MEMORANDUM

TO: DTP Technical Staff

FROM: Ronald Milone

DATE: April 8, 2013

SUBJECT: Round 8.2 Cooperative Forecasts-Based Exogenous Travel Files

This memorandum documents the development of exogenous trip file inputs to the Version 2.3 travel model on the 3,722 TAZ system. The exogenous files have been produced on a year-by-year basis and have been formulated to be consistent with Round 8.2 land activity inputs that have recently been produced[1]. The files may be obtained on the LAN from the following subdirectories:

- Airport passenger auto driver trip tables:
  I:\ateam\mod_inputs\airport\2013_3_29_Rnd82_3722TAZ_2009APS
- External trip ends and through trip tables:
  I:\ateam\mod_inputs\externals\2013_03_29_Rnd82_3722_V2.3
- Miscellaneous auto driver trip tables:
  I:\ateam\mod_inputs\misc\2013_03_29_Rnd82Based3722

The year-specific files that have been created are indicated in Table 1. The table also indicates the generic name that is assigned to each file during the application of the Version 2.3 travel model. All of the trip table files are provided in Cube Voyager binary form. The external trip-end file, however, is provided in dBase form.

Table 1 Round 8.2 Cooperative Forecast–Based Exogenous Travel File Inputs

File Description	Year-Specific Filename	Generic Filename
Commercial Vehicle, Medium Truck, Heavy Truck Through trip tables (Three tables in the file)	XXCVT<*year*>.vtt	XXCVT.VTT
Auto through trip table (one trip table in file)	XXAUT<*year*>.vtt	XXAUT.VTT
External and through zonal person/vehicle trip-ends	EXT_PsAs<*year*>.dbf	EXT_PsAs .dbf
Visitor/tourist auto driver trips (one trip table in the file)	VISI<*year*>_3722TAZ.VTT	VISI.ADR
Taxi auto driver trips (one trip table in the file)	TAXI<Year>ADR_3722TAZ.VTT	TAXI.ADR
School auto driver trips (one trip table in the file)	SCHL<*year*>_3722TAZ.VTT	SCHL.ADR
Airport Passenger auto driver trips (one trip table in the file)	APX<*year*>ADR.VTT	AIRPAX.ADR

External, through and miscellaneous files have been prepared for the years 2007 through 2040. Airport trip files have been prepared for the years 2009 through 2040. Flowcharts containing

[1] Hamid Humeida to Ron Milone, "Developing land use input files for the Version 2.3 travel model using Round 8.2 Cooperative Forecasts, the CTPP-based employment adjustment factors, and linear interpolation," April 3, 2013 ("I:\ateam\mod_inputs\lu\Rnd82_taz3722\Documentation\Devel_Rnd 8 2_lu_v23mod_v4.docx)

data processing steps are attached at the end of this memorandum (Figures 1, 2 and 3). More detail on the development of the exogenous trip files follows below.

External and Through Trips

The 3,722 TAZ system includes 47 external stations, numbered from 3676 to 3722. These represent points of travel generation for vehicles using the regional highway system from/to locations that are outside of the study area. The Version 2.3 model presently addresses external (I-X, X-I) and through (X-X) travelers using the highway system[2].

The Version 2.3 model requires two through (X-X) *trip* files, one containing a single auto trip matrix and another containing three vehicle trip tables sequenced as: 1) commercial vehicles, 2) medium trucks and 3) heavy trucks. The trip files are prepared in Cube Voyager binary format. The model also requires a file containing external and through vehicle *trip-ends* in dBase format.

TPB staff currently develops external and through trip forecasts as follows:

1) The most currently available traffic (AAWDT) counts are assembled at each external station.

2) Forecasted traffic counts at each station are estimated based on assumed, measured growth rates that are applied to existing traffic. Growth rates are applied on an external station group basis.

3) After forecasted traffic counts are established, the total counts are apportioned among vehicle types (auto, commercial vehicle, truck) and movement type (through and external) based on observed shares. Auto external trips are subsequently apportioned further by purpose based on observed shares.

The most recently assembled traffic counts at external locations are listed in Table 2. The table includes data for two years, 2007 and 2010. The data, in aggregate, indicates that traffic counts across all stations have declined by about 3% between 2007 and 2010, which reflects the slowing economic conditions that existed for the period.

The assumed traffic growth rates at external stations are shown in Table 3. These rates are generally consistent with the growth that is implied by the Round 8.2 Cooperative Forecasts. Both households and jobs are projected to grow will grow by between 1 to 2% per year in between 2010 and 2030. After 2030, the rate of job and household growth is projected to be less than 1% per year. It is also important to note that the job-to-household ratio is projected to grow, from 1.57 in 2010 to 1.64 in 2040, which implies that in-commuting from outside of the study area will continue to grow. Table 3 indicates that differential rates are specified by external station groups. The growth rates for external stations in Virginia, which exist in largely undeveloped areas, are assumed to be higher than the growth rates of the Baltimore area stations, which are located in already well developed areas.

[2] Developmental work on the Version 2.3 model is currently underway to include external transit trips as well as external highway travel.

Table 2: 2007 and 2010 Traffic Counts at External Stations

TAZ/Station #	Facility	2007 AWDT	2010 AWDT	Chg ('10-'07)	Ratio ('10/'07)
3676	VA 3 (East)	5,722	5,120	-602	-0.105
3677	US 301 (South)	11,963	11,184	-779	-0.065
3678	US 17	5,037	5,572	535	0.106
3679	VA 2	6,181	5,524	-657	-0.106
3680	I-95 (South)	86,000	85,138	-862	-0.010
3681	US 1(South)	13,313	13,978	665	0.050
3682	VA 208/606	5,776	3,936	-1,840	-0.319
3683	VA 612	3,366	3,470	104	0.031
3684	VA 3(West)	24,882	23,812	-1,070	-0.043
3685	US 15/29 (South)	27,235	25,106	-2,129	-0.078
3686	US 211	16,425	15,916	-509	-0.031
3687	I-66	34,000	33,931	-69	-0.002
3688	VA 55	781	860	79	0.101
3689	US 340	8,456	6,850	-1,606	-0.190
3690	US 17/50	12,460	10,440	-2,020	-0.162
3691	VA 7	27,466	26,594	-872	-0.032
3692	WV 51	8,052	6,771	-1,281	-0.159
3693	WV 9	19,880	15,004	-4,876	-0.245
3694	WV 45	10,651	11,733	1,082	0.102
3695	MD 34/WVA 480	7,341	7,071	-270	-0.037
3696	Alt US 40	10,249	10,040	-209	-0.020
3697	I-70 (West)	70,534	69,580	-954	-0.014
3698	US 40	5,824	5,710	-114	-0.020
3699	MD 77	5,379	4,612	-767	-0.143
3700	MD 550	2,011	1,592	-419	-0.208
3701	MD 140/PA16	8,644	8,760	116	0.013
3702	US 15 (North)	19,283	18,876	-407	-0.021
3703	MD 194 /PA194	5,346	4,850	-496	-0.093
3704	MD 97/PA 97	9,756	9,786	30	0.003
3705	MD 30 (North)/ PA 94	16,141	15,390	-751	-0.047
3706	MD 86 / PA 516	2,303	2,012	-291	-0.126
3707	MD 88	4,234	4,102	-132	-0.031
3708	MD 30 (East)	22,691	13,992	-8,699	-0.383
3709	MD 140/91	50,438	47,570	-2,868	-0.057
3710	MD 26	32,822	31,730	-1,092	-0.033
3711	I-70 (East)	84,271	88,992	4,721	0.056
3712	US 40 (East) / MD 144	42,749	40,400	-2,349	-0.055
3713	I-95 (North)	203,394	204,440	1,046	0.005
3714	I-195 /US 1 (North)	42,315	27,790	-14,525	-0.343
3715	Md 295 / B/W Pkwy	99,565	87,012	-12,553	-0.126
3716	MD 170	14,085	12,612	-1,473	-0.105
3717	MD 648	18,512	17,660	-852	-0.046
3718	MD 3 / I-97	110,612	108,992	-1,620	-0.015
3719	MD 2	38,465	43,642	5,177	0.135
3720	MD 10	54,444	52,312	-2,132	-0.039
3721	MD 710	27,895	35,172	7,277	0.261
3722	US 50 (East) / 301	66,594	74,362	7,768	0.117
Total:		1,403,543	1,359,998	-43,545	-0.031

Table 3: Annual Rates of Traffic Growth by Station Group

		Forecasting Period		
External Group	Extl. Stations	2010 to 2020	2020 to 2030	2030 to 2040
Va/WVa	3976 to 3695	2.50%	2.50%	1.50%
MD / North	3696 to 3704	1.50%	1.50%	0.50%
MD / Baltimore	3705 to 3722	1.10%	1.00%	0.50%

The processing steps for computing the external and through files are shown graphically on Figure 1. The program script *sumxx2007Trips.s* was first used to summarize through trip-ends at each external station by vehicle type (auto, commercial vehicle, medium truck, and heavy truck) based on pre-existing 2007 through trip tables. The following *Create_Extl_Template.s* step reads the through trips ends, along with a preexisting 2007 external trip file (containing 2007 traffic counts), a file containing 2010 traffic counts, and a file containing growth factors and the assumed share of internal traffic occurring at each station. The *Create_Extl_Template.s* script merges this station level data and computes probabilities for apportioning future year traffic counts among mode (auto, truck), movement type (external and through), and trip purpose. The output file also contains base year traffic counts (2007 and 2010).

The resulting probability file is read by the final script, *Ext_Thru_Trips_3722.s*. The script applies the appropriate growth factor to the AAWDT count, extracts the internal proportion of travel from the factored count (if needed), and apportions the resulting traffic figure among the primary and secondary shares developed from base year data. The script writes out year specific external trip files and through trip files, from 2007 to 2040.

The global control totals for external and through trips by highway mode and purpose are shown on Table 4, Table 5, and Table 6.

Table 4 External and Through Control Totals by Mode

Yr	AAWDT	Auto Drv Control	Truck Control	Auto XX Trip-Ends	ComVehXX Trip-End	Auto XI Adr Trip	Auto IX Adr Trip	TruckXX Trip-Ends	Truck XI Trips	Truck IX Trips
2007	1,403,543	1,163,919	119,524	78,645	5,774	563,320	515,515	66,907	26,309	26,309
2008	1,389,028	1,151,098	119,028	78,203	5,747	556,880	509,604	66,380	26,324	26,324
2009	1,374,513	1,138,278	118,531	77,762	5,719	550,439	503,692	65,853	26,339	26,339
2010	1,359,998	1,125,458	118,035	77,320	5,691	543,999	497,781	65,326	26,354	26,354
2011	1,379,945	1,142,330	119,789	78,537	5,778	552,182	505,156	66,364	26,713	26,713
2012	1,400,231	1,159,496	121,574	79,775	5,867	560,507	512,658	67,421	27,076	27,076
2013	1,420,863	1,176,960	123,389	81,036	5,958	568,978	520,289	68,498	27,446	27,446
2014	1,441,847	1,194,730	125,236	82,319	6,050	577,598	528,053	69,594	27,821	27,821
2015	1,463,189	1,212,811	127,114	83,626	6,144	586,368	535,950	70,711	28,201	28,201
2016	1,484,898	1,231,209	129,025	84,957	6,239	595,294	543,986	71,849	28,588	28,588
2017	1,506,980	1,249,931	130,969	86,312	6,337	604,376	552,161	73,007	28,981	28,981
2018	1,529,443	1,268,984	132,947	87,692	6,435	613,620	560,479	74,188	29,379	29,379
2019	1,552,295	1,288,373	134,959	89,097	6,536	623,027	568,942	75,390	29,784	29,784
2020	1,575,542	1,308,106	137,006	90,528	6,639	632,601	577,555	76,615	30,195	30,195
2021	1,598,180	1,327,386	139,007	91,940	6,740	641,962	585,949	77,822	30,592	30,592
2022	1,621,209	1,347,006	141,042	93,377	6,842	651,488	594,491	79,051	30,996	30,996
2023	1,644,636	1,366,974	143,113	94,840	6,947	661,184	603,182	80,304	31,405	31,405
2024	1,668,470	1,387,297	145,221	96,331	7,053	671,053	612,026	81,580	31,821	31,821
2025	1,692,719	1,407,983	147,365	97,849	7,161	681,098	621,027	82,880	32,243	32,243
2026	1,717,391	1,429,039	149,547	99,396	7,271	691,324	630,187	84,205	32,671	32,671
2027	1,742,495	1,450,473	151,768	100,972	7,384	701,734	639,509	85,555	33,107	33,107
2028	1,768,040	1,472,292	154,028	102,576	7,498	712,331	648,997	86,930	33,549	33,549
2029	1,794,035	1,494,504	156,328	104,211	7,614	723,120	658,655	88,332	33,998	33,998
2030	1,820,489	1,517,119	158,669	105,877	7,733	734,105	668,486	89,761	34,454	34,454
2031	1,834,803	1,529,417	159,921	106,772	7,797	740,074	673,848	90,548	34,687	34,687
2032	1,849,266	1,541,846	161,187	107,676	7,861	746,107	679,267	91,344	34,921	34,921
2033	1,863,881	1,554,410	162,466	108,591	7,927	752,206	684,744	92,149	35,158	35,158
2034	1,878,649	1,567,110	163,758	109,516	7,993	758,371	690,280	92,963	35,397	35,397
2035	1,893,573	1,579,947	165,064	110,451	8,060	764,602	695,875	93,787	35,639	35,639
2036	1,908,654	1,592,923	166,384	111,397	8,127	770,902	701,531	94,620	35,882	35,882
2037	1,923,896	1,606,040	167,718	112,353	8,195	777,270	707,247	95,463	36,128	36,128
2038	1,939,298	1,619,300	169,066	113,320	8,264	783,707	713,025	96,315	36,375	36,375
2039	1,954,865	1,632,705	170,428	114,298	8,334	790,215	718,865	97,178	36,625	36,625
2040	1,970,598	1,646,256	171,805	115,287	8,405	796,794	724,769	98,050	36,878	36,878

Table 5 External-to-Internal Highway Trips by Mode

	HBWXI	HBSXI	HBOXI	NHBXI	ComvXI	MedTkXI	HeavyTkXI	AutoXI	TruckXI
Yr	AutoDrvs	Auto Drvs	AutoDrvs	AutoDrvs	AutoDrv			Drv Totl	Total
2007	274,371	48,114	137,684	64,537	38,616	11,937	14,372	563,320	26,309
2008	270,694	47,772	136,286	63,983	38,148	11,973	14,351	556,880	26,324
2009	267,017	47,430	134,888	63,429	37,679	12,010	14,330	550,439	26,339
2010	263,340	47,087	133,490	62,874	37,210	12,046	14,309	543,999	26,354
2011	267,282	47,785	135,608	63,703	37,806	12,202	14,510	552,182	26,713
2012	271,292	48,494	137,765	64,544	38,414	12,361	14,715	560,507	27,076
2013	275,372	49,216	139,962	65,398	39,033	12,522	14,924	568,978	27,446
2014	279,523	49,950	142,200	66,264	39,663	12,685	15,136	577,598	27,821
2015	283,746	50,697	144,478	67,144	40,305	12,851	15,351	586,368	28,201
2016	288,043	51,457	146,800	68,037	40,959	13,019	15,569	595,294	28,588
2017	292,416	52,230	149,164	68,944	41,626	13,189	15,791	604,376	28,981
2018	296,865	53,017	151,572	69,864	42,305	13,362	16,017	613,620	29,379
2019	301,392	53,817	154,025	70,798	42,996	13,538	16,247	623,027	29,784
2020	305,999	54,632	156,524	71,747	43,701	13,716	16,480	632,601	30,195
2021	310,503	55,425	158,986	72,654	44,396	13,886	16,706	641,962	30,592
2022	315,087	56,232	161,494	73,573	45,104	14,059	16,936	651,488	30,996
2023	319,751	57,054	164,049	74,507	45,826	14,234	17,170	661,184	31,405
2024	324,498	57,890	166,652	75,455	46,561	14,412	17,408	671,053	31,821
2025	329,329	58,740	169,304	76,417	47,311	14,593	17,650	681,098	32,243
2026	334,246	59,606	172,006	77,394	48,074	14,776	17,896	691,324	32,671
2027	339,250	60,487	174,759	78,386	48,853	14,961	18,145	701,734	33,107
2028	344,344	61,384	177,565	79,393	49,646	15,150	18,399	712,331	33,549
2029	349,530	62,298	180,425	80,416	50,455	15,341	18,657	723,120	33,998
2030	354,809	63,227	183,338	81,454	51,279	15,535	18,919	734,105	34,454
2031	357,656	63,739	184,940	82,009	51,733	15,633	19,053	740,074	34,687
2032	360,533	64,256	186,561	82,568	52,193	15,732	19,189	746,107	34,921
2033	363,440	64,778	188,199	83,133	52,658	15,832	19,326	752,206	35,158
2034	366,379	65,306	189,857	83,702	53,129	15,933	19,465	758,371	35,397
2035	369,350	65,840	191,533	84,277	53,604	16,034	19,604	764,602	35,639
2036	372,352	66,380	193,229	84,857	54,086	16,137	19,745	770,902	35,882
2037	375,386	66,925	194,945	85,443	54,573	16,240	19,888	777,270	36,128
2038	378,454	67,477	196,680	86,033	55,066	16,344	20,031	783,707	36,375
2039	381,554	68,034	198,435	86,629	55,564	16,449	20,176	790,215	36,625
2040	384,689	68,598	200,211	87,231	56,069	16,555	20,323	796,794	36,878

Table 6 Internal-to-External Highway Trips by Mode

	HBWIX	HBSIX	HBOIX	NHBIX	ComvIX	MedTkIX	HeavyTkIX	AutoIX	TruckIX
Yr	AutoDrvs	Auto Drvs	AutoDrvs	AutoDrvs	AutoDrvs			Drv Totl	Total
2007	171,272	45,992	195,106	64,527	38,617	11,937	14,372	515,515	26,309
2008	169,472	44,783	193,226	63,973	38,148	11,973	14,351	509,604	26,324
2009	167,672	43,575	191,346	63,419	37,679	12,010	14,330	503,692	26,339
2010	165,873	42,366	189,466	62,864	37,210	12,046	14,309	497,781	26,354
2011	168,187	42,992	192,476	63,693	37,806	12,202	14,510	505,156	26,713
2012	170,539	43,628	195,541	64,534	38,414	12,361	14,715	512,658	27,076
2013	172,929	44,275	198,663	65,388	39,033	12,522	14,924	520,289	27,446
2014	175,358	44,933	201,843	66,254	39,663	12,685	15,136	528,053	27,821
2015	177,826	45,603	205,082	67,134	40,305	12,851	15,351	535,950	28,201
2016	180,334	46,283	208,380	68,026	40,959	13,019	15,569	543,986	28,588
2017	182,884	46,976	211,741	68,933	41,626	13,189	15,791	552,161	28,981
2018	185,475	47,680	215,164	69,853	42,305	13,362	16,017	560,479	29,379
2019	188,109	48,397	218,651	70,787	42,997	13,538	16,247	568,942	29,784
2020	190,785	49,126	222,204	71,736	43,701	13,716	16,480	577,555	30,195
2021	193,369	49,838	225,702	72,642	44,397	13,886	16,706	585,949	30,592
2022	195,994	50,562	229,266	73,562	45,105	14,059	16,936	594,491	30,996
2023	198,662	51,299	232,896	74,496	45,827	14,234	17,170	603,182	31,405
2024	201,374	52,049	236,595	75,443	46,562	14,412	17,408	612,026	31,821
2025	204,131	52,812	240,365	76,406	47,312	14,593	17,650	621,027	32,243
2026	206,933	53,588	244,205	77,382	48,075	14,776	17,896	630,187	32,671
2027	209,782	54,377	248,119	78,374	48,854	14,961	18,145	639,509	33,107
2028	212,678	55,181	252,108	79,381	49,647	15,150	18,399	648,997	33,549
2029	215,622	55,998	256,173	80,403	50,456	15,341	18,657	658,655	33,998
2030	218,616	56,830	260,316	81,442	51,280	15,535	18,919	668,486	34,454
2031	220,235	57,270	262,609	81,996	51,735	15,633	19,053	673,848	34,687
2032	221,870	57,715	264,929	82,556	52,194	15,732	19,189	679,267	34,921
2033	223,522	58,164	267,275	83,120	52,660	15,832	19,326	684,744	35,158
2034	225,190	58,618	269,649	83,690	53,130	15,933	19,465	690,280	35,397
2035	226,875	59,077	272,050	84,264	53,606	16,034	19,604	695,875	35,639
2036	228,576	59,541	274,478	84,844	54,088	16,137	19,745	701,531	35,882
2037	230,295	60,009	276,935	85,430	54,575	16,240	19,888	707,247	36,128
2038	232,030	60,482	279,420	86,020	55,068	16,344	20,031	713,025	36,375
2039	233,783	60,960	281,935	86,616	55,567	16,449	20,176	718,865	36,625
2040	235,554	61,444	284,478	87,218	56,071	16,555	20,323	724,769	36,878

Miscellaneous Trips

The Version 2.3 model uses three non-modeled auto driver trip tables (collectively known as "miscellaneous trips") which represent visitor/tourist trips, taxi trips, and school trips. Three separate files are prepared, each with 1 trip table.

A flowchart showing the development of miscellaneous trip tables is shown in Figure 2 The forecasted trips were produced by applying global growth factors to pre-existing 2007 trip tables. The growth factors were derived from the Round 8.2 land activity. Taxi and visitor trips were factored based on yearly employment growth while school trips were factored based on household growth. The factoring of trip tables was done using a script named Grow_Misc_*3722_Rnd82.s*.

The resulting files and associated control totals are shown in Table 7.

Table 7 Miscellaneous Auto Driver Trip Table Totals by Year

Taxi Auto Drivers		Visitor/Tourist Auto Drivers		School Auto Drivers	
Filename(year)	Trip Total	Filename(year)	Trip Total	Filename(year)	Trip Total
TAXI2007ADR.VTT	122,518	VISI2007ADR.VTT	249,014	SCHL2007ADR.VTT	280,649
TAXI2008ADR.VTT	124,086	VISI2008ADR.VTT	252,201	SCHL2008ADR.VTT	283,623
TAXI2009ADR.VTT	125,655	VISI2009ADR.VTT	255,389	SCHL2009ADR.VTT	286,570
TAXI2010ADR.VTT	127,223	VISI2010ADR.VTT	258,576	SCHL2010ADR.VTT	289,545
TAXI2011ADR.VTT	128,877	VISI2011ADR.VTT	261,938	SCHL2011ADR.VTT	293,643
TAXI2012ADR.VTT	130,531	VISI2012ADR.VTT	265,300	SCHL2012ADR.VTT	297,740
TAXI2013ADR.VTT	132,185	VISI2013ADR.VTT	268,661	SCHL2013ADR.VTT	301,866
TAXI2014ADR.VTT	133,851	VISI2014ADR.VTT	272,048	SCHL2014ADR.VTT	305,991
TAXI2015ADR.VTT	135,505	VISI2015ADR.VTT	275,410	SCHL2015ADR.VTT	310,089
TAXI2016ADR.VTT	137,637	VISI2016ADR.VTT	279,742	SCHL2016ADR.VTT	313,849
TAXI2017ADR.VTT	139,781	VISI2017ADR.VTT	284,100	SCHL2017ADR.VTT	317,610
TAXI2018ADR.VTT	141,925	VISI2018ADR.VTT	288,458	SCHL2018ADR.VTT	321,399
TAXI2019ADR.VTT	144,069	VISI2019ADR.VTT	292,816	SCHL2019ADR.VTT	325,159
TAXI2020ADR.VTT	146,213	VISI2020ADR.VTT	297,173	SCHL2020ADR.VTT	328,920
TAXI2021ADR.VTT	148,112	VISI2021ADR.VTT	301,033	SCHL2021ADR.VTT	332,681
TAXI2022ADR.VTT	150,011	VISI2022ADR.VTT	304,893	SCHL2022ADR.VTT	336,470
TAXI2023ADR.VTT	151,923	VISI2023ADR.VTT	308,777	SCHL2023ADR.VTT	340,230
TAXI2024ADR.VTT	153,822	VISI2024ADR.VTT	312,637	SCHL2024ADR.VTT	343,991
TAXI2025ADR.VTT	155,721	VISI2025ADR.VTT	316,497	SCHL2025ADR.VTT	347,752
TAXI2026ADR.VTT	157,448	VISI2026ADR.VTT	320,008	SCHL2026ADR.VTT	351,007
TAXI2027ADR.VTT	159,163	VISI2027ADR.VTT	323,494	SCHL2027ADR.VTT	354,263
TAXI2028ADR.VTT	160,891	VISI2028ADR.VTT	327,005	SCHL2028ADR.VTT	357,490
TAXI2029ADR.VTT	162,618	VISI2029ADR.VTT	330,516	SCHL2029ADR.VTT	360,718
TAXI2030ADR.VTT	164,334	VISI2030ADR.VTT	334,003	SCHL2030ADR.VTT	363,973
TAXI2031ADR.VTT	165,828	VISI2031ADR.VTT	337,041	SCHL2031ADR.VTT	366,864
TAXI2032ADR.VTT	167,311	VISI2032ADR.VTT	340,054	SCHL2032ADR.VTT	369,726
TAXI2033ADR.VTT	168,806	VISI2033ADR.VTT	343,092	SCHL2033ADR.VTT	372,617
TAXI2034ADR.VTT	170,300	VISI2034ADR.VTT	346,130	SCHL2034ADR.VTT	375,508
TAXI2035ADR.VTT	171,783	VISI2035ADR.VTT	349,143	SCHL2035ADR.VTT	378,398
TAXI2036ADR.VTT	173,290	VISI2036ADR.VTT	352,205	SCHL2036ADR.VTT	380,980
TAXI2037ADR.VTT	174,797	VISI2037ADR.VTT	355,268	SCHL2037ADR.VTT	383,562
TAXI2038ADR.VTT	176,304	VISI2038ADR.VTT	358,331	SCHL2038ADR.VTT	386,144
TAXI2039ADR.VTT	177,798	VISI2039ADR.VTT	361,369	SCHL2039ADR.VTT	388,726
TAXI2040ADR.VTT	179,305	VISI2040ADR.VTT	364,432	SCHL2040ADR.VTT	391,308

Airport Trips

The airport passenger auto driver trip tables were prepared by obtaining observed travel patterns from a recent air passenger survey and applying a "Fratar" procedure to develop future-year trip tables. A flowchart showing the development of air passenger auto driver trip tables is shown in Figure 3.

The process began with trip tables that were built from the COG 2009 Regional Air Passenger Survey. Surveyed home-based and non-home-based trip tables were used as a "seed" table upon

which future year trips were developed. An automated Fratar procedure was used to develop forecasted trip tables on a year-by year basis. The Fratar process was applied at the air-passenger district level due to survey sampling limitations. Home-end origins were factored based on projected Round8.2-based household growth. Non-home-origins were factored on the basis of Round 8.2-based employment forecasts. The airport-end factoring was based on FAA enplanement forecasts at each airport. The Fratar process was controlled to match the airport end (enplanement-based) growth. The district level trips resulting from the Fratar process were ultimately 'split' to the TAZ level using household- or job-based proration.

A Cube Voyager script named *AirFrat_2009_2040.s* was used to create air passenger trip tables for the standard forecasting years, and subsequently, a script named *Interpolate_Airport_Trips.s* was used to interpolate 'off-year' trip tables. The resulting trip files and the associated control totals by airport are shown in Table 8.

Source file note: The airport enplanement forecasts and the airport survey file were originally transmitted to me from Abdul Mohammed in three separate emails on March 29, 2013. The emails and, thus far, undocumented data items are located on the LAN, at:

I:\ateam\mod_inputs\airport\2013_3_29_Rnd82_3722TAZ_2009APS\Abduls_Documentation

Table 8 Airport Daily Auto Driver Trip Table Totals (based on Round 8.2 Cooperative Forecasts and the 2009 Air Passenger Survey)

	Airport			
Filename (Year)	National	Dulles	BWI	TOTAL
APX2009ADR.VTT	25,647	23,278	18,428	67,305
APX2010ADR.VTT	26,434	23,813	19,304	69,497
APX2011ADR.VTT	26,988	23,752	19,302	69,988
APX2012ADR.VTT	27,545	23,692	19,299	70,482
APX2013ADR.VTT	28,103	23,629	19,295	70,973
APX2014ADR.VTT	28,661	23,568	19,292	71,467
APX2015ADR.VTT	29,214	23,508	19,290	71,959
APX2016ADR.VTT	29,512	24,368	19,892	73,718
APX2017ADR.VTT	29,810	25,230	20,496	75,481
APX2018ADR.VTT	30,107	26,094	21,102	77,247
APX2019ADR.VTT	30,406	26,955	21,705	79,010
APX2020ADR.VTT	30,704	27,816	22,308	80,769
APX2021ADR.VTT	31,015	28,679	22,978	82,613
APX2022ADR.VTT	31,329	29,543	23,649	84,461
APX2023ADR.VTT	31,648	30,410	24,321	86,317
APX2024ADR.VTT	31,961	31,274	24,993	88,164
APX2025ADR.VTT	32,273	32,138	25,663	90,009
APX2026ADR.VTT	32,600	33,140	26,435	92,109
APX2027ADR.VTT	32,930	34,143	27,208	94,214
APX2028ADR.VTT	33,264	35,148	27,980	96,325
APX2029ADR.VTT	33,593	36,151	28,754	98,430
APX2030ADR.VTT	33,921	37,153	29,526	100,530
APX2031ADR.VTT	34,265	38,321	30,414	102,929
APX2032ADR.VTT	34,612	39,488	31,304	105,332
APX2033ADR.VTT	34,963	40,657	32,193	107,740
APX2034ADR.VTT	35,310	41,825	33,083	110,143
APX2035ADR.VTT	35,654	42,992	33,971	112,541
APX2036ADR.VTT	36,015	44,351	34,995	115,284
APX2037ADR.VTT	36,379	45,711	36,020	118,031
APX2038ADR.VTT	36,749	47,072	37,044	120,784
APX2039ADR.VTT	37,113	48,432	38,068	123,531
APX2040ADR.VTT	37,474	49,791	39,092	126,273

Figure 1 External and Through Trip Processing

TITLE:	**Version 2.3 Travel Model on the 3,722 TAZ System**
COMPANY: MWCOG	CREATOR: RJM/MS
DATE: 03/29/2013	PG: 1 OF 3 PGS
FILENAME:	V2.3_Misc_Ext_Airport_LU_TPBTAZ3722_Rnd8.2.vsd

Subdirectory: I:\ateam\mod_inputs\externals\2013-03-29_Rnd82_3722_V2.3

Round 8.2 Based External and Through Travel Forecasts Development

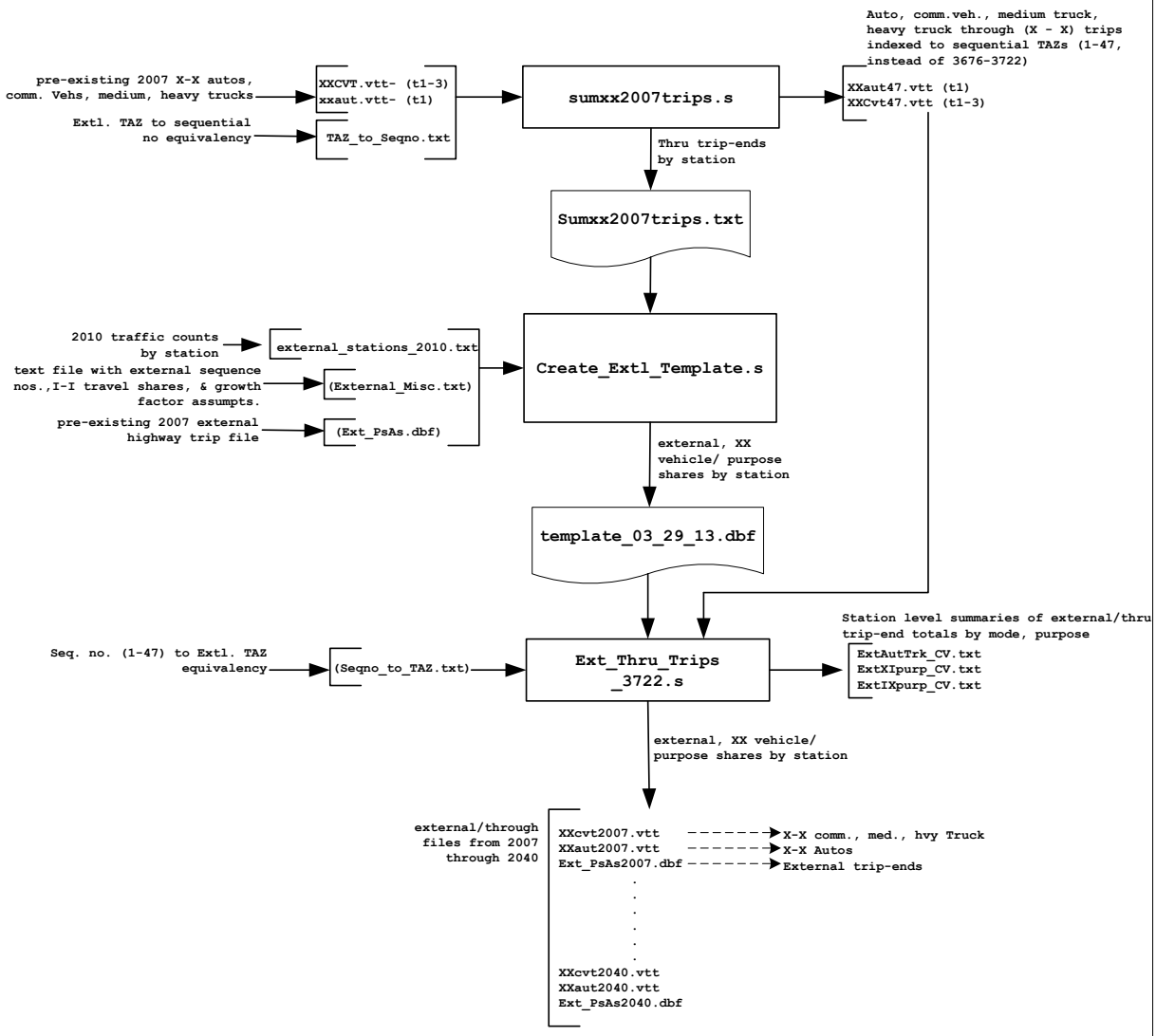

Figure 2 Miscellaneous Trip Processing

TITLE:	**Version 2.3 Travel Model on the 3,722 TAZ System**
COMPANY: MWCOG	CREATOR: RJM/MS
DATE: 03/29/2013	PG: 2 OF 3 PGS
FILENAME:	V2.3_Misc_Ext_Airport_LU_TPBTAZ3722_Rnd8.2.vsd

Subdirectory: I:\ateam\mod_inputs\misc\2013_03_29_Rnd82Based3722

Expand 2,191 Miscellaneous Trips off the shelf to 3,722 TAZ system based on RND 8.2 LU Growth

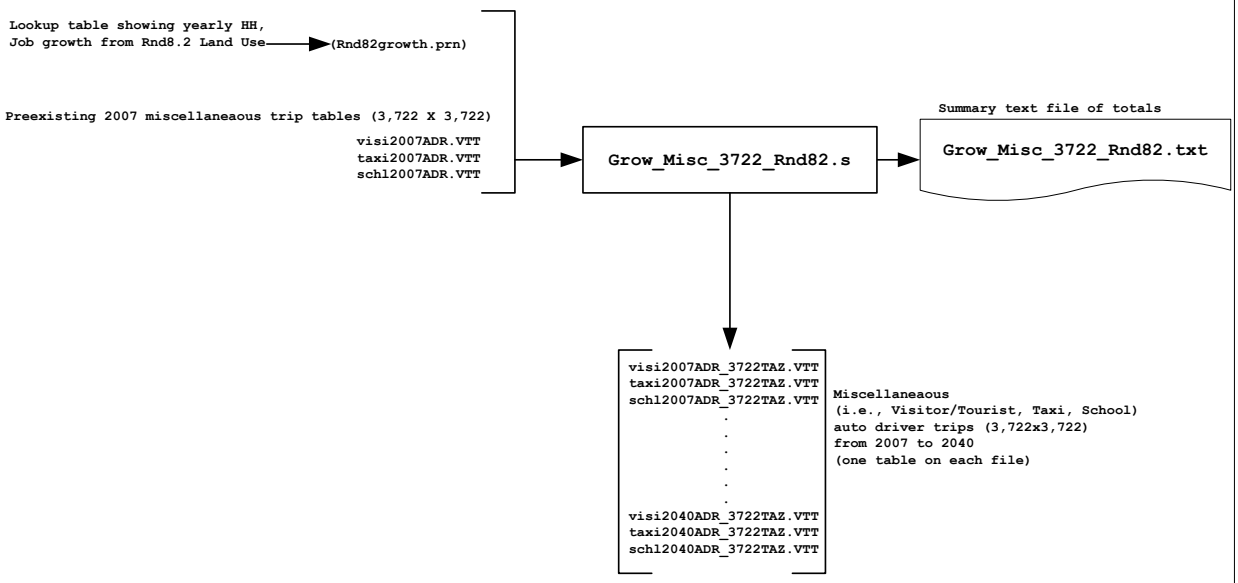

Figure 3 Airport Trip Processing

TITLE:	**Version 2.3 Travel Model on the 3,722 TAZ System**
COMPANY: MWCOG	CREATOR: RJM/MS
DATE: 03/29/2013	PG: 3 OF 3 PGS
FILENAME:	V2.3_Misc_Ext_Airport_LU_TPBTAZ3722_Rnd8.2.vsd

Subdirectory: I:\ateam\mod_inputs\airport\2013_3_29_Rnd82_3722TAZ_2009APS

Round 8.2 Based Airport Passenger Auto Driver Trip Development