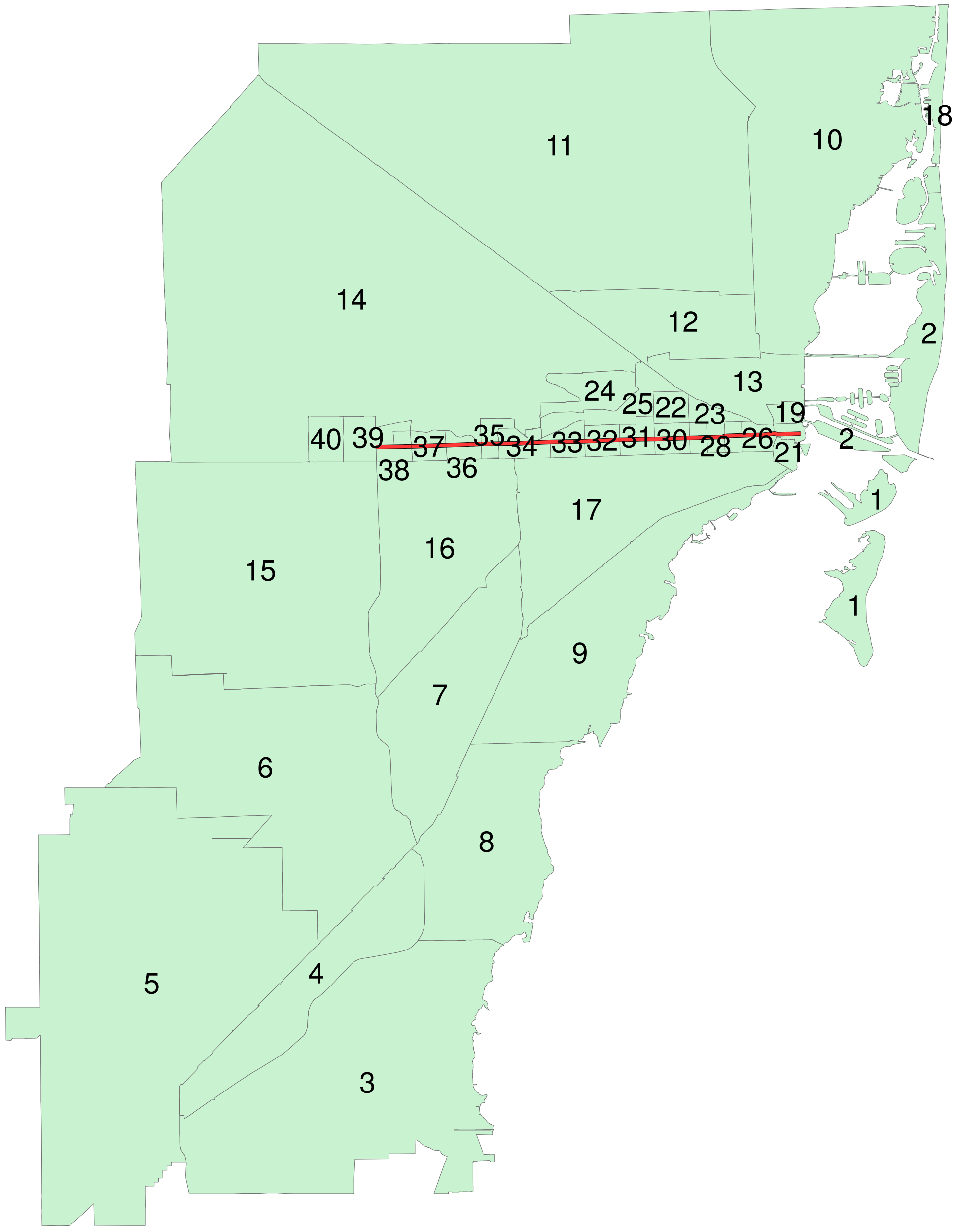
Miami-Dade County 40 Zones (PTAZs)



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APPENDIX B

Hourly Distribution Data

DATE 04/07/15

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC COUNTS
HOURLY CONTINUOUS COUNTS FINAL REPORT
APRIL 2014

COUNTY NAME: MIAMI-DADE STATION: 0188 DIRECTION: W LANE: 0
DESCRIPTION: SR-94/KENDALL DR,150' W OF SW 91ST AVE,DADE CO.
LOCATION: COUNTY 87 SECTION 001 SUBSECTION 000 MILEPOST 8.556 ROUTES: SR-94

DY	D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	DAILY
1	T	298	152	85	70	82	163	509	785	1173	1046	1184	1421	1426	1460	1703	1921	2040	2085	1735	1625	1374	1179	836	611	24963N
2	W	297	124	91	67	90	155	477	985	1027	983	1184	1283	1295	1487	1761	1956	2040	2153	1703	1537	1433	1116	954	653	24851N
3	R	312	185	106	88	88	167	518	990	1041	1070	1251	1342	1597	1541	1672	2018	2099	2189	1762	1733	1357	1191	903	623	25843N
4	F	319	199	113	92	105	168	500	947	986	1008	1265	1401	1559	1570	1680	1937	1964	2064	1719	1664	1474	1347	1091	864	26036N
5	A	545	355	225	174	141	148	257	576	753	807	1067	1289	1398	1412	1455	1488	1557	1485	1506	1475	1435	1296	936	760	22540N
6	S	555	354	216	198	123	135	199	410	407	493	729	867	1128	1203	1327	1314	1331	1299	1366	1543	1070	774	584	424	18049N
7	M	272	137	98	75	102	175	505	948	961	1047	1247	1397	1502	1469	1625	1964	2083	2112	1834	1582	1232	1009	768	556	24700N
8	T	272	145	85	62	74	167	521	951	1017	1055	1195	1508	1509	1443	1678	1955	2041	2102	1723	1652	1288	1071	765	602	24881N
9	W	255	148	87	83	91	170	473	934	1024	999	1197	1341	1516	1453	1768	1980	2100	2156	1810	1558	1378	1188	821	631	25161N
10	R	302	154	119	85	87	179	465	984	1022	1078	1218	1364	1460	1496	1697	1528	1501	2171	1794	1630	1375	1246	872	601	24428A
11	F	320	223	150	109	93	178	497	922	1064	1109	1235	1424	1555	1659	1723	1931	1940	2041	1758	1679	1374	1290	1054	842	26170N
12	A	506	308	195	145	144	146	289	578	728	874	1031	1211	1407	1528	1500	1491	1432	1435	1504	1547	1316	1300	1014	790	22419N
13	S	588	362	218	149	150	107	175	376	411	518	731	883	1082	1236	1289	1410	1354	1339	1284	1496	1057	688	579	434	17916N
14	M	203	113	67	69	78	186	514	918	993	1003	1192	1393	1506	1547	1656	2037	2002	1920	1741	1534	1220	1082	810	565	24349N
15	T	311	133	76	73	82	157	458	967	1019	1054	1202	1461	1495	1516	1723	1904	2083	2140	1824	1671	1360	1212	869	598	25388N
16	W	293	160	102	81	97	169	472	947	1027	1015	1218	1370	1565	1588	1743	1993	2160	2155	1810	1681	1372	1138	895	701	25752N
17	R																									17184B
18	F	398	220	112	116	120	190	422	662	832	964	1155	1471	1577	1669	1751	1939	1880	1912	1513	1562	1395	1298	1034	766	24958N
19	A	470	295	198	146	122	148	212	420	517	726	924	1171	1314	1394	1434	1525	1468	1468	1558	1494	1421	1267	983	777	21452N
20	S	525	320	224	187	117	133	171	369	400	512	723	876	1065	1157	1261	1150	1028	929	993	1050	935	657	510	391	15683S
21	M	241	124	78	51	90	180	474	893	957	999	1176	1329	1479	1426	1672	1924	2085	2176	1740	1483	1358	1060	783	561	24339N
22	T	272	111	77	78	81	164	504	951	972	1000	1185	1415	1524	1518	1737	1935	2115	2116	1764	1614	1345	1202	803	548	25031N
23	W	279	158	72	82	90	163	466	952	969	987	1183	1408	1558	1449	1615	1981	2088	2018	1824	1540	1317	1138	925	629	24891N
24	R	306	174	114	87	88	160	479	927	990	1024	1185	1380	1477	1532	1731	1927	2122	1997	1564	1496	1306	1332	987	699	25084N
25	F	361	194	142	87	103	183	466	878	1178	1088	1232	1349	1545	1488	1783	1847	2003	1933	1722	1687	1364	1374	1132	809	25948N
26	A	492	297	203	172	146	152	259	573	724	796	996	1266	1371	1435	1414	1515	1504	1504	1399	1544	1272	1141	969	759	21903N
27	S	493	302	213	158	119	115	214	400	436	489	713	906	1074	1152	1318	1338	1362	1413	1380	1465	1026	784	664	500	18034N
28	M	241	146	98	81	92	171	472	887	1017	1031	1121	1439	1467	1441	1656	1959	1947	2107	1785	1528	1289	1003	797	523	24298N
29	T	295	172	84	98	72	157	474	955	1002	1086	1216	1420	1470	1493	1677	1943	2078	2156	1861	1684	1408	1235	848	583	25467N
30	W	325	154	81	87	91	167	469	939	1100	1041	1219	1444	1555	1605	1739	1930	2159	2112	1872	1730	1301	1234	900	615	25869N

WEEKDAY AVERAGE = 25154 SATURDAY AVERAGE = 22079 SUNDAY AVERAGE = 17421 NUMBER OF GOOD DAYS 29 TOTAL MONTHLY COUNT = 686403
MONTHLY AVERAGE = 23610

"B"=====> BAD DAY
"N"=====> NORMAL DAY
"A"=====> ATYPICAL DAY
"H"=====> ATYPICAL DAY (HOLIDAY)
"S"=====> ATYPICAL DAY (SPECIAL EVENT)

COMMENTS:
4/15, FEDERAL TAX DAY - 4/20, EASTER SUNDAY

NOTE: ATYPICAL DAYS HAVE COUNTS THAT ARE HIGHER OR LOWER THAN NORMAL, BUT STILL REASONABLE, AND NO LOCAL SPECIAL EVENTS ARE KNOWN.

APPENDIX C

Growth Analysis

Florida Department of Transportation
Transportation Statistics Office
2014 Historical AADT Report

County: 86 - BROWARD

Site: 0027 - SR 818 /GRIFFIN RD - E OF I-95 W OF OLD GRIFFIN RD

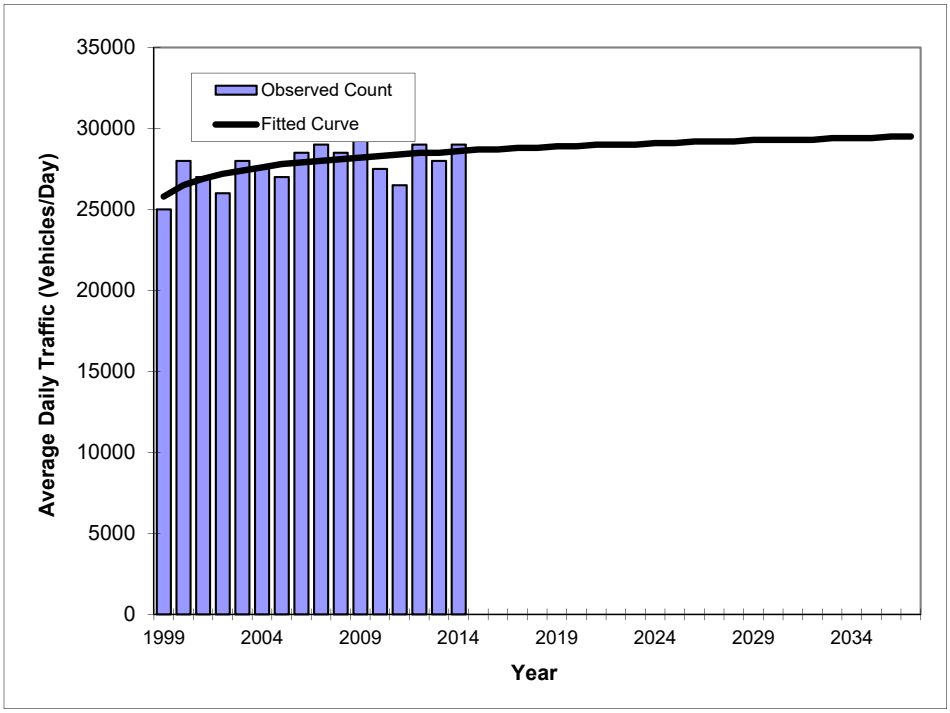
Year	AADT	Direction 1	Direction 2	*K Factor	D Factor	T Factor
2014	29000 C	E 15500	W 13500	9.00	54.20	11.70
2013	28000 C	E 15000	W 13000	9.00	53.60	11.70
2012	29000 C	E 15500	W 13500	9.00	52.20	3.40
2011	26500 C	E 13000	W 13500	9.00	52.50	3.40
2010	27500 C	E 13500	W 14000	8.35	52.69	3.40
2009	29500 C	E 15000	W 14500	8.53	53.89	4.60
2008	28500 C	E 15000	W 13500	8.81	54.16	4.60
2007	29000 C	E 15000	W 14000	8.63	55.75	5.30
2006	28500 C	E 16000	W 12500	8.40	55.34	5.40
2005	27000 C	E 13500	W 13500	8.20	51.70	4.00
2004	27500 C	E 14000	W 13500	9.10	55.30	4.00
2003	28000 C	E 14500	W 13500	8.60	57.50	4.00
2002	26000 C	E 14000	W 12000	8.70	56.40	5.60
2001	27000 C	E 14000	W 13000	9.00	60.20	4.30
2000	28000 C	E 14000	W 14000	8.90	57.80	2.30
1999	25000 C	E 12000	W 13000	9.60	62.50	5.70

AADT Flags: C = Computed; E = Manual Estimate; F = First Year Estimate
S = Second Year Estimate; T = Third Year Estimate; F = Fourth Year Estimate
V = Fifth Year Estimate; 6 = Sixth Year Estimate; X = Unknown
*K Factor: Starting with Year 2011 is StandardK, Prior years are K30 values

Alton Road --

FIN#	0
Location	1

County:	Broward (86)
Station #:	0
Highway:	Alton Road



	Traffic (ADT/AADT)	
Year	**Count***	**Trend****
1999	25000	25800
2000	28000	26500
2001	27000	26900
2002	26000	27200
2003	28000	27400
2004	27500	27600
2005	27000	27800
2006	28500	27900
2007	29000	28000
2008	28500	28100
2009	29500	28200
2010	27500	28300
2011	26500	28400
2012	29000	28500
2013	28000	28500
2014	29000	28600
2016 Opening Year Trend		
2016	N/A	28700
2027 Mid-Year Trend		
2027	N/A	29200
2037 Design Year Trend		
2037	N/A	29500
TRANPLAN Forecasts/Trends		

*Axle-Adjusted

Trend R-squared:	40.81%
Compounded Annual Historic Growth Rate:	0.69%
Compounded Growth Rate (2014 to Design Year):	0.13%
Printed:	22-Jul-16

Decaying Exponential Growth Option