National Capital Region Transportation Planning Board
Metropolitan Washington Council of Governments

Calibration Report
for the TPB Travel Forecasting Model,
Version 2.3.36,
on the 3,722-Zone Area System

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| Transportation planning at the regional level in the Washington area is coordinated by the National Capital Region Transportation Planning Board (TPB), the federally designated Metropolitan Planning Organization (MPO) for the region. The TPB is staffed by the Department of Transportation Planning (DTP) at the Metropolitan Washington Council of Governments (COG). COG is an independent, nonprofit association comprised of elected officials from 21 local governments, members of the Maryland and Virginia state legislatures, and members of the U.S. Congress. |

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Abstract: This report describes the calibration of a regional travel demand forecasting model, known as the TPB Version 2.3 Travel Model, which has been constructed for use in the Washington, D.C. region. This report describes build 36 of the Version 2.3 Travel Model, also known as Version 2.3.36. The Version 2.3 Travel Model is distinguished from prior TPB travel models in that it has been developed over a new 3,722 transportation analysis zone (TAZ) system, and it has been calibrated and validated with several sources of recently collected travel data, including the COG/TPB 2007/08 Household Travel Survey and several on-board transit surveys.   The TPB Travel Forecasting Subcommittee provided oversight for the Version 2.3 Model development effort.

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Chapter 1 Introduction

This report documents the calibration of the National Capital Region Transportation Planning Board (TPB) Version 2.3 Travel Model. This report is to be used in conjunction with the TPB Version 2.3 Travel Model user's guide, which is referenced at various points in this report. The Version 2.3 Travel Model became the adopted regional travel model for the for the Washington, D.C. area on November 16, 2011, when the TPB approved the Air Quality Conformity Determination of the 2011 Financially Constrained Long-Range Transportation Plan (CLRP), since that analysis was done using the new travel model.

Transportation planning at the regional level in the Washington area is coordinated by the National Capital Region Transportation Planning Board (TPB), the federally designated Metropolitan Planning Organization (MPO) for the region. The TPB is staffed by the Department of Transportation Planning (DTP) at the Metropolitan Washington Council of Governments (COG). COG is an independent, nonprofit association comprised of elected officials from 21 local governments, members of the Maryland and Virginia state legislatures, and members of the U.S. Congress. The TPB coordinates transportation planning among federal, state, and local transportation agencies in the region. TPB staff maintains a travel forecasting capability that is used to support regional, corridor, and local transportation planning needs. The Models Development work activity in the TPB's Unified Planning Work Program (element 4.C in the FY 2012 UPWP) is established to maintain and refine the TPB's travel forecasting methods and practice on a continuing basis.

The Version 2.3 Travel Model is similar to the TPB's previous model, Version 2.2, in that it is a trip-based model incorporating the standard "four-step," trip-based process applied by most MPOs. However, the Version 2.3 model is different from Version 2.2 in two key respects. First, Version 2.3 operates on a more detailed zone system consisting of 3,722 Transportation Analysis Zones (TAZs). This represents an almost doubling of internal TAZs that are currently used by the Version 2.2 model. The increase in TAZs will allow for greater sensitivity to land development patterns, particularly for areas of intense land development. Second, the Version 2.3 model has also been calibrated with an array of newly collected travel survey data. The primary data source supporting the Version 2.3 calibration is the COG/TPB 2007/08 Household Travel Survey. The previous regional travel survey supporting the existing Version 2.2 model was conducted in 1994. Version 2.3 also includes several additional technical refinements which are described in greater detail below.

The oversight body of the TPB's Models Development program is the Travel Forecasting Subcommittee (TFS), a subcommittee of the Transportation Planning Board's Technical Committee. The TFS is comprised of representatives from state and local transportation agencies, local transportation consultants, and interested citizens. As many TFS members are active users of the regional model, the subcommittee has been engaged in all facets of the Version 2.3 development process on a bi-monthly basis during the past two years.

The remainder of this chapter briefly describes background on the data that was prepared for the Version 2.3 calibration process. It also describes technical features of the model that were not considered in the

TPB's previous Version 2.2 model. Chapter 2 describes some of the basic inputs to the travel model.   The remainder of this report addresses the specific calibration work undertaken for each step of the model chain (Chapters 3 to 8). Validation summaries are presented in Chapter 9.   The report also contains an appendix section which includes detailed calibration summaries.

1.1 Development history of the Version 2.3 travel model

The TPB's previously adopted travel model, Version 2.2, was released on March 1, 2008.[1] The Version 2.2 travel model was developed on the 2,191-TAZ area system and most of its sub-models were estimated/calibrated with data from the COG/TPB 1994 Household Travel Survey.   At the time Version 2.2 was released, a parallel effort was also underway to combine a nested logit mode choice model and revised truck models into the Version 2.2 framework. This development effort proved to be viable and resulted in a release of what was then called the "draft Version 2.3 travel model" in June of 2008. The draft Version 2.3 model, like Version 2.2, was developed on the 2,191-TAZ area system.

The draft Version 2.3 model was not brought into production given that two related events were in motion during 2008. First, a new round of travel data collection was underway, including a major regional household travel survey (2007/08 HTS) and a series of transit on-board surveys. Second, a new TAZ system was in development. The new zone system was envisioned to be developed over the same geographic area as the 2,191-TAZ system, but with smaller average zone sizes.   TPB staff ultimately decided that the Version 2.3 travel model should not become the approved regional travel model until it incorporated the new zone system and the new data from the 2007/2008 Household Travel Survey.

The last two to three years have been spent compiling and cleaning new survey data, preparing calibration files based on the new 3,722 TAZ system, and estimating/calibrating the models that make up the regional travel model.   This report documents the culmination of the Version 2.3 model calibration effort. Each minor change that occurs to the model, e.g., a change in a script or a batch file, is known as a new "build" of the travel model. This documentation is about build 36 of the Version 2.3 Travel Model, also known as Version 2.3.36. Note that the most recent Air Quality Conformity (AQC) Determination done by TPB was done with Version 2.3.33, however the differences between Version 2.3.33 and Version 2.3.36 can be viewed as "cosmetic," since they do not affect the estimates of VMT or transit person trips coming out of the model. These recent updates to the model are described in chapter 1 of the user's guide.

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[1] Ronald Milone et al., *TPB Travel Forecasting Model, Version 2.2: Specification, Validation, and User's Guide* (Washington, D.C.: Metropolitan Washington Council of Governments, National Capital Region Transportation Planning Board, March 1, 2008).

1.2 Calibration Data

1.2.1 2007/2008 COG/TPB Household Travel Survey

The COG/TPB 2007/08 Household Travel Survey (HTS) served as the primary data source for estimation and calibration of the Version 2.3 model. The survey included a sample of 11,400 households drawn from all 22 jurisdictions comprising the Version 2.3 modeled area (See Figure 1). The 2007/08 HTS survey yielded approximately 88,000 un-weighted trip records occurring on weekdays.[2] The previous regional household travel survey, conducted in the spring and fall of 1994, included a 4,800-household sample drawn from a subset of jurisdictions in the modeled region (13 of the 22).

The 2007/08 HTS was not conducted during a specific season of the year, but rather was collected on a continuing basis over a 15-month period, from February 2007 through May 2008.   As some of the sampled travel data were collected on federal holidays, staff decided to remove all holiday-related data from the final calibration file to ensure that the data reflected truly normal weekday conditions.[3] The removing of holiday-related data reduced the household sample by about 300 households and necessitated the reweighting of the household and trip files.

TPB staff spent several months during the fall of 2010 checking the geo-coding, logic, and internal consistency of the household travel data, and summarizing the data by purposes, modes, political geography, and by time of day. Some of the key trip information is presented in Table 1.

1.2.2 Land activity

The provision of zonal land activity posed a significant challenge as no such data was readily available for the new TAZ system during the early stages of the calibration effort (spring of 2010).   At that point in time, the adopted land activity projections (Round 7.2a Cooperative Forecasts) were developed for the 2,191 TAZ-system only. Consequently, TPB staff assembled American Community Survey (ACS) and proprietary employment inventory data to develop what was referred to as the 2007 "Pseudo Round 8.0" land use for the 3,722-TAZ system. The 2007 land activity totals are shown on Table 2.

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[2] National Capital Region Transportation Planning Board, Metropolitan Washington Council of Governments, *2007/2008 TPB Household Travel Survey: Technical Documentation*, Draft report (Washington, D.C.: National Capital Region Transportation Planning Board, Metropolitan Washington Council of Governments, August 27, 2010).

[3] Ronald Milone et al., *FY-2010 Development Program for TPB Travel Forecasting Models: DRAFT* (Washington, D.C.: National Capital Region Transportation Planning Board, June 30, 2010), sec. 2.4.4.

Table 1 2007/2008 HTS Trip Summary by Purpose and Mode

	HBW	HBS	HBO	NHW	NHO	Total
Auto Driver	2,786,976	1,934,278	3,808,912	1,326,060	1,904,312	11,760,538
Auto Passenger	162,607	877,567	2,396,515	145,469	947,355	4,529,513
Subtotal Auto Person	2,949,583	2,811,845	6,205,427	1,471,529	2,851,667	16,290,051
Average Auto Occupancy	1.06	1.45	1.63	1.11	1.50	1.39
Transit	571,886	70,250	215,477	139,584	65,365	1,062,562
Motorized Person Subtotal	3,521,469	2,882,095	6,420,904	1,611,113	2,917,032	17,352,613
Transit Percentage	16.24%	2.44%	3.36%	8.66%	2.24%	6.12%
Walk	84,275	180,660	576,456	396,435	293,130	1,530,956
Bike	32,514	8,798	36,399	7,379	6,608	91,698
Non-Motorized Person Subtotal	116,789	189,458	612,855	403,814	299,738	1,622,654
Other Subtotal	28,277	9,249	732,000	33,517	84,240	887,283
Total Person Subtotal	3,666,535	3,080,802	7,765,759	2,048,444	3,301,010	19,862,550

Note: The above trips are internal (I-I) with repect to the study area

Table 2 2007 "Pseudo Round 8.0" Land Activity Totals

Households	2,339,832
HH Population	5,860,693
Group Quarters	119,669
Total Population	5,980,362
Total Employment	3,801,935
Industrial Employment	547,612
Retail Employment	665,172
Office Employment	179,6018
Other Employment	793,133
Land Area (sq. mi)	6,795.684

1.2.3 Other data

Staff compiled several sources of recent data beyond the 2007/08 HTS to support the Version 2.3 calibration and validation. These included 2007 Highway Performance Monitoring System (HPMS) traffic counts, the 2007 Air Passenger Survey, 2007 ACS data, and numerous transit on-board surveys for 2007 and 2008. The transit on-board surveys are discussed in more detail in Chapter 6.

1.3 Features of the Version 2.3 travel model

The following sections provide greater detail on the new TAZ system and on technical refinements to Version 2.3.

1.3.1 Modeled area and the 3,722-TAZ system

The Version 2.3 modeled area is the same as that of the existing Version 2.2 model (see Figure 1). The modeled area is comprised of 22 jurisdictions and extends over the District of Columbia and portions of three states: Maryland, Virginia, and West Virginia. The modeled area was expanded to its current size in the 1990s, in order to extend well beyond the TPB member area (as can be seen in Figure 1), [4] as well as, beyond the non-attainment area that is used in air quality planning work. [5] In the 1990s, there was one non-attainment area, but now there are three non-attainment areas, depending on the pollutant (See for example Posey, 2011). [6]

The modeled area is divided into a new 3,722-TAZ system, comprised of 3,675 internal zones and 47 external stations. The new TAZ system contains about 85% more internal zones than the existing 2,191-TAZ system (The 2,191-TAZ system has 1,972 internal zones; the 3,722-TAZ system has 3,675 internal zones). The new TAZ system was developed to improve the connection between transportation planning and local development plans. The delineation of the new zone system was conducted primarily by land use planners and was heavily influenced by the regional activity centers/activity clusters concept adopted by the TPB and COG Board. [7] The modeling benefits of the more detailed zone system are substantial. It allows for a more detailed depiction of zonal access to the highway and transit systems and it also enables improved opportunities for modeling non-motorized travel.

One unfortunate aspect of the 3,722 TAZ system is that it does not neatly nest into the existing 2,191-TAZ system, and so, translating zonal attributes between systems is not easily done. However, spatial relationships between the two TAZ systems, complicated as they are, are well defined and can be made available.

The 3,722 TAZ system numbering has been developed on a jurisdictional basis as indicated in Table 3. The table indicates that the internal TAZs are numbered from 1 to 3675. It also indicates that thirteen TAZs in this range are unused and so 3662 internal TAZs are active. External stations are sequenced from 3676 to 3722. There are 1278 reserve TAZs (3723-5000) available for future use. .

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[4] In many cases, there is a one-jurisdiction buffer between the modeled area cordon and the TPB member jurisdiction cordon. The urbanized portion of Charles County, Maryland is part of the TPB membership, but not the entire county.

[5] Ronald Milone, *FY-94 Development Program for MWCOG Travel Forecasting Models, Volume A: Current Applications*, Draft report (Washington, D.C.: Metropolitan Washington Council of Governments, National Capital Region Transportation Planning Board, June 30, 1994), 9-10.

[6] Jane A. Posey to National Capital Region Planning Board, "Air Quality Conformity Assessment for the 2011 Update of the Constrained Long Range Plan (CLRP)," Memorandum, November 16, 2011, 6.

[7] Metropolitan Washington Council of Governments, *Metropolitan Washington Regional Activity Centers and Clusters* (Washington, D.C.: Metropolitan Washington Council of Governments (COG), April 2007).
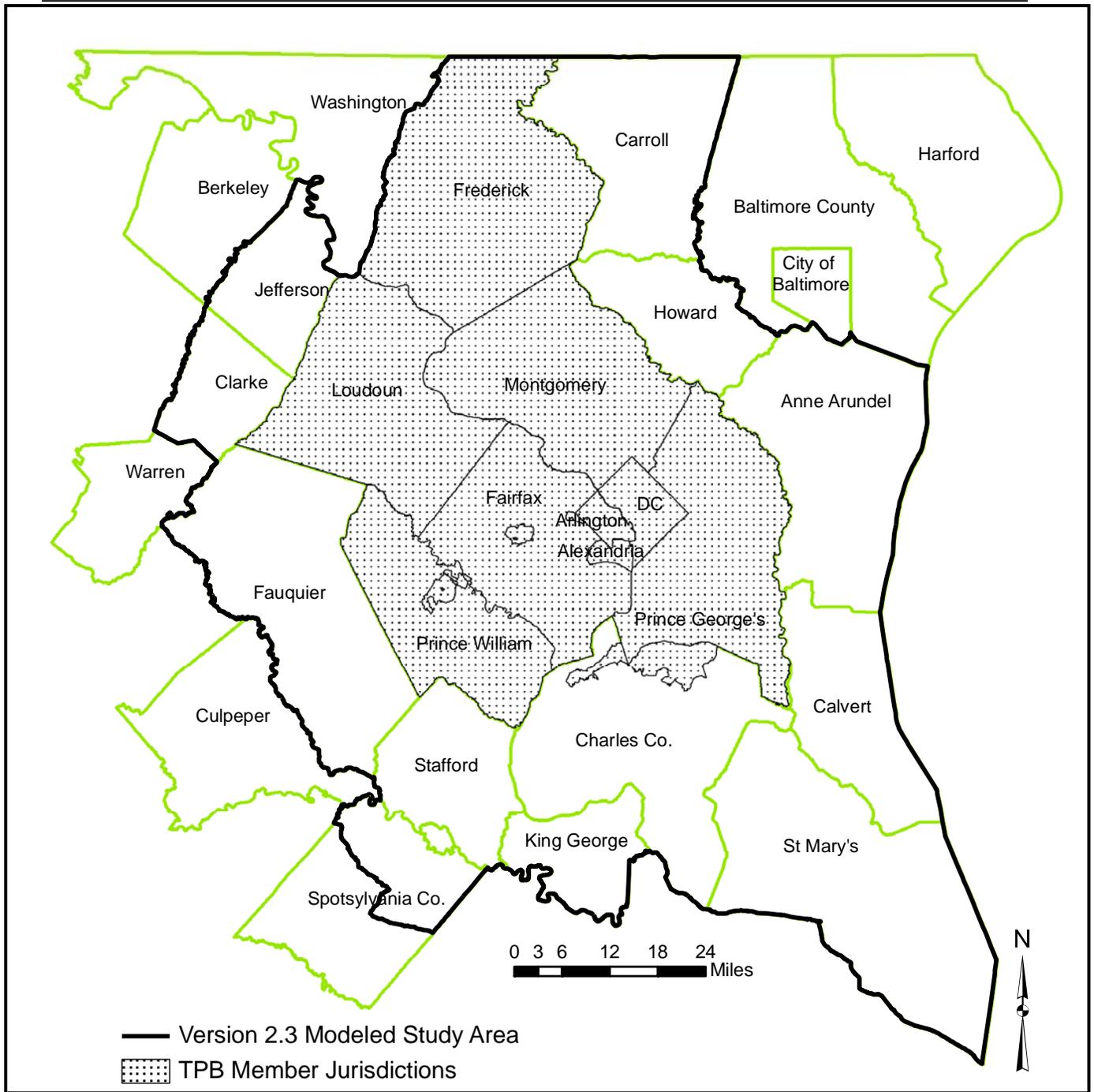
Figure 1 Modeled area of the Version 2.3 travel model and the TPB member jurisdiction area

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Table 3 3,722-TAZ Numbering Allocation by Jurisdiction

Jurisdiction	Active TAZ Count	Beginning TAZ	Ending TAZ	Inactive TAZs
District of Columbia	391	1	393	61, 382
Montgomery Co., Md.	376	394	769	
Prince George's Co., Md.	633	770	1404	770, 777
Arlington Co., Va.	141	1405	1545	
City of Alexandria, Va.	65	1546	1610	
Fairfax Co.. Va.	549	1611	2159	
Loudoun Co., Va.	282	2160	2441	
Prince William Co., Va.	376	2442	2819	2555, 2629
Frederick Co., Md.	130	2820	2949	
Howard Co., Md.	68	2950	3017	
Anne Arundel Co., Md.	98	3018	3116	3103
Charles Co., Md.	113	3117	3229	
Carroll Co., Md.	56	3230	3287	3266, 3267
Calvert Co., Md	47	3288	3334	
St. Mary's Co., Md.	75	3335	3409	
King George Co., Va.	25	3410	3434	
City of Fredericksburg, Va.	14	3435	3448	
Stafford Co., Va.	90	3449	3541	3478, 3482, 3495
Spotsylvania Co., Va.	61	3542	3603	3544
Fauquier Co., Va.	50	3604	3653	
Clarke Co., Va.	9	3654	3662	
Jefferson Co., W Va.	13	3663	3675	
External Stations:	47	3676	3722	
Reserved TAZ numbers	1,278	3723	5000	
Total Active Internal TAZs:	3662			
Total Active Internal and External TAZs:	3709			

Ref: 3722TAZ_Master_Node_Table.xls

1.3.2 Nested-logit mode choice model

Version 2.3 model includes a nested-logit (NL) mode choice model, which replaces the sequential multinomial logit (SMNL) mode choice model used in Version 2.2.   The NL model provides for a more exhaustive choice set (15 choices) compared to that offered by the existing SMNL model (5 choices).

1.3.3 Updated models for medium trucks and heavy trucks

The Version 2.2 model contains revised truck models that were initially developed, with consultant assistance, for the Version 2.3 model on the 2,191-TAZ system.[8]   Separate model specifications exist for "medium" (2-axle, 6 tire), and "heavy" (all combination vehicle) trucks.   TPB staff has adapted the 2,191-TAZ-based models to operate on the 3,722-TAZ system.

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[8] William G. Allen, *Development of a Model for Truck Trips* (Windsor, South Carolina: Prepared for the Metropolitan Washington Council of Governments/National Capital Region Transportation Planning Board, January 14, 2008).

1.3.4 Subdivided non-home-based purpose

Whereas the Version 2.2 model uses a single Non-Home-Based trip purpose, the Version 2.3 model disaggregates NHB travel among two sub-purposes: Non-Home-Base Work (NHW) and Non-Home Base Other (NHO). This change was also in line with consultant recommendations.[9] TPB staff felt that the observed differences between these travel markets in terms of trip rates, trip lengths, modal preferences, etc. were substantial enough to justify establishing an additional purpose.   TPB staff considered making other splits of trip purposes (e.g., separating out home-based school trips from home-based other trips), but ultimately decided to defer making any further splits of trip purposes at the present time.

1.3.5 Refined non-motorized travel

The Version 2.3 model includes the development of non-motorized trips[10] for all (work and non-work) purposes. The Version 2.2 model develops non-motorized travel for the HBW purpose only. Staff felt that the more detailed TAZ system would facilitate efforts to better reflect this particular travel market. However, the non-motorized travel will be developed at the trip generation stage only.

1.4 Overview of the Version 2.3 travel model

A graphic showing the essential parts of the Version 2.3 modeling process is shown on Figure 2. Despite the general name for travel models ("four step"), the TPB travel model could more accurately be called a "six step" model. These six steps are described below.

The demographic models are used to disaggregate the total number of zonal households across 64 cross-classes: 4 household income groups[11] by 4 household size groups (1, 2, 3, 4+ persons) by 4 vehicle availability groups (0, 1, 2, and 3+ vehicles available). The allocation of households to each cross-class is made at the traffic analysis zone (TAZ) level. The figure indicates that peak-hour transit accessibility measures are used as part of the demographic (vehicle availability) submodel step.

The trip generation models are next applied to compute daily person trip productions and attractions by purpose. Five modeled purposes are modeled: Home-Based Work (HBW), Home-Based Shop (HBS), Home-Based Other (HBO), Non-Home-Based Work (NHW), and Non-Home-Based Other (NHO). A commercial vehicle purpose (consisting of both autos and light duty trucks), and two truck types, Medium and Heavy, are also modeled. Medium trucks are those with two axles and 6 tires. Heavy trucks represent all combination vehicles.

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[9] Cambridge Systematics, Inc., *Fiscal Year 2010 Task Reports*, Final Report (Washington, D.C.: National Capital Region Transportation Planning Board, November 16, 2010), 2–3, 2–12.

[10] Actually, "trip ends," since they are an output from trip generation.

[11] The income levels used approximate household income quartiles, based on the 2007 ACS.
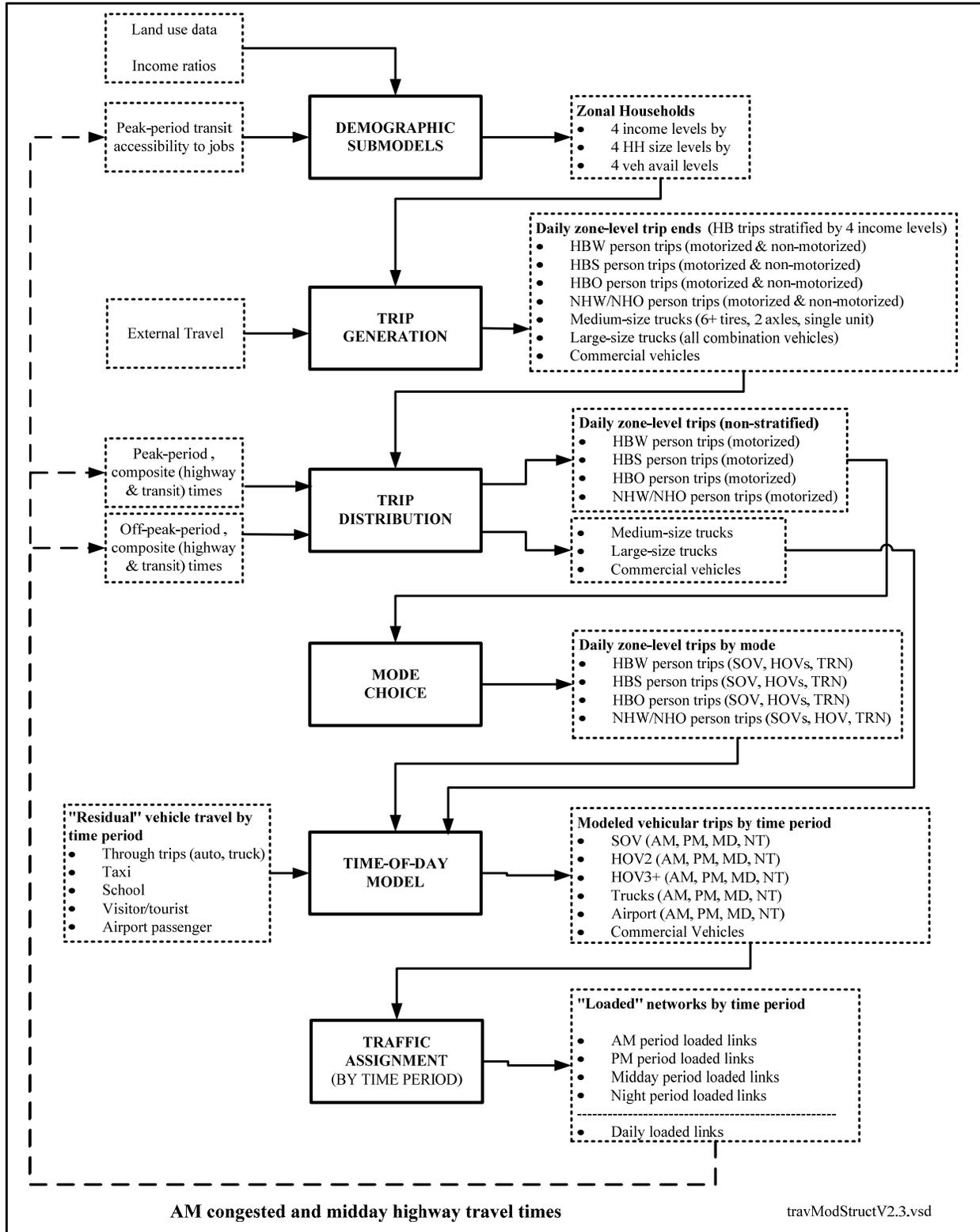
Figure 2 Structure of the Version 2.3 Travel Model

Trip generation involves the application of daily trip rates to the number of households, in each of the 64 classes, and to the number of jobs. The trip rates reflect both motorized (i.e., transit and automobile) and non-motorized (i.e., bicycle and walk) person travel.   The non-motorized trip-ends produced in the trip generation step are not carried forward into trip distribution.   Trip attractions are computed by purpose as a function of zonal land use attributes. External (i.e., external-to-internal, X/I, and internal-to-external, I/X) productions and attractions are entered as an exogenous input, by purpose, into the trip generation process. External travel relates to auto person, commercial vehicle and truck travel only (transit externals are currently not considered in the model).   The home-based productions and attractions are developed by the four income levels.

The trip distribution model uses the standard gravity model formulation and makes use of a composite time function that represents a blending of transit and highway travel times. The gravity model is doubly constrained for all five trip purposes. The distribution step involves separate gravity model runs for 30 travel markets, given that home-based purposes are income stratified, and external travel is modeled separately by purpose and facility type (interstate travel vs. non-interstate). However, the trip distribution process ultimately results in seven daily trip tables corresponding to the basic motorized person, commercial, and truck purposes.

The mode choice process consists of five models corresponding to the HBW, HBS, HBO, NHW, and NHO purposes. The models are used to apportion total motorized person trips among SOVs, 2-occupant HOVs, 3+occupant HOVs, and 12 combinations of transit mode and access to transit.

The time-of-day model apportions daily resident travel among four time periods: AM peak period (6:00 AM to 9:00 AM), midday (9:00 AM to 3:00 PM), PM peak period (3:00 PM to 7:00 PM), and the nighttime/early morning hours (7:00 PM to 6:00 AM). The time-of-day model consists of survey-based factors that are applied on the basis of purpose, mode, and directionality (i.e., the home-to-non-home and non-home-to-home directions). This step also includes provisions for apportioning daily residual travel[12] and truck travel among the three time periods. The time-of-day process ultimately produces three "total vehicle" trip tables, one for each of the four time periods.

The traffic assignment process addresses six user classes: SOVs, HOV-2, HOV 3+, commercial vehicles, trucks, and airport passenger vehicles. Highway link volumes are developed for each of the user classes by time period. Although one might expect the four time-of-day periods to result in four time-of-day traffic assignments, there are actually six traffic assignments conducted, since the AM and PM peak periods are split into two assignments (HOV3+ and non-HOV3+, the so-called "two-step assignment"). This is described in more detail in Chapter 8 and Figure 19. Daily transit assignments can also be produced in the Version 2.3 model, though this capability has yet to be fully calibrated and validated.

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[12] Residual travel is also referred to as "miscellaneous" travel which represents special travel markets that are typically not (or not well) represented in home-interview surveys; it is comprised of taxi, school, visitor/tourist, and air passenger auto driver travel.

Figure 2 also indicates that highway speeds resulting from the traffic assignment process are recycled back into the trip distribution and mode choice steps. A method of successive averages (MSA) is applied to daily link volumes to ensure that regional speeds and VMT close in on an equilibrium condition. Figure 3 shows the 2007 VMT that is produced by the Version 2.3 model by speed feedback (SFB) iteration, and the dampened behavior that results using the MSA procedure. As indicated, the Version 2.3 model execution consists of five SFB iterations: an initial (or "pump prime") iteration using default input highway speeds and default mode choice model percentages, and four "standard" SFB iterations using traffic assignment-based input highway speeds and a mode choice model execution. Volume averaging is implemented for SFB iterations 2, 3, and 4.
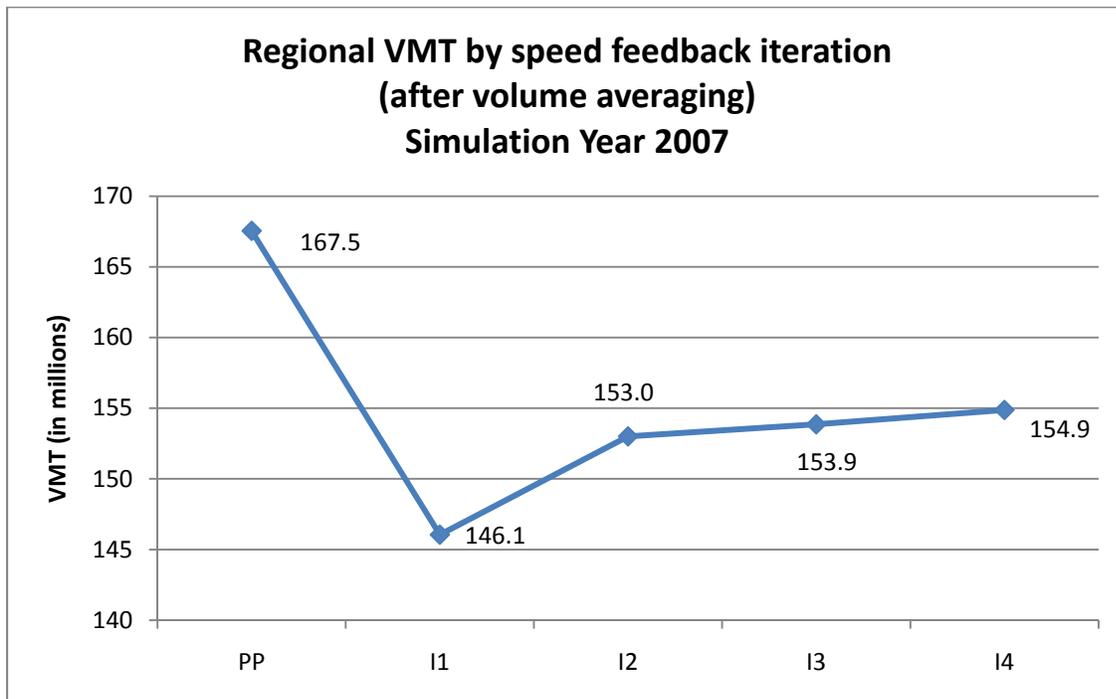
Figure 3 VMT by Iteration

1.5 Special modeling applications

A single standard execution of the regional travel is sometimes insufficient for representing a special policy condition that is relevant to a particular forecasted scenario. In recent years, TPB staff has established two model execution "variations," which address the treatment of special transportation policies or operations.

The first such variation is known as the "transit constraint" option. Since the year 2000, TPB forecasts have been subject to a Metrorail-related capacity limitation in the core area. It is currently assumed that, beyond the year 2020, all Metrorail trips moving to and through the regional core area will not exceed 2020 levels. Consequently, procedures have been added to all *post*-2020 model executions to compare the modeled Metrorail trip table with a pre-existing 2020 Metrorail trip table. Under current procedures, post-2020 Metrorail trips exceeding 2020 ridership levels to and through the regional core are converted into auto trips.

The second variation, known as the "HOV-3+ skims substitution" option, is undertaken to the model of planned HOT (High-Occupancy/Toll) lanes in Northern Virginia. Modeling this type of facility has proven to be especially challenging given:

1. The HOT facility will operate using dynamic tolling, i.e., the tolls will change in real time to maintain a service speed at or near free-flow levels;
2. The legislative stipulation that SOV's and 2-occupant HOVs will pay for the HOT lane access while 3+ occupant HOVs will be allowed access to the HOT facility at no charge; and
3. the legislative stipulation that the HOV travel market will suffer no service degradation from the HOT lane operation.

Obviously, a central modeling objective in representing HOT lanes is to specify detailed toll rates that will result in demand levels that do not degrade the prevailing speed on the HOT facility. Another modeling objective is to ensure that HOV 3+ service levels will remain unaffected by the HOT operation. To achieve these two objectives, the following four steps are currently undertaken by TPB staff on a year-by-year basis to simulate HOT lanes in Virginia.

1. The travel model is fully executed whereby all Virginia HOT lanes in the highway network are coded as HOV 3+-priority lanes. The resulting HOV 3+ LOS skim files corresponding to each iteration (pump-prime, iteration 1,…, iteration 6) are preserved for later use. This step is known as the "base" execution.
2. The travel model is fully executed again. This time, the Virgina HOT lanes are coded as mixed use lanes (i.e., allowing access by both SOVs and HOVs). The HOT lanes are assigned a "straw" toll level of 20 cents per mile during the peak periods and 15 cents per mile during the off-peak. The toll is included into the overall highway impedance during path building in the traffic assignment step. Therefore, the toll level impacts the loading in the HOT lane facility.
3. The final (iteration 6) highway assignment process (including three traffic assignments for each time period) resulting from Step 2 is run iteratively, on a trial-and-error basis, to identify HOT lane toll rates (cents/mile) which yield optimum speeds on the facility. The toll rates are developed on a freeway segment by segment basis. The queuing delay function is disabled on the HOT lane facility during this particular step as such delay will presumably be minimal given

  the special operating conditions of the facility. At the end of each assignment execution, the segment level volume and speed is evaluated and the toll rate is adjusted incrementally. The toll level is increased when the desired segment speed is too low. The result of this process is a file containing "final" toll rates for each HOT lane freeway segment, by time period.

4. The model is again executed as in Step 2, such that: 1) the final HOT lane toll rates developed in Step 3 are invoked and 2) the HOV 3+ skims developed in Step 1 are used as "overrides" to the HOV 3+ skims that would be normally developed as part of the modeling process. The result of this execution produces the final loaded links (this step is referred to as the "final" run).

After the above steps are completed, TPB travel forecasts involving HOT-lane scenarios are developed using two separate model executions: 1) the "base" run from which HOV 3+ skims are developed by simulating the proposed HOT lanes as HOV lanes, and 2) the "final" run which accurately simulates the HOT operation using specially developed toll rates and using (substituting) the HOV 3+ skims from the "base" run in the mode choice model. While the use of "dual" modeling scenarios requires additional network coding requirements and imposes more running time, it is currently the best approach staff has formulated for reflecting a very complicated operating policy.

Chapter 2 Inputs to the Travel Model

This chapter describes the land use and exogenous travel files that have been prepared for the Version 2.3 model application.   Zonal land use forecasts are periodically updated from COG's Cooperative Forecasting Program.   The most recent land use release is known as Round 8.0 and it was released in July 2010. Exogenous trip files used in the Version 2.3 model represent special travel markets that need to be accounted for in the regional forecast. Such markets include external trip-ends, through trips, airport passengers trips, and "miscellaneous" (or taxi, school, and visitor/ tourist) trips. This chapter does not address network-related inputs to the travel model, which are typically discussed in network documentation.

2.1 Round 8.0 Land Use

The Version 2.3 model requires the preparation of a zonal land use file in a standard format, for each simulation year. The most recently adopted land use projections are the Round 8.0 Cooperative Forecasts (adopted in November 2010). The Cooperative Forecasts are zonal (both 2,191- and 3,722-TAZ systems) projections of households, household population, group quarters population, and employment by category (i.e., retail, office, industrial, and other).   The Round 8.0 forecasts include land use projections from 2005 to 2040 in five-year increments. The Version 2.3 model requires a few additional data items that are included in the standard land use file.

- Zonal area (sqare miles)
- Jurisdiction code (0-23)
- Zonal median income index (ratio of 2007 zonal median income to the regional median income, in tenths (e.g. a value of "10" indicates the ratio is 1.0 meaning the zonal income equals the regional median income)
- Airline distance to the nearest external station (miles)
- X-coordinate of TAZ centroid (Datum NAD83; Projection: Maryland state plane; Units: feet)
- Y-coordinate of TAZ centroid (Datum NAD83; Projection: Maryland state plane; Units: feet)

The zonal median income index was developed using 2007 ACS information and is normally assumed to remain constant over time. Procedures to prepare standardized land use files supporting the TPB travel model have, in recent years, included a provision to factor employment on a jurisdictional basis to account for definitional differences between local planning agencies.   The Round 8.0 regional land use totals over time are listed on Table 4. The totals shown in between the five-year increments have been linearly interpolated. (Intermediate years are typically required for air quality planning work, and so files are generally prepared for all years between the base and horizon year in a given land use round).

Table 4 Round 8.0 Land Use Forecasts for Version 2.3 Modeling (w/ CTPP Employment Adjustments)

Year	HH	HHPOP	GQPop	TotPop	TotEMP	OffEMP	RetEMP	IndEMP	OthEMP
2000	2,143,451	5,632,014	116,105	5,748,119	3,441,381	1,630,149	628,912	459,906	722,414
2001	2,183,671	5,730,582	120,415	5,851,012	3,493,123	1,651,538	640,799	471,392	729,431
2002	2,223,890	5,829,130	124,740	5,953,891	3,544,852	1,672,917	652,676	482,869	736,474
2003	2,264,122	5,927,655	129,102	6,056,736	3,596,604	1,694,239	664,507	494,309	743,465
2004	2,304,341	6,026,203	133,427	6,159,615	3,648,333	1,715,618	676,384	505,786	750,508
2005	2,344,561	6,124,771	137,737	6,262,508	3,700,075	1,737,007	688,271	517,272	757,525
2006	2,373,295	6,196,646	138,757	6,335,407	3,745,215	1,756,046	700,656	523,177	765,338
2007	2,402,012	6,268,475	139,783	6,408,278	3,790,330	1,775,055	713,043	529,082	773,150
2007	2,339,832	5,860,693	119,669	5,980,362	3,801,935	1,796,018	665,172	547,612	793,133
2008	2,430,726	6,340,350	140,837	6,481,167	3,835,434	1,794,100	725,370	534,987	780,977
2009	2,459,443	6,412,179	141,863	6,554,038	3,880,549	1,813,109	737,757	540,892	788,789
2010	2,488,177	6,484,054	142,883	6,626,937	3,925,689	1,832,148	750,142	546,797	796,602
2011	2,524,150	6,562,726	143,920	6,706,665	3,982,448	1,860,822	762,224	552,967	806,367
2012	2,560,126	6,641,442	144,994	6,786,434	4,039,250	1,889,515	774,342	559,164	816,163
2013	2,596,143	6,720,132	146,038	6,866,172	4,096,084	1,918,247	786,467	565,363	826,073
2014	2,632,119	6,798,848	147,112	6,945,941	4,152,886	1,946,940	798,585	571,560	835,869
2015	2,668,092	6,877,520	148,149	7,025,669	4,209,645	1,975,614	810,667	577,730	845,634
2016	2,702,192	6,954,419	148,452	7,102,874	4,276,603	2,014,539	822,186	585,908	853,940
2017	2,736,270	7,031,287	148,762	7,180,051	4,343,579	2,053,440	833,723	594,056	862,270
2018	2,770,344	7,108,250	149,081	7,257,329	4,410,604	2,092,399	845,309	602,272	870,714
2019	2,804,422	7,185,118	149,391	7,334,506	4,477,580	2,131,300	856,846	610,420	879,044
2020	2,838,522	7,262,017	149,694	7,411,711	4,544,538	2,170,225	868,365	618,598	887,350
2021	2,870,184	7,333,196	150,516	7,483,723	4,599,869	2,202,750	877,523	624,893	894,682
2022	2,901,857	7,404,337	151,347	7,555,697	4,655,240	2,235,254	886,683	631,204	902,006
2023	2,933,527	7,475,526	152,190	7,627,703	4,710,506	2,267,809	895,868	637,520	909,402
2024	2,965,200	7,546,667	153,021	7,699,677	4,765,877	2,300,313	905,028	643,831	916,726
2025	2,996,862	7,617,846	153,843	7,771,689	4,821,208	2,332,838	914,186	650,126	924,058
2026	3,024,306	7,680,053	154,389	7,834,459	4,868,342	2,357,519	922,961	657,237	930,578
2027	3,051,804	7,742,282	154,953	7,897,243	4,915,485	2,382,209	931,694	664,379	937,125
2028	3,079,378	7,804,473	155,544	7,960,009	4,962,592	2,406,933	940,512	671,523	943,702
2029	3,106,876	7,866,702	156,108	8,022,793	5,009,735	2,431,623	949,245	678,665	950,249
2030	3,134,320	7,928,909	156,654	8,085,563	5,056,869	2,456,304	958,020	685,776	956,769
2031	3,158,341	7,984,123	157,111	8,141,244	5,099,494	2,478,581	966,151	692,053	962,650
2032	3,182,385	8,039,333	157,584	8,196,924	5,142,175	2,500,839	974,322	698,358	968,567
2033	3,206,445	8,094,523	158,064	8,252,580	5,184,826	2,523,179	982,549	704,656	974,531
2034	3,230,489	8,149,733	158,537	8,308,260	5,227,507	2,545,437	990,720	710,961	980,448
2035	3,254,510	8,204,947	158,994	8,363,941	5,270,132	2,567,714	998,851	717,238	986,329
2036	3,275,533	8,254,463	159,481	8,413,952	5,307,502	2,587,634	1,006,677	720,919	992,210
2037	3,296,569	8,303,964	159,979	8,463,962	5,344,893	2,607,540	1,014,501	724,623	998,114
2038	3,317,681	8,353,473	160,507	8,513,961	5,382,243	2,627,515	1,022,420	728,372	1,004,051
2039	3,338,717	8,402,974	161,005	8,563,971	5,419,634	2,647,421	1,030,244	732,076	1,009,955
2040	3,359,740	8,452,490	161,492	8,613,982	5,457,004	2,667,341	1,038,070	735,757	1,015,836
	Notes: (1) - Rnd 8.0 Employment has been adjusted with CTPP-based factors.								
	(2) -The sum of emp. subcategories may not exactly equal the total emp. figures for interpolated years due to								
	rounding								
	2007	2007 "Pseudo" Round 8.0 Land Activity							

2.2 External and Through Forecasts

External stations represent the entry and exit points of the highway network along the periphery of the modeled study area. External and through travel files are geographically referenced to 47 external stations, numbered from 3676 to 3722. The Version 2.3 model requires three files relating to external (I-X and X-I) and through (X-X) travel, for a given simulation year. These include:

- A through auto driver trip table file;
- A through commercial vehicle and truck (medium/heavy) trip table file;
- A file containing external productions and attractions by mode (auto, commercial vehicle, medium trucks, and heavy trucks).

The Version 2.3 external and through trip forecasts were recently updated to accommodate the revised truck models. Previously, the external and through trip forecasts were developed from base-year (year-2000) counts at each external station. The updated forecasts, however, were built from year-2005 counts, the year for which the revised truck models were calibrated. Care was taken to respect the same traffic growth levels for 2030 that were established previously. A summary of the revised external and through trips are shown in Table 5.   The projected total level of external travel between 2005 and 2040 is shown to grow from 1,320,900 to 2,082,700, which reflects an average annual growth rate of about 1.3%. External productions and attractions are shown by travel mode and purpose, in Table 6 and Table 7, respectively.

Table 5 External and Through Auto/Truck Trips by Year

Year	AAWDT	Auto Drv Control	Truck Control	Auto XX Trip-Ends	ComVehXX Trip-Ends	Auto XI Adr Trips	Auto IX Adr Trips	TruckXX Trip-Ends	Truck XI Trips	Truck IX Trips
2000	1,215,783	1,003,776	114,016	70,027	5,318	486,084	442,347	59,702	27,157	27,157
2001	1,236,031	1,020,677	116,024	71,258	5,413	494,348	449,658	60,766	27,629	27,629
2002	1,256,657	1,037,896	118,072	72,513	5,510	502,769	457,104	61,851	28,110	28,110
2003	1,277,670	1,055,440	120,161	73,793	5,609	511,350	464,688	62,958	28,601	28,601
2004	1,299,076	1,073,316	122,292	75,099	5,710	520,094	472,413	64,089	29,102	29,102
2005	1,320,886	1,091,530	124,466	76,430	5,813	529,005	480,281	65,242	29,612	29,612
2006	1,343,106	1,110,090	126,684	77,789	5,918	538,087	488,296	66,420	30,132	30,132
2007	1,365,745	1,129,002	128,947	79,174	6,025	547,343	496,460	67,622	30,663	30,663
2008	1,388,813	1,148,275	131,256	80,587	6,135	556,776	504,777	68,848	31,204	31,204
2009	1,412,317	1,167,915	133,612	82,028	6,246	566,391	513,250	70,101	31,756	31,756
2010	1,436,269	1,187,931	136,016	83,499	6,360	576,191	521,882	71,379	32,319	32,319
2011	1,460,676	1,208,331	138,469	84,999	6,476	586,180	530,676	72,684	32,893	32,893
2012	1,485,548	1,229,122	140,973	86,529	6,595	596,362	539,636	74,017	33,478	33,478
2013	1,510,895	1,250,312	143,527	88,090	6,716	606,741	548,765	75,377	34,075	34,075
2014	1,536,728	1,271,912	146,135	89,683	6,839	617,322	558,067	76,766	34,684	34,684
2015	1,563,056	1,293,928	148,796	91,309	6,966	628,109	567,545	78,184	35,306	35,306
2016	1,589,891	1,316,370	151,511	92,967	7,094	639,105	577,203	79,632	35,940	35,940
2017	1,617,242	1,339,246	154,283	94,660	7,226	650,316	587,045	81,111	36,586	36,586
2018	1,645,121	1,362,567	157,113	96,386	7,360	661,747	597,075	82,621	37,246	37,246
2019	1,673,539	1,386,342	160,001	98,149	7,497	673,401	607,296	84,164	37,919	37,919
2020	1,702,507	1,410,580	162,950	99,947	7,637	685,283	617,713	85,739	38,605	38,605
2021	1,719,603	1,424,873	164,676	101,002	7,718	692,284	623,868	86,659	39,009	39,009
2022	1,736,886	1,439,323	166,423	102,069	7,801	699,363	630,089	87,590	39,416	39,416
2023	1,754,359	1,453,933	168,189	103,149	7,885	706,521	636,378	88,532	39,829	39,829
2024	1,772,023	1,468,704	169,977	104,240	7,970	713,758	642,736	89,485	40,246	40,246
2025	1,789,883	1,483,639	171,785	105,345	8,055	721,076	649,163	90,449	40,668	40,668
2026	1,807,938	1,498,739	173,615	106,462	8,142	728,475	655,659	91,425	41,095	41,095
2027	1,826,193	1,514,006	175,466	107,592	8,230	735,957	662,227	92,413	41,527	41,527
2028	1,844,649	1,529,443	177,339	108,735	8,319	743,523	668,866	93,412	41,963	41,963
2029	1,863,309	1,545,051	179,233	109,892	8,408	751,173	675,578	94,424	42,405	42,405
2030	1,882,174	1,560,833	181,151	111,062	8,499	758,908	682,363	95,447	42,852	42,852
2031	1,901,249	1,576,790	183,090	112,246	8,591	766,730	689,223	96,483	43,304	43,304
2032	1,920,534	1,592,924	185,053	113,443	8,684	774,640	696,157	97,531	43,761	43,761
2033	1,940,033	1,609,239	187,038	114,654	8,779	782,638	703,168	98,592	44,223	44,223
2034	1,959,749	1,625,735	189,047	115,880	8,874	790,726	710,255	99,666	44,691	44,691
2035	1,979,683	1,642,415	191,080	117,120	8,970	798,904	717,421	100,752	45,164	45,164
2036	1,999,838	1,659,281	193,136	118,374	9,068	807,175	724,665	101,852	45,642	45,642
2037	2,020,217	1,676,336	195,217	119,643	9,167	815,538	731,989	102,965	46,126	46,126
2038	2,040,823	1,693,582	197,323	120,927	9,266	823,996	739,393	104,091	46,616	46,616
2039	2,061,659	1,711,021	199,454	122,225	9,368	832,549	746,879	105,231	47,111	47,111
2040	2,082,727	1,728,655	201,610	123,540	9,470	841,198	754,448	106,385	47,612	47,612

Table 6 External Auto/Truck Productions by Year

Year	HBWXI AutoDrvs	HBSXI Auto Drvs	HBOXI AutoDrvs	NHBXI AutoDrvs	ComvXI AutoDrv	HBWXI AutoPsns	HBSXI Auto Psns	HBOXI AutoPsns	NHBXI AutoPsns	ComvXI AutoPsns	MedTkXI	HeavyTkXI	AutoXI Drv Totl	TruckXI Total
2000	236,559	42,352	117,778	56,408	32,987	272,043	69,457	189,623	72,203	42,223	3,637	23,520	486,084	27,157
2001	240,636	43,005	119,847	57,297	33,562	276,732	70,529	192,953	73,340	42,960	3,700	23,929	494,348	27,629
2002	244,792	43,670	121,956	58,202	34,149	281,510	71,619	196,348	74,499	43,711	3,765	24,346	502,769	28,110
2003	249,027	44,346	124,106	59,123	34,748	286,381	72,727	199,810	75,678	44,477	3,831	24,771	511,350	28,601
2004	253,344	45,034	126,298	60,061	35,358	291,346	73,855	203,340	76,878	45,258	3,898	25,204	520,094	29,102
2005	257,744	45,733	128,533	61,016	35,979	296,406	75,002	206,939	78,100	46,054	3,966	25,646	529,005	29,612
2006	262,229	46,444	130,813	61,987	36,613	301,564	76,168	210,609	79,344	46,865	4,036	26,096	538,087	30,132
2007	266,801	47,168	133,137	62,977	37,260	306,822	77,355	214,351	80,610	47,692	4,108	26,555	547,343	30,663
2008	271,462	47,903	135,508	63,984	37,919	312,181	78,562	218,167	81,900	48,536	4,180	27,024	556,776	31,204
2009	276,213	48,652	137,925	65,010	38,591	317,645	79,789	222,059	83,213	49,396	4,254	27,501	566,391	31,756
2010	281,057	49,413	140,390	66,055	39,276	323,216	81,038	226,028	84,550	50,273	4,330	27,989	576,191	32,319
2011	285,995	50,188	142,904	67,118	39,974	328,894	82,308	230,076	85,911	51,167	4,407	28,486	586,180	32,893
2012	291,030	50,976	145,468	68,201	40,687	334,684	83,600	234,204	87,298	52,079	4,486	28,992	596,362	33,478
2013	296,163	51,777	148,084	69,304	41,413	340,587	84,915	238,415	88,709	53,009	4,566	29,509	606,741	34,075
2014	301,396	52,593	150,751	70,427	42,154	346,606	86,252	242,710	90,147	53,957	4,648	30,037	617,322	34,684
2015	306,732	53,423	153,472	71,571	42,910	352,742	87,613	247,091	91,611	54,925	4,731	30,574	628,109	35,306
2016	312,174	54,267	156,248	72,737	43,680	359,000	88,997	251,559	93,103	55,911	4,816	31,123	639,105	35,940
2017	317,722	55,126	159,079	73,923	44,466	365,380	90,406	256,118	94,622	56,917	4,903	31,683	650,316	36,586
2018	323,380	55,999	161,968	75,132	45,268	371,887	91,839	260,768	96,169	57,943	4,992	32,254	661,747	37,246
2019	329,149	56,889	164,914	76,363	46,086	378,521	93,297	265,512	97,745	58,990	5,082	32,837	673,401	37,919
2020	335,033	57,793	167,920	77,618	46,920	385,288	94,781	270,351	99,350	60,057	5,174	33,431	685,283	38,605
2021	338,495	58,333	169,685	78,361	47,410	389,270	95,666	273,193	100,302	60,684	5,228	33,780	692,284	39,009
2022	341,997	58,878	171,471	79,113	47,905	393,296	96,560	276,068	101,264	61,319	5,283	34,133	699,363	39,416
2023	345,538	59,428	173,276	79,872	48,407	397,368	97,463	278,975	102,236	61,961	5,339	34,490	706,521	39,829
2024	349,118	59,984	175,102	80,639	48,914	401,486	98,375	281,915	103,218	62,610	5,395	34,851	713,758	40,246
2025	352,739	60,546	176,950	81,415	49,427	405,650	99,296	284,889	104,211	63,266	5,451	35,217	721,076	40,668
2026	356,400	61,114	178,818	82,199	49,945	409,860	100,226	287,897	105,214	63,930	5,509	35,586	728,475	41,095
2027	360,103	61,687	180,707	82,991	50,470	414,118	101,166	290,939	106,228	64,601	5,567	35,960	735,957	41,527
2028	363,847	62,266	182,619	83,792	51,000	418,424	102,115	294,016	107,253	65,280	5,625	36,338	743,523	41,963
2029	367,633	62,850	184,552	84,601	51,536	422,778	103,075	297,128	108,289	65,967	5,685	36,720	751,173	42,405
2030	371,463	63,441	186,507	85,419	52,079	427,182	104,043	300,276	109,336	66,661	5,745	37,107	758,908	42,852
2031	375,335	64,038	188,485	86,245	52,628	431,635	105,022	303,461	110,394	67,363	5,805	37,498	766,730	43,304
2032	379,251	64,640	190,485	87,080	53,183	436,138	106,010	306,681	111,463	68,074	5,867	37,894	774,640	43,761
2033	383,211	65,249	192,509	87,925	53,744	440,693	107,009	309,939	112,544	68,792	5,929	38,294	782,638	44,223
2034	387,216	65,864	194,555	88,778	54,312	445,299	108,018	313,234	113,636	69,519	5,992	38,699	790,726	44,691
2035	391,266	66,486	196,626	89,641	54,886	449,956	109,037	316,567	114,740	70,254	6,055	39,109	798,904	45,164
2036	395,363	67,113	198,720	90,512	55,466	454,667	110,066	319,939	115,856	70,997	6,119	39,523	807,175	45,642
2037	399,505	67,747	200,838	91,394	56,054	459,431	111,106	323,349	116,984	71,749	6,184	39,942	815,538	46,126
2038	403,695	68,388	202,981	92,284	56,648	464,249	112,156	326,799	118,124	72,509	6,250	40,366	823,996	46,616
2039	407,932	69,035	205,148	93,184	57,249	469,122	113,217	330,289	119,276	73,279	6,317	40,795	832,549	47,111
2040	412,217	69,689	207,341	94,094	57,857	474,050	114,289	333,819	120,441	74,056	6,384	41,229	841,198	47,612

Table 7 External Auto/Truck Attractions by Year

Year	HBWIX AutoDrvs	HBSIX Auto Drvs	HBOIX AutoDrvs	NHBIX AutoDrvs	ComvIX AutoDrv	HBWIX AutoPsns	HBSIX Auto Psns	HBOIX AutoPsns	NHBIX AutoPsns	ComvIX AutoPsns	MedTkIX	HeavyTkIX	AutoIX Drv Totl	TruckIX Total
2000	146,581	41,644	164,738	56,400	32,983	168,568	68,297	265,229	72,193	42,219	3,637	23,520	442,347	27,157
2001	148,926	42,318	167,565	57,289	33,559	171,265	69,402	269,780	73,330	42,956	3,700	23,929	449,658	27,629
2002	151,314	43,004	170,447	58,194	34,146	174,011	70,526	274,419	74,488	43,707	3,765	24,346	457,104	28,110
2003	153,744	43,702	173,384	59,115	34,744	176,806	71,670	279,148	75,667	44,472	3,831	24,771	464,688	28,601
2004	156,218	44,411	176,378	60,053	35,354	179,650	72,834	283,968	76,867	45,253	3,898	25,204	472,413	29,102
2005	158,736	45,133	179,430	61,007	35,976	182,546	74,019	288,882	78,089	46,049	3,966	25,646	480,281	29,612
2006	161,299	45,868	182,541	61,979	36,609	185,494	75,224	293,890	79,333	46,860	4,036	26,096	488,296	30,132
2007	163,909	46,616	185,712	62,968	37,256	188,495	76,450	298,997	80,600	47,687	4,108	26,555	496,460	30,663
2008	166,565	47,376	188,946	63,976	37,915	191,550	77,697	304,203	81,889	48,531	4,180	27,024	504,777	31,204
2009	169,270	48,150	192,242	65,001	38,586	194,661	78,966	309,510	83,202	49,391	4,254	27,501	513,250	31,756
2010	172,024	48,938	195,603	66,046	39,271	197,827	80,258	314,921	84,539	50,267	4,330	27,989	521,882	32,319
2011	174,828	49,739	199,030	67,109	39,970	201,052	81,572	320,439	85,900	51,161	4,407	28,486	530,676	32,893
2012	177,682	50,554	202,525	68,192	40,682	204,335	82,909	326,064	87,286	52,073	4,486	28,992	539,636	33,478
2013	180,589	51,384	206,088	69,295	41,409	207,678	84,270	331,801	88,698	53,003	4,566	29,509	548,765	34,075
2014	183,549	52,228	209,721	70,418	42,149	211,082	85,655	337,651	90,135	53,951	4,648	30,037	558,067	34,684
2015	186,564	53,088	213,426	71,562	42,905	214,548	87,064	343,616	91,600	54,918	4,731	30,574	567,545	35,306
2016	189,633	53,962	217,205	72,727	43,675	218,078	88,498	349,699	93,091	55,904	4,816	31,123	577,203	35,940
2017	192,760	54,852	221,058	73,914	44,461	221,673	89,958	355,904	94,610	56,910	4,903	31,683	587,045	36,586
2018	195,943	55,758	224,988	75,123	45,263	225,335	91,443	362,231	96,157	57,936	4,992	32,254	597,075	37,246
2019	199,186	56,680	228,997	76,354	46,080	229,064	92,955	368,685	97,733	58,982	5,082	32,837	607,296	37,919
2020	202,488	57,618	233,085	77,608	46,914	232,861	94,493	375,267	99,338	60,050	5,174	33,431	617,713	38,605
2021	204,447	58,176	235,490	78,351	47,404	235,114	95,408	379,138	100,290	60,677	5,228	33,780	623,868	39,009
2022	206,426	58,740	237,921	79,103	47,900	237,390	96,333	383,053	101,251	61,311	5,283	34,133	630,089	39,416
2023	208,426	59,309	240,380	79,862	48,401	239,690	97,267	387,012	102,223	61,953	5,339	34,490	636,378	39,829
2024	210,448	59,885	242,867	80,629	48,908	242,015	98,211	391,015	103,206	62,602	5,395	34,851	642,736	40,246
2025	212,490	60,466	245,381	81,405	49,420	244,364	99,164	395,064	104,198	63,258	5,451	35,217	649,163	40,668
2026	214,554	61,053	247,924	82,189	49,939	246,738	100,127	399,158	105,202	63,922	5,509	35,586	655,659	41,095
2027	216,641	61,646	250,496	82,981	50,463	249,137	101,100	403,299	106,216	64,593	5,567	35,960	662,227	41,527
2028	218,749	62,246	253,097	83,781	50,993	251,561	102,083	407,486	107,240	65,272	5,625	36,338	668,866	41,963
2029	220,879	62,851	255,727	84,591	51,530	254,011	103,076	411,721	108,276	65,958	5,685	36,720	675,578	42,405
2030	223,032	63,463	258,388	85,408	52,072	256,487	104,079	416,004	109,323	66,652	5,745	37,107	682,363	42,852
2031	225,208	64,081	261,078	86,235	52,621	258,989	105,093	420,336	110,380	67,355	5,805	37,498	689,223	43,304
2032	227,407	64,705	263,799	87,070	53,176	261,518	106,117	424,716	111,450	68,065	5,867	37,894	696,157	43,761
2033	229,630	65,336	266,551	87,914	53,737	264,074	107,151	429,147	112,530	68,783	5,929	38,294	703,168	44,223
2034	231,876	65,973	269,334	88,768	54,304	266,657	108,196	433,628	113,622	69,510	5,992	38,699	710,255	44,691
2035	234,146	66,617	272,149	89,630	54,879	269,268	109,252	438,160	114,726	70,245	6,055	39,109	717,421	45,164
2036	236,440	67,268	274,996	90,502	55,459	271,906	110,319	442,744	115,842	70,988	6,119	39,523	724,665	45,642
2037	238,759	67,925	277,875	91,383	56,046	274,573	111,397	447,380	116,970	71,739	6,184	39,942	731,989	46,126
2038	241,103	68,589	280,788	92,273	56,640	277,268	112,486	452,068	118,110	72,500	6,250	40,366	739,393	46,616
2039	243,471	69,260	283,733	93,174	57,241	279,992	113,586	456,811	119,262	73,269	6,317	40,795	746,879	47,111
2040	245,865	69,937	286,713	94,083	57,849	282,745	114,697	461,607	120,427	74,047	6,384	41,229	754,448	47,612

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I:\ateam\docum\FY11\Ver2.3\modelDoc\ Rnd8Based_Ext_AutTrk_CV.xlsx, (IXTrips)

2.3 Miscellaneous and Airport-Passenger Trip Forecasts

The remaining exogenous travel markets consist of taxis, school, and visitor/tourist auto driver trips (collectively referred to as "miscellaneous trips") and airport-passenger auto driver trips. The miscellaneous trip totals, shown by year on Table 8, are based on surveyed travel patterns that have been growth factored through time. The airport-passenger forecasts are shown on Table 9. The airport trips have been recently updated using the 2007 COG Air Passenger Survey. The trip tables represent auto travel to each of the three major airports serving the Washington/Baltimore area.

Table 8 Miscellaneous Auto Driver Forecasts

Year	School	Taxi	Visitor/ Tourist
2000	250,448	111,246	222,227
2001	255,158	112,989	226,423
2002	259,861	114,586	230,605
2003	264,556	116,329	234,769
2004	269,271	117,928	238,970
2005	273,930	119,671	243,045
2006	277,301	121,103	246,065
2007	280,645	122,504	249,010
2008	283,994	123,938	251,972
2009	287,368	125,477	254,993
2010	290,712	126,881	257,941
2011	294,940	128,748	261,728
2012	299,119	130,536	265,388
2013	303,334	132,394	269,139
2014	307,557	134,263	272,918
2015	311,736	136,057	276,574
2016	315,734	138,233	280,147
2017	319,733	140,385	283,723
2018	323,707	142,564	287,229
2019	327,698	144,721	290,788
2020	331,653	146,891	294,257
2021	335,374	148,724	297,598
2022	339,052	150,476	300,828
2023	342,766	152,304	304,155
2024	346,445	154,101	307,391
2025	350,158	155,830	310,714
2026	353,359	157,324	313,529
2027	356,574	158,933	316,376
2028	359,810	160,395	319,284
2029	363,022	161,984	322,126
2030	366,220	163,486	324,934
2031	369,030	164,826	327,428
2032	371,830	166,186	329,898
2033	374,676	167,632	332,479
2034	377,476	169,010	334,951
2035	380,292	170,339	337,456
2036	382,740	171,540	339,623
2037	385,196	172,762	341,808
2038	387,653	173,952	343,989
2039	390,110	175,134	346,174
2040	392,556	176,445	348,328

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I:\ateam\docum\FY11\Ver2.3\modelDoc\ Interpolate_Misc_trips_V23.xlsx

Table 9 Air Passenger Auto Driver Trips by Year and Airport

Year	Airport			
	National	Dulles	BWI	Total
2000	18,746	16,585	14,486	49,723
2001	18,343	16,595	14,810	49,656
2002	17,941	16,604	15,134	49,588
2003	17,538	16,614	15,459	49,521
2004	17,136	16,623	15,783	49,453
2005	16,733	16,633	16,107	49,386
2006	16,714	17,000	16,918	50,544
2007	16,694	17,368	17,729	51,703
2008	16,673	17,737	18,540	52,863
2009	16,653	18,105	19,351	54,022
2010	16,634	18,471	20,162	55,180
2011	16,870	19,407	20,626	56,814
2012	17,106	20,343	21,091	58,449
2013	17,347	21,279	21,556	60,089
2014	17,583	22,214	22,020	61,724
2015	17,820	23,150	22,485	63,358
2016	18,058	24,133	22,969	65,061
2017	18,298	25,116	23,452	66,765
2018	18,541	26,101	23,938	68,476
2019	18,781	27,084	24,421	70,180
2020	19,019	28,068	24,906	71,883
2021	19,233	29,032	25,393	73,547
2022	19,448	29,997	25,883	75,214
2023	19,667	30,962	26,372	76,885
2024	19,882	31,927	26,861	78,552
2025	20,096	32,891	27,349	80,216
2026	20,284	33,850	27,856	81,868
2027	20,474	34,810	28,362	83,522
2028	20,667	35,771	28,869	85,180
2029	20,857	36,731	29,376	86,835
2030	21,046	37,690	29,883	88,487
2031	21,171	38,518	30,360	89,917
2032	21,298	39,347	30,839	91,350
2033	21,425	40,175	31,316	92,781
2034	21,551	41,004	31,795	94,213
2035	21,677	41,832	32,272	95,643
2036	21,765	42,416	32,724	96,766
2037	21,852	43,001	33,175	97,890
2038	21,938	43,586	33,627	99,012
2039	22,025	44,171	34,078	100,135
2040	22,113	44,755	34,530	101,258

Ref: I:\ateam\mod_inputs\airport\2009_07_25_Rnd80Based\ Airport_Summary.xls
I:\ateam\docum\FY11\Ver2.3\modelDoc\ Airport_Summary_V23.xls

Chapter 3 Demographic models

This chapter describes the specification of the demographic modeling process used within the Version 2.3 travel model. The demographic models, or sub-models, refer to the household size, household income, and vehicle availability models that are run prior to trip generation. The models are applied at the zone level and are used to apportion the total number households among 64 size, income, and vehicle availability categories or cross classifications:

- Household size (1, 2, 3, or 4+ persons per household);
- Household income (Income "quartile" 1, 2, 3, or 4); and
- Vehicle ownership/availability (0, 1, 2, or 3+ vehicles per household).

Prior to this latest update, the last two updates of the demographic models, or sub-models, were completed in 2004, using the 1990 Census Transportation Planning Package (CTPP) data, and in 2006, using the 2000 CTPP data. The demographic models used in the Version 2.3 travel model are similar to those used in the Version 2.2 travel model, with the following exceptions. First, the validation of the three demographic sub-models was updated to year 2007 conditions, using the American Community Survey (ACS). [13] Second, the vehicle availability model has been recalibrated based on the 2007/2008 Household Travel Survey.

The 2000 Census was the last decennial census to include the long form, a roughly one-in-six sample of the population that included many questions about commuting travel. The long form was the basis for the CTPP data in 1990 and 2000. The American Community Survey (ACS) is a project of the U.S. Census Bureau that replaces the long form in the decennial census. Ideally, when updating the demographic models, one would like to have small area, e.g., zone-level, data. Unfortunately, the ACS data does not generally support development of models at the TAZ level of geography, due to privacy concerns regarding the release of data. Consequently, the ACS updates were done using county-level data. [14]

According to the 2007 ACS data, the regional median household income is $84,280 and the regional mean household income is $106,780 (in year 2007 dollars). The household income quartiles, based on the 2007 ACS data, are shown in Table 10.

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[13] Hamid Humeida to Files, "Analysis of data from the American Community Survey (ACS): Households by household income, household size, and vehicle availability," Memorandum, March 19, 2010.
[14] It is thought that some CTPP data may be produced in the future from multiple years of the ACS, but that data is not likely to be available for another few years.

Table 10 Household income quartiles computed from the ACS

Quartile	Income range (2007 dollars)
First	Less than $50,000
Second	$50,000 to $99,999
Third	$100,000 to $149,999
Fourth	$150,000 or more

The median household income reported from the 2007/2008 HTS ($90,086) is slightly higher than that of the ACS ($84,280). However, both medians fall in the same income interval, $50,000-$99,999. One possible explanation for the difference is that the larger ACS sample covered a larger percentage of lower income households than the 2007/2008 HTS.

A sub-model was developed for each of the three socio-economic dimensions. The household size sub-model uses Census-based relationships to estimate the percent of households in each integer class of household size, given the zone's average household size. The household income sub-model uses similar Census-based relationships to estimate the percent of households in each income class, given the zone's median household income. Lastly, the vehicle ownership model uses a disaggregate logit formulation to estimate the percentage of households in each of the four vehicle-availability classes. The logit model makes use of the household size and income information developed in prior steps as well as some additional parameters. The model specifications are detailed below.

3.1 Household size sub-model

The household size sub-model is an "aggregate share" model. The model is essentially a family of four curves used to allocate the total number of households among integer size levels, based on the average household size of a given zone. Each curve uses the same independent variable.

Curve	Dependent variable	Independent variable
1	Percent of HHs with 1 person	Average zonal household size
2	Percent of HHs with 2 persons	Average zonal household size
3	Percent of HHs with 3 persons	Average zonal household size
4	Percent of HHs with 4+ persons	Average zonal household size

The final model is shown in graphical form in Figure 4 and in tabular form in Table 11.
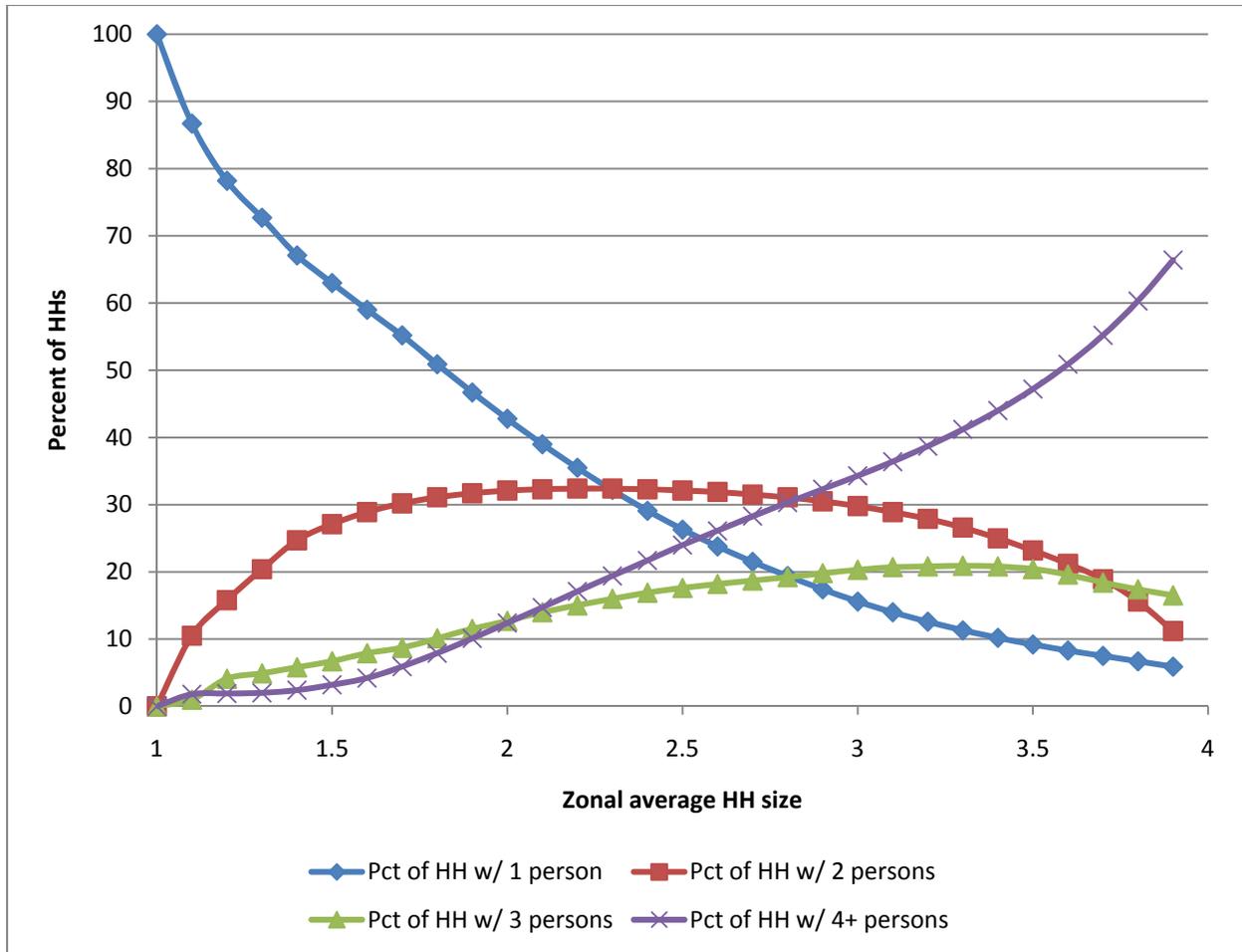
Figure 4 Household size sub-model: Graphical form

Table 11 Household size sub-model: Tabular form

Avg. Zonal HH Size	Pct of HH with 1 person	Pct of HH with 2 persons	Pct of HH with 3 persons	Pct of HH with 4+ persons
1.0	100.0	0.0	0.0	0.0
1.1	86.7	10.5	1.0	1.8
1.2	78.2	15.8	4.1	1.9
1.3	72.7	20.4	4.9	2.0
1.4	67.1	24.7	5.8	2.4
1.5	63.0	27.1	6.7	3.2
1.6	59.0	28.9	7.9	4.2
1.7	55.2	30.2	8.7	5.9
1.8	50.9	31.1	10.1	7.9
1.9	46.7	31.7	11.5	10.1
2.0	42.8	32.1	12.7	12.4
2.1	39.0	32.3	14.0	14.7
2.2	35.5	32.4	15.0	17.1
2.3	32.2	32.4	16.0	19.4
2.4	29.1	32.3	16.9	21.7
2.5	26.3	32.1	17.6	24.0
2.6	23.8	31.9	18.2	26.1
2.7	21.5	31.5	18.7	28.3
2.8	19.4	31.1	19.2	30.3
2.9	17.4	30.5	19.8	32.3
3.0	15.6	29.8	20.3	34.3
3.1	14.0	28.9	20.7	36.4
3.2	12.6	27.9	20.8	38.7
3.3	11.3	26.6	20.9	41.2
3.4	10.2	25.0	20.8	44.0
3.5	9.2	23.2	20.4	47.2
3.6	8.3	21.2	19.6	50.9
3.7	7.5	18.9	18.4	55.2
3.8	6.7	15.6	17.4	60.3
3.9	5.9	11.2	16.5	66.4

3.2 Household income sub-model

The household income sub-model is also an "aggregate share" model and is, therefore, similar in form to the household size sub-model. The household income sub-model is used to estimate the share of households in each of the four income quartiles in each zone, given the median household income for the zone.

Unlike the 2000 CTPP, the most recent census data, the 2007 American Community Survey (ACS), is not available at the census tract level. This fact presented a limitation to any possible updates of the income sub-model using the ACS aggregated data. The county geography is the lowest level that the 2000 CTPP and the 2007 ACS data could be compared. As such, it was decided to use the existing models based on the 2000 CTPP data and to develop an area-based zone equivalency to migrate the 2191 TAZ model to the new 3722 TAZ system.[15] Based on the 2000 CTPP data, the income ratio variable was developed as shown in Equation 1.

Equation 1 Income ratio equation

Income ratio = (zonal median HH income) / (regional median HH income)

The final model is shown in graphical form in Figure 5 and in tabular form in Table 12.

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[15] Hamid Humeida to Files, "Development of an equivalency file to convert the household income sub-model from the 2191 TAZ system to the new 3722 TAZ system," Memorandum, June 2, 2010.
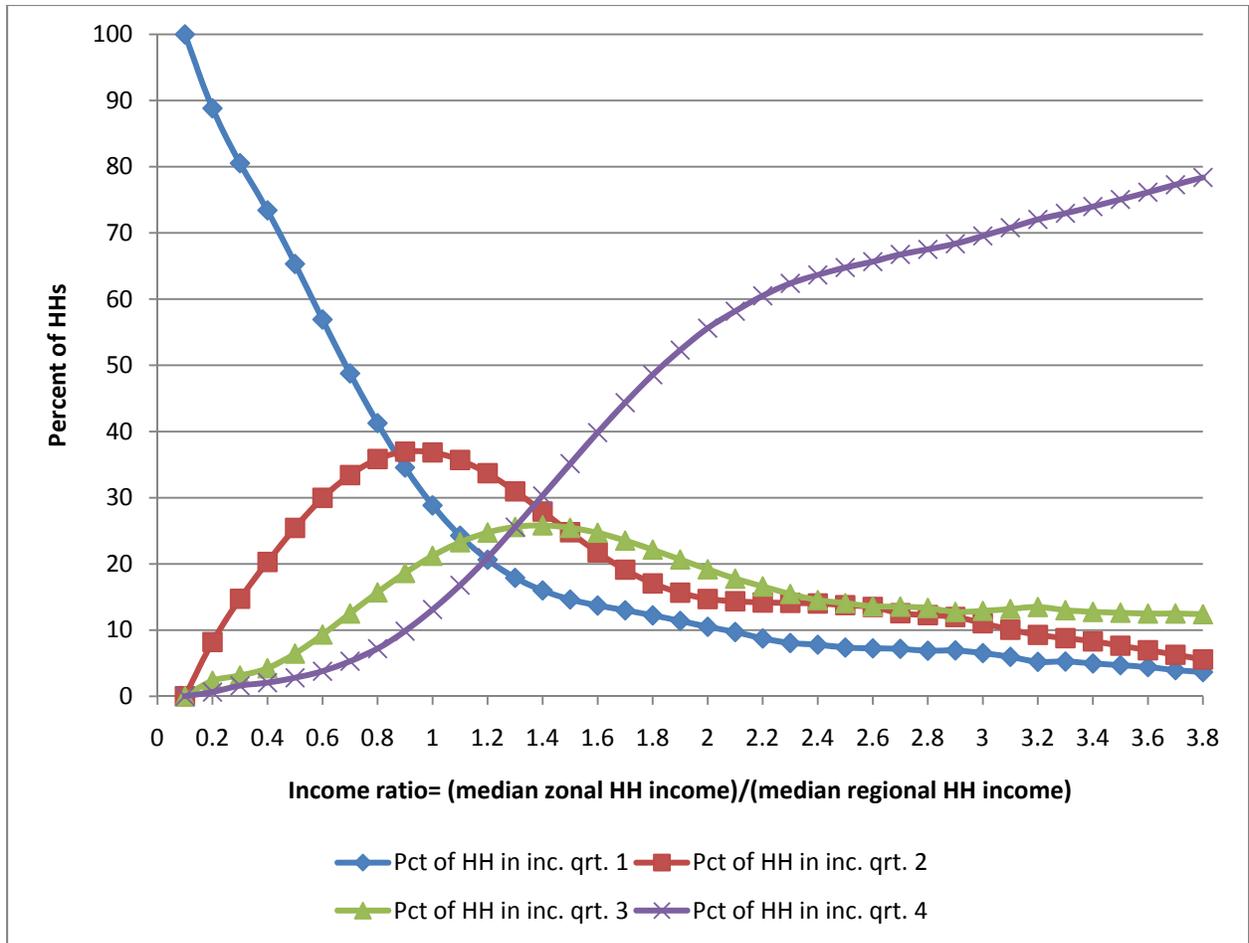
Figure 5 Household income sub-model: Graphical form

Table 12 Household income sub-model: Tabular form

Income Ratio	Pct of HH in inc. qrt. 1	Pct of HH in inc. qrt. 2	Pct of HH in inc. qrt. 3	Pct of HH in inc. qrt. 4
0.1	100.0	0.0	0.0	0.0
0.2	88.8	8.2	2.3	0.6
0.3	80.5	14.7	3.1	1.6
0.4	73.4	20.3	4.2	2.1
0.5	65.3	25.4	6.4	2.8
0.6	56.9	30.0	9.3	3.8
0.7	48.8	33.4	12.5	5.3
0.8	41.3	35.9	15.7	7.2
0.9	34.6	37.0	18.6	9.8
1.0	28.8	36.8	21.2	13.1
1.1	24.3	35.7	23.3	16.8
1.2	20.6	33.7	24.8	20.9
1.3	17.9	31.0	25.6	25.6
1.4	16.0	27.9	25.8	30.3
1.5	14.6	24.8	25.5	35.2
1.6	13.7	21.7	24.7	39.8
1.7	13.0	19.1	23.5	44.4
1.8	12.2	17.0	22.2	48.6
1.9	11.4	15.7	20.7	52.3
2.0	10.5	14.7	19.2	55.6
2.1	9.7	14.4	17.8	58.2
2.2	8.7	14.2	16.6	60.5
2.3	8.1	14.1	15.5	62.4
2.4	7.8	14.0	14.5	63.7
2.5	7.4	13.8	14.1	64.8
2.6	7.3	13.5	13.6	65.7
2.7	7.2	12.6	13.5	66.8
2.8	6.9	12.3	13.3	67.5
2.9	6.9	12.0	12.7	68.4
3.0	6.5	11.0	12.9	69.6
3.1	6.0	10.1	13.2	70.8
3.2	5.2	9.3	13.5	72.0
3.3	5.3	8.8	13.0	73.0
3.4	5.0	8.3	12.8	74.0
3.5	4.7	7.6	12.6	75.1
3.6	4.4	7.0	12.5	76.1
3.7	4.0	6.3	12.5	77.3
3.8	3.7	5.6	12.4	78.4

3.3 Vehicle availability sub-model

The vehicle availability sub-model is the last demographic sub-model. It is a disaggregate choice model that apportions households among vehicle availability levels. The variables considered are household size, household income (furnished by the previous sub-models), area type, and transit accessibility defined as the number of jobs accessible in 45 minutes using the "best" AM transit service. The best transit service is defined as the minimum AM walk-/drive-access transit time among the Metrorail-related transit (i.e., Metrorail only or bus/Metrorail). The vehicle availability model specification is detailed in Table 13.

Table 13 Vehicle availability model

| Number of Vehicles | | |
0	1	2	3+	Variable	New Coefficient
	X			Constant	0.5382
		X		Constant	-3.0820
			X	Constant	-6.8508
	X			Household Size	0.1693
		X		Household Size	1.3439
			X	Household Size	1.6910
	X			Income level 2	1.4535
		X		Income level 2	1.8432
			X	Income level 2	2.4619
	X			Income level 3	2.2589
		X		Income level 3	3.4209
			X	Income level 3	4.6234
	X			Income level 4	2.6558
		X		Income level 4	3.9163
			X	Income level 4	5.5402
	X			Employment w/in 45 min transit	-1.20E-06
		X		Employment w/in 45 min transit	-2.04E-06
			X	Employment w/in 45 min transit	-2.37E-06
	X			Area type	0.2092
		X		Area type	0.4772
			X	Area type	0.7792
	X			DC dummy	-0.9448
		X		DC dummy	-1.3977
			X	DC dummy	-1.5294

3.4 Demographic Model Validation Results

In order to evaluate how well the models fit the data, a comparison was made between the estimated results and data from the 2007 ACS. Table 14, Table 15, and Table 16 show the regional estimates, observed ACS data, the ratio of estimated to observed, and the difference between the estimated and observed results. It is evident that the difference between the estimated and observed data is less than 1% for all three demographic models, which indicates an acceptable fit. The difference in the total number of households of 15,885 is due to Clarke County being omitted from the ACS dataset because the county is small and no data was available at this level of geography. In addition to regional summaries, jurisdictional summaries for household size, household income, and vehicle availability are presented in a memorandum[16].

Table 14 2007 Regional Estimated and Observed Households by Size

	1 Psn	2 Psns	3 Psns	4+ Psns	Total
Estimated					
HHs	664,559	723,464	392,846	558,997	2,339,865
Pct.	28.40%	30.92%	16.79%	23.89%	100.00%
Observed					
HHs	649,305	713,509	385,435	575,731	2,323,980
Pct.	27.94%	30.70%	16.59%	24.77%	100.00%
Estimated/Observed Ratio					
HHs	1.0235	1.0140	1.0192	0.9709	1.0068
Pct.	1.0165	1.0071	1.0123	0.9643	1.0000
Estimated- Observed					
HHs	15,254	9,955	7,411	-16,734	15,885
Pct.	0.46%	0.22%	0.20%	-0.88%	0.00%

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[16] Hamid Humeida to Files, "Analysis of data from the American Community Survey (ACS): Households by household income, household size, and vehicle availability," Memorandum, March 19, 2010.

Table 15 2007 Regional Estimated and Observed Households by Income Level

	< 50.00k	50.00k-99.99k	100.k-149.99k	> 150.00k	Total
Estimated					
HHs	635,803	726,626	483,261	494,175	2,339,865
Pct.	27.17%	31.05%	20.65%	21.12%	100.00%
Observed					
	< 50.00k	50.00k-99.99k	100.k-149.99k	> 150.00k	Total
HHs	640,594	731,729	470,110	481,547	2,323,980
Pct.	27.56%	31.49%	20.23%	20.72%	100.00%
Estimated/Observed Ratio					
	< 50.00k	50.00k-99.99k	100.k-149.99k	> 150.00k	Total
HHs	0.9925	0.9930	1.0280	1.0262	1.0068
Pct.	0.9858	0.9863	1.0210	1.0193	1.0000
Estimated- Observed					
	< 50.00k	50.00k-99.99k	100.k-149.99k	> 150.00k	Total
HHs	-4,791	-5,103	13,151	12,628	15,885
Pct.	-0.39%	-0.43%	0.42%	0.40%	0.00%

Table 16 2007 Regional Estimated and Observed Households by Vehicles Available

	0 Vehs.	1 Veh.	2 Vehs.	3+ Vehs.	Total
Estimated					
HHs	202,358	736,973	871,294	529,240	2,339,865
Pct.	8.65%	31.50%	37.24%	22.62%	100.00%
Observed					
	0 Vehs.	1 Veh.	2 Vehs.	3+ Vehs.	Total
HHs	200,561	733,753	865,514	524,152	2,323,980
Pct.	8.63%	31.57%	37.24%	22.55%	100.00%
Estimated/Observed Ratio					
	0 Vehs.	1 Veh.	2 Vehs.	3+ Vehs.	Total
HHs	1.0090	1.0044	1.0067	1.0097	1.0068
Pct.	1.0021	0.9938	1.0065	1.0056	1.0000
Estimated- Observed					
	0 Vehs.	1 Veh.	2 Vehs.	3+ Vehs.	Total
HHs	1,797	3,220	5,780	5,088	15,885
Pct.	0.02%	-0.07%	0.00%	0.07%	0.00%

Chapter 4 Trip Generation

The Version 2.3 trip generation process computes zonal trip productions and trip attractions, for each modeled purpose, on the basis of zonal land activity. This chapter details the trip generation model pertaining to resident, commercial vehicle, and truck purposes. "Resident trips" are those made by people who reside in the modeled area. Information on resident trips is obtained from the COG/TPB 2007/2008 Household Travel Survey.

4.1 Model Structure

The trip generation model is used to compute the number of daily person trips (i.e., on an average weekday) and daily truck/commercial vehicle trips produced by and attracted to each transportation analysis zone (TAZ). Resident trips are stratified into five trip purposes:

- Home-Based Work (HBW)
- Home-Based Shop (HBS)
- Home-Based Other (HBO)
- Non-Home-Based Work (NHW)
- Non-Home-Based Other (NHO)

HBO trips include home-based school and home-based university trips, since these trips are not modeled separately. Following consultant guidance, what used to be one trip purpose – non-home-based (NHB) – has now been divided into two trip purposes: NHW and NHO.[17] In the Version 2.1 travel model and previous TPB travel models, commercial vehicle travel, described below, was assumed to be part of the non-home-based trip purpose, although this is no longer the case. In general, a commercial vehicle is a motor vehicle used to transport goods (freight), services, or, potentially, revenue-paying passengers. However, the usage of this term within the TPB travel model is more limited. Since the TPB travel model has always had a truck model (for medium trucks and heavy trucks), the term "commercial vehicle" is used to refer to light-duty vehicles (auto, light trucks, SUV, etc.) used to transport goods and services.[18] Consequently, there are three commercial/truck vehicle types:

- Medium truck (single unit, two axles, 6 or more tires)
- Heavy truck (all combination vehicles)[19]
- Commercial vehicles (autos and light duty trucks used to transport commercial goods and services)

Examples of commercial vehicles include "delivery and courier vehicles (including postal vehicles), light trucks used in construction, tradesmen, craftsmen, equipment service personnel, telephone company trucks, shuttle vans, taxicabs, ambulances, police cars, government vehicles, and 4-tire vans used for

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[17] Cambridge Systematics, Inc., *Fiscal Year 2010 Task Reports*, 2–3, 2–12.

[18] William G. Allen Jr., *Development of a Model for Commercial Vehicle Trips* (Washington, D.C.: Metropolitan Washington Council of Governments, National Capital Region Transportation Planning Board, May 4, 2007).

[19] Note that "heavy" and "medium" do not refer strictly to the weight of the vehicle.

paratransit and school transportation."[20] As stated earlier, in the Version 2.1 travel model and previous TPB travel models, commercial vehicle travel was assumed to be part of the non-home-based trip purpose. Similar to the Version 2.2 model, the Version 2.3 model now accounts for commercial trips as a separate and distinct trip purpose. The trip generation process also estimates productions and attractions associated with non-motorized (walk and bicycle) trips. The non-motorized trips are removed from the "final" trip-ends prior to the trip distribution step.

The resident trip generation process can be envisioned as a series of six sequential steps. These are:

1) Trip production model;
2) Internal-to-external trip extraction model;
3) Non-motorized trip production model;
4) Trip attraction model;
5) Non-motorized trip attraction model; and
6) Home-based attraction income disaggregation model.

4.2 Trip Production Model

The trip production model is a cross-classification model involving the application of trip rates to households in specific socioeconomic categories. The trip rates are specific to each purpose. The cross-classes established for the Version 2.3 model are structured by the four household income, four household size, and four vehicle availability levels used in the demographic models. The total number of cross-classes equals 64 (i.e., 4 x 4 x 4).   The trip rates are displayed, by purpose in Table 17, Table 18, Table 19, Table 20, and Table 21. Trip rates are weighted rates, based on the 2007/2008 Household Travel Survey.[21]

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[20] Allen, *Development of a Model for Commercial Vehicle Trips*, 4.
[21] Hamid Humeida to Files, Mark Moran, and Ronald Milone, "Estimation of Trip Production Model based on the 2007 Household Travel Survey," Memorandum, January 13, 2011.

Table 17 Final HBW Trip Production Rates[22]

Income Level	HH Size	Vehicles				
		0	**1**	**2**	**3+**	**Subtotal**
00k - 50k	1-PSN	0.41	0.65	0.54	0.66	0.58
	2-PSN	0.67	0.86	1.27	1.34	1.05
	3-PSN	0.91	1.34	1.89	1.92	1.55
	4+PSN	1.34	1.34	1.70	2.50	1.69
	Subtotal	0.55	0.80	1.35	1.75	0.94
50k-100k	1-PSN	1.00	1.06	1.04	1.04	1.05
	2-PSN	1.20	1.29	1.41	1.51	1.39
	3-PSN	1.25	1.70	1.95	2.05	1.93
	4+PSN	1.34	1.82	1.99	2.69	2.24
	Subtotal	1.06	1.20	1.63	2.14	1.55
100k-150k	1-PSN	1.08	0.99	1.09	1.29	1.03
	2-PSN	1.72	1.78	1.78	1.87	1.79
	3-PSN	1.72	1.82	2.05	2.51	2.23
	4+PSN	1.75	1.97	1.98	2.71	2.26
	Subtotal	1.33	1.36	1.86	2.42	1.92
> 150k	1-PSN	1.16	1.04	1.20	0.87	1.07
	2-PSN	1.72	1.82	1.87	1.90	1.88
	3-PSN	1.72	2.16	2.28	2.93	2.62
	4+PSN	1.75	2.24	2.60	2.97	2.75
	Subtotal	1.33	1.57	2.15	2.58	2.25
	TOTAL	0.72	1.10	1.78	2.33	**1.63**

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[22] Source: Hamid Humeida to Files, Mark Moran, and Ronald Milone, "Estimation of Trip Production Model based on the 2007 Household Travel Survey," Memorandum, January 13, 2011.

Table 18 Final HBS Trip Production Rates[23]

Income Level	HH Size	Vehicles				
		0	**1**	**2**	**3+**	**Subtotal**
00k - 50k	1-PSN	0.59	0.65	0.77	0.77	0.64
	2-PSN	0.88	1.16	1.18	1.29	1.15
	3-PSN	0.90	1.31	1.52	1.57	1.36
	4+PSN	1.00	1.31	1.52	1.53	1.40
	Subtotal	0.69	0.85	1.25	1.35	0.94
50k-100k	1-PSN	0.59	0.67	0.64	0.77	0.66
	2-PSN	0.88	1.26	1.31	1.31	1.28
	3-PSN	0.92	0.94	1.64	1.74	1.52
	4+PSN	1.25	1.59	2.12	2.15	2.07
	Subtotal	0.69	0.85	1.52	1.76	1.28
100k-150k	1-PSN	0.67	0.71	0.73	0.77	0.71
	2-PSN	0.88	1.30	1.31	1.31	1.30
	3-PSN	0.88	1.65	1.69	1.63	1.66
	4+PSN	1.75	1.81	2.22	2.36	2.25
	Subtotal	0.83	1.04	1.68	1.86	1.60
> 150k	1-PSN	0.86	0.89	0.89	0.89	0.89
	2-PSN	1.31	1.31	1.31	1.31	1.31
	3-PSN	0.88	1.66	1.66	1.66	1.66
	4+PSN	1.24	2.12	2.40	2.45	2.41
	Subtotal	0.99	1.27	1.71	1.83	1.70
	TOTAL	0.70	0.90	1.58	1.79	**1.36**

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[23] Source: Hamid Humeida to Files, Mark Moran, and Ronald Milone, "Estimation of Trip Production Model based on the 2007 Household Travel Survey," Memorandum, January 13, 2011.

Table 19 Final HBO Trip Production Rates[24]

Income Level	HH Size	Vehicles				
		0	**1**	**2**	**3+**	**Subtotal**
00k - 50k	1-PSN	0.80	0.89	0.89	1.17	0.87
	2-PSN	0.78	1.57	1.98	2.22	1.70
	3-PSN	1.55	1.57	3.00	3.00	2.25
	4+PSN	1.66	3.76	3.76	5.91	3.93
	Subtotal	0.91	1.30	2.38	3.48	1.62
50k-100k	1-PSN	0.80	0.89	0.89	1.18	0.89
	2-PSN	1.26	2.08	2.08	2.10	2.06
	3-PSN	1.55	3.00	3.47	3.79	3.47
	4+PSN	1.66	6.15	6.44	6.81	6.52
	Subtotal	0.96	1.59	3.45	4.52	2.86
100k-150k	1-PSN	1.09	0.90	0.93	0.90	0.92
	2-PSN	1.55	2.08	2.08	2.10	2.08
	3-PSN	2.50	3.40	3.66	3.79	3.70
	4+PSN	2.50	6.48	7.36	7.36	7.31
	Subtotal	1.35	1.87	4.24	4.93	3.96
> 150k	1-PSN	1.09	0.90	0.98	1.15	0.95
	2-PSN	1.55	2.08	2.08	2.08	2.08
	3-PSN	2.50	4.15	5.00	5.00	4.94
	4+PSN	2.50	6.48	7.36	7.87	7.55
	Subtotal	1.23	2.35	4.25	5.09	4.34
	TOTAL	0.95	1.58	3.76	4.75	**3.13**

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[24] Source: Hamid Humeida to Files, Mark Moran, and Ronald Milone, "Estimation of Trip Production Model based on the 2007 Household Travel Survey," Memorandum, January 13, 2011.

Table 20 Final NHW Trip Production Rates[25]

Income Level	HH Size	Vehicles				
		0	**1**	**2**	**3+**	**Subtotal**
00k - 50k	1-PSN	0.30	0.37	0.37	0.37	0.35
	2-PSN	0.30	0.32	0.44	0.44	0.38
	3-PSN	0.35	0.56	0.56	0.85	0.57
	4+PSN	0.35	0.56	0.56	1.18	0.65
	Subtotal	0.31	0.39	0.48	0.76	0.42
50k-100k	1-PSN	0.30	0.75	0.75	0.75	0.72
	2-PSN	0.30	0.77	0.81	0.81	0.79
	3-PSN	0.83	0.77	0.77	0.93	0.83
	4+PSN	0.83	0.94	0.94	1.04	0.97
	Subtotal	0.33	0.77	0.83	0.94	0.81
100k-150k	1-PSN	0.30	0.75	0.75	0.75	0.73
	2-PSN	0.75	1.03	1.03	1.18	1.06
	3-PSN	0.95	1.03	1.15	1.18	1.15
	4+PSN	0.98	1.03	1.15	1.33	1.21
	Subtotal	0.49	1.03	1.08	1.24	1.08
> 150k	1-PSN	0.75	1.00	1.00	1.05	0.99
	2-PSN	0.80	1.08	1.08	1.08	1.08
	3-PSN	1.26	1.26	1.30	1.42	1.36
	4+PSN	1.26	1.35	1.35	1.42	1.38
	Subtotal	0.77	1.10	1.20	1.31	1.23
	TOTAL	0.33	0.70	0.95	1.13	**0.87**

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[25] Source: Hamid Humeida to Files, Mark Moran, and Ronald Milone, "Estimation of Trip Production Model based on the 2007 Household Travel Survey," Memorandum, January 13, 2011.

Table 21 Final NHO Trip Production Rates[26]

Income Level	HH Size	Vehicles				
		0	1	2	3+	Subtotal
00k - 50k	1-PSN	0.58	0.68	0.96	1.12	0.68
	2-PSN	0.63	1.22	1.22	1.44	1.17
	3-PSN	0.71	1.25	1.25	1.25	1.18
	4+PSN	1.10	1.10	1.72	1.69	1.45
	Subtotal	0.63	0.86	1.30	1.44	0.95
50k-100k	1-PSN	0.61	0.68	0.96	1.21	0.72
	2-PSN	0.63	1.22	1.25	1.45	1.26
	3-PSN	0.74	1.46	1.47	1.62	1.52
	4+PSN	1.10	1.54	2.33	2.56	2.33
	Subtotal	0.64	0.89	1.56	1.95	1.35
100k-150k	1-PSN	0.61	0.72	0.94	0.88	0.76
	2-PSN	0.87	1.22	1.25	1.53	1.30
	3-PSN	1.00	1.46	1.47	1.62	1.53
	4+PSN	1.38	1.54	2.33	2.56	2.38
	Subtotal	0.75	0.99	1.67	2.00	1.63
> 150k	1-PSN	0.67	0.72	0.99	1.36	0.84
	2-PSN	0.95	1.22	1.49	1.62	1.50
	3-PSN	1.00	1.46	1.56	1.66	1.61
	4+PSN	1.49	2.39	2.41	2.56	2.48
	Subtotal	0.76	1.17	1.79	1.98	1.79
	TOTAL	0.64	0.91	1.61	1.94	**1.41**

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Table 22 shows a summary of the trip production rates across the five trip purposes, indicating an average of about 8.40 trip productions per household on an average weekday. According to NCHRP 365, one would expect about 8.5 daily person trips per household for an urban area with over one million people.[27]

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[26] Source: Hamid Humeida to Files, Mark Moran, and Ronald Milone, "Estimation of Trip Production Model based on the 2007 Household Travel Survey," Memorandum, January 13, 2011.
[27] William A. Martin and Nancy A. McGuckin, *NCHRP Report 365, Travel Estimation Techniques for Urban Planning*, National Cooperative Highway Research Program (NCHRP) (Washington, D.C.: Transportation Research Board, National Research Council, 1998), 25.

Table 22 Daily trip productions per household (average weekday), summary across the trip purposes

	Daily Trip Productions per HH (ave wkday)
HBW	1.63
HBS	1.36
HBO	3.13
NHW	0.87
NHO	1.41
Total	8.40

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4.3 The Internal-to-External Trip Estimation Model

Travel can be categorized into four markets, based on whether the starting and ending points of the trip are within or beyond the modeled area, as can be seen in Table 23.

Table 23 Categorization of trips into four markets, based on whether the starting and ending points of the trip are within or beyond the modeled area

Travel market	Acronym	Short-hand name
Internal-to-internal	I-I	Internal
Internal-to-external	I-X	External
External-to-internal	X-I	External
External-to-external	X-X	Through

Since I-X trips and X-I trips are typically referred to as "external travel," one can also think in terms of three markets: internal, external, and through. External and through travel (I-X, X-I and X-X) are entered exogenously into the trip generation process. However, since the trip production rates include both internal (I-I) and internal-to-external (I-X) trips generated by households that reside in the modeled area, it is necessary to remove the I-X portion of total trip productions to avoid double counting.

The first I-X trip extraction sub-model was estimated by William Allen in the early 1990s based on the 1987 Home Interview Survey and the 1478 zone system. The model was then updated by TPB staff in 1997 using the 1994 HTS and the 2,191 zone system.[28] [29] [30] Consequently, this is the third update of the I-X trip extraction model. This latest update is based on the 2007 HTS and the 3,722-zone system, which has 3,675 internal zones. All of these models are based on the premise that the share of I-X trips is inversely related to the distance between the centroid of the production zone and the nearest external station.

In Version 2.2 of the travel model, a single curve was developed to extract internal-to-external trips following trip generation. However, during Version 2.3 model calibration, it was noted that Home-Based-Work internal-to-external trip rates are dramatically different for counties in the vicinity of Baltimore.[31] Thus, for the purposes of HBW I-X trip estimation, the region was split into counties near Baltimore (i.e., Anne Arundel, Howard, and Carroll counties) and the rest of the region. The equations

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[28] Parsons, Brinckerhoff, Quade & Douglas, Inc., KPMG Peat Marwick LLP, and William G. Allen Jr. to Metropolitan Washington Council of Governments, "Technical Assistance for 1995 Model Validation: Technical Memorandum #2: Review of 1994 Survey Files," Memorandum, January 19, 1997, 16.

[29] Parsons, Brinckerhoff, Quade & Douglas, Inc., KPMG Peat Marwick LLP, and William G. Allen Jr. to Metropolitan Washington Council of Governments, "Technical Assistance for 1995 Model Validation: Technical Memorandum #4: Trip Generation and Time-of-Day Models," Memorandum, June 30, 1997, 7.

[30] Ronald Milone, Hamid Humeida, and Meseret Seifu, *FY-97 Models Development Program for COG/TPB Travel Models*, Draft (Washington, D.C.: Metropolitan Washington Council of Governments, National Capital Region Transportation Planning Board, June 30, 1997), 3–31.

[31] Hamid Humeida to Mark Moran, "I-X Trip Extraction Sub-Model," Memorandum, January 13, 2011.

developed for I-X trip extraction are described below and shown graphically in Figure 6. This function captures the fact that, as the distance to the nearest external station increases, the share of total trip productions that is attracted to external locations (I-X) drops.

Equation 2 Percent of total trips productions that are I-X

$IX\_Baltimore\_HBW = 0.3348 \, Exp \, (-0.0938*DNE)$

$IX\_Baltimore\_Non\text{-}HBW = 0.1766 \, Exp \, (-0.1957*DNE)$

$IX\_Non\text{-}Baltimore\_HBW = 0.2133 \, Exp \, (-0.1950*DNE)$

where
DNE	=	the "straight-line" distance to the nearest external station (in miles)
Exp	=	the exponential function
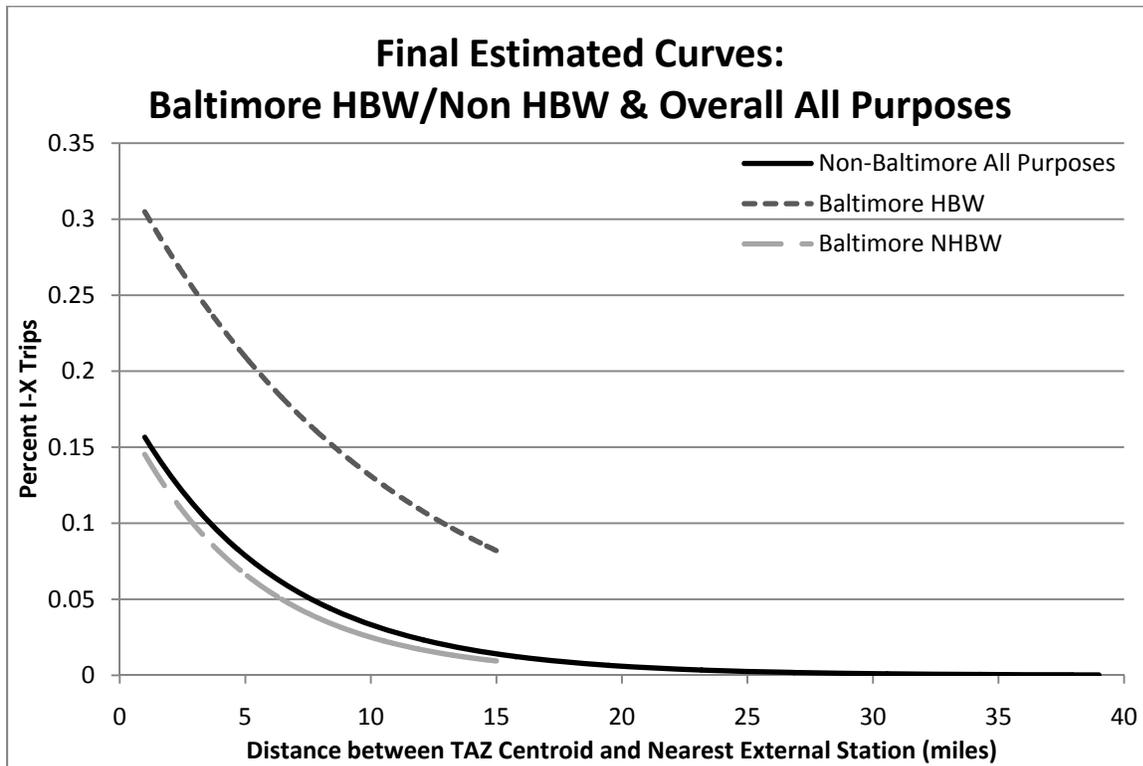
Figure 6 Internal-to-External Trip Extraction Model

4.4 Area type

Area type is an important parameter that is used as a basis for determining link free-flow speed and link capacity, and is also used in a number of models, including the vehicle ownership model, the trip generation model, and the non-motorized HBW trip-end model. In the Version 2.2 model, area type is defined based on a one-mile "floating" employment and population density. The one-mile floating

density for a specified TAZ is calculated by adding the density in the TAZ to the density in other TAZs whose centroid lies within a one-mile radius of the specified TAZ's centroid (this aggregation technique is sometimes referred to as "geographic centroid aggregation"). In the Version 2.2 travel model, there were seven area types, which were a function of the population density and the employment density. [32] By contrast, in the Version 2.3 travel model on the 3,722-TAZ area system, there are now six area types, as can be seen in Table 24.[33] Changes to the previous definitions included combining area types 6 and 7, changing the employment and population category thresholds, as well as reclassifying some area types. Also, the new scheme has generally a smoother transition from one area type to the next.

Table 24 Area Type Definitions (1-7) as a function of population and employment density

One-Mile "Floating" Population Density (Pop/Sq mi)	One- mile "Floating" Employment Density (Emp/Sq mi)						
	0-100	101-350	351-1,500	1,501-3,550	3,551-13,750	13,751-15,000	15,001+
0-750	6	6	5	3	3	3	2
751-1,500	6	5	5	3	3	3	2
1,501-3,500	6	5	5	3	3	2	2
3,501-6,000	6	4	4	3	2	2	1
6,001-10,000	4	4	4	2	2	2	1
10,001-15,000	4	4	4	2	2	2	1
15,001+	2	2	2	2	2	1	1

Two maps showing the revised area types can be seen in Figure 7and Figure 8.

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[32] Ronald Milone et al., *TPB Travel Forecasting Model, Version 2.2: Specification, Validation, and User's Guide*, 4–8.
[33] Mary Martchouk to Mark S. Moran, "Area Type Definitions for Version 2.3 Travel Demand Model," Memorandum, June 16, 2010.
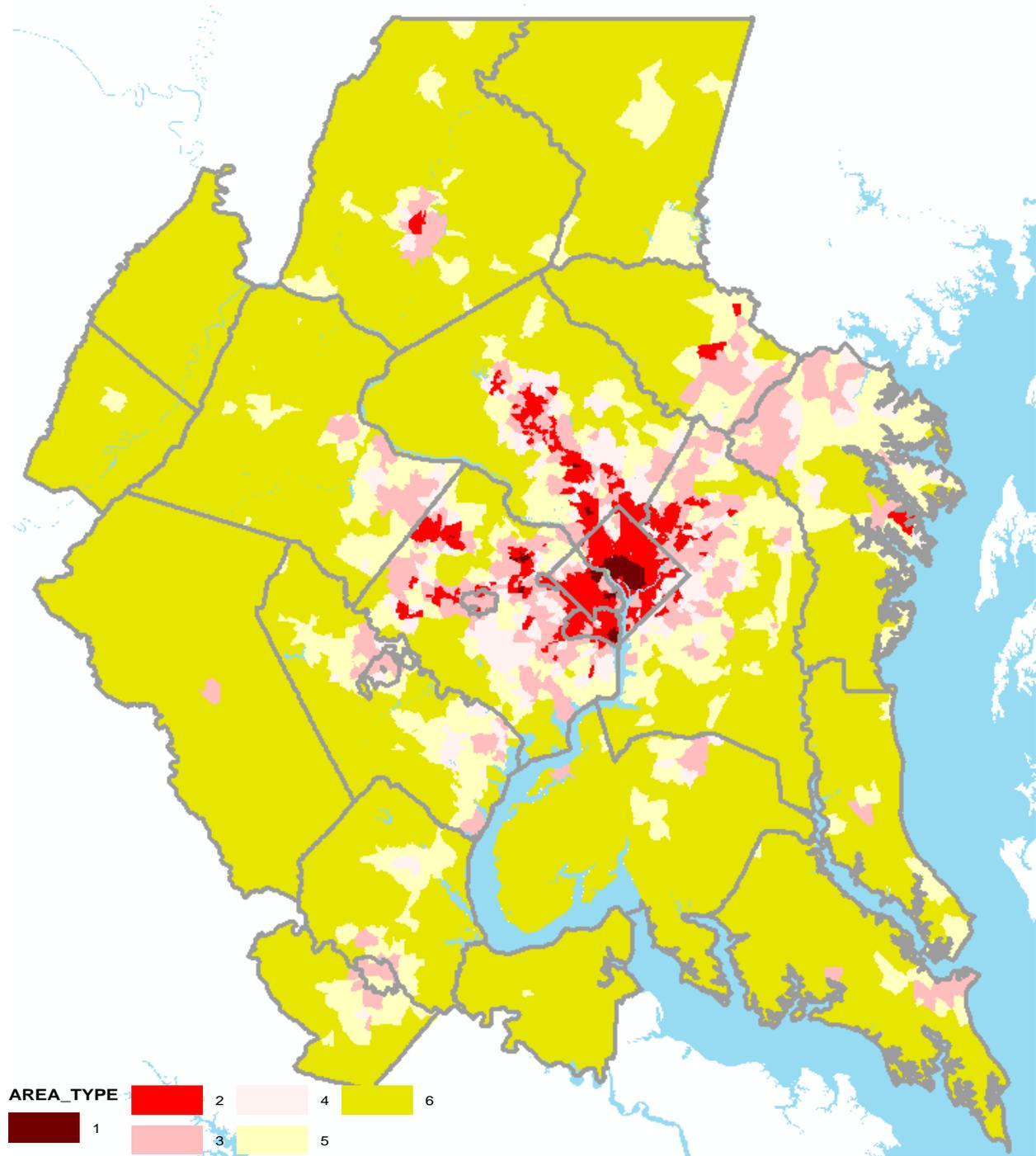
Figure 7 Revised area types used in the Version 2.3 travel model: Modeled area
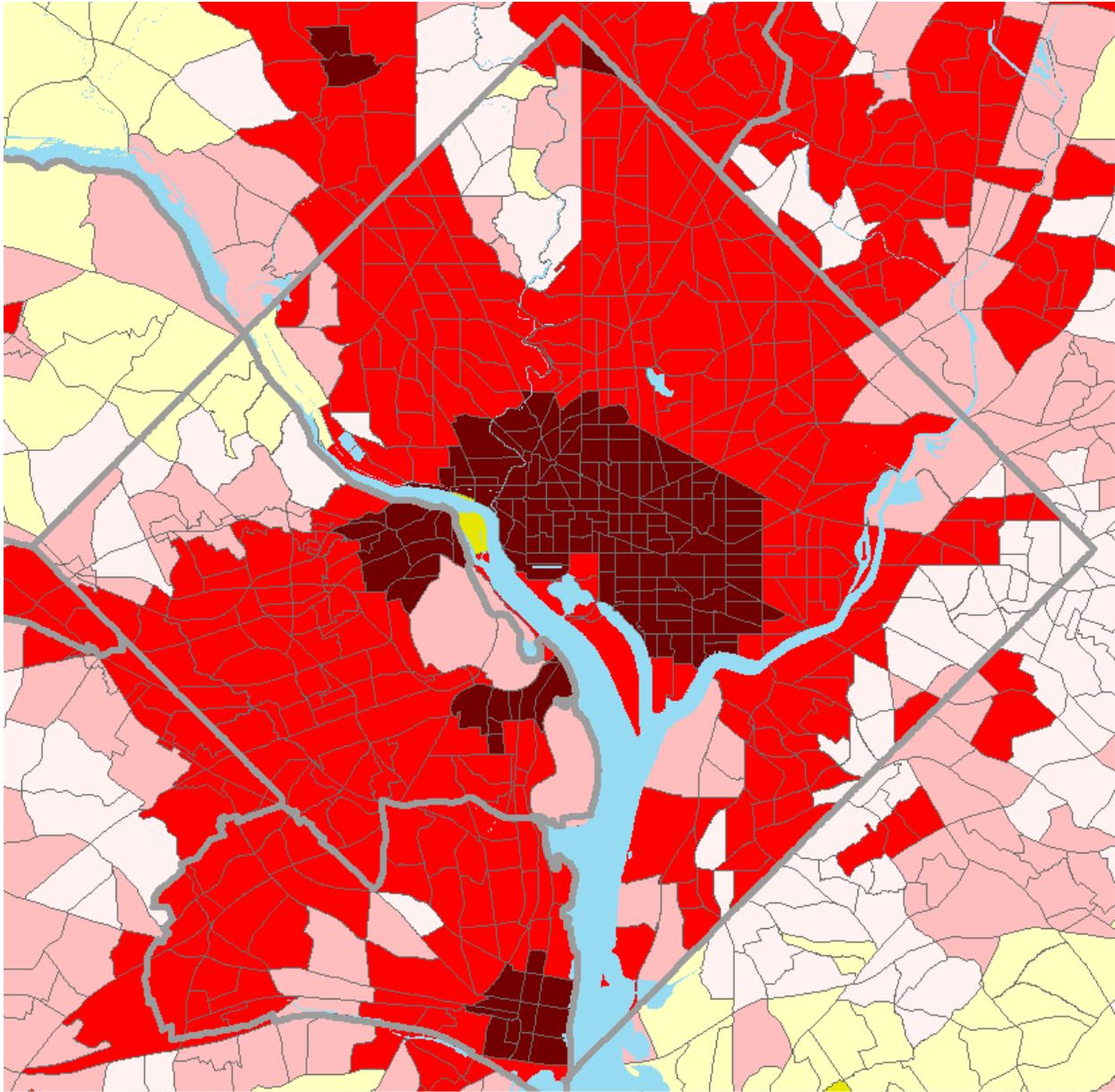
Figure 8 Revised area types used in the Version 2.3 travel model: the 10-mile square

Notice that the TAZs containing both the Pentagon (TAZ 1496) and Arlington Cemetery (TAZ 1487) are shown as area type 3 ("medium employment density"). In reality, the Pentagon should probably be area type 1 ("high mixed employment and population density") or 2 ("medium/high mixed density"). Similarly, Arlington Cemetery should probably be area type 6 ("rural"). This apparent mischaracterization of area types for these two zones is likely due to the fact that floating density is used in the calculations. In the Version 2.3.30 model, we added the *capability* to have area type overrides. In the year-2007 model runs done for the 2.3.31 and 2.3.32 models, we changed the area type of the Pentagon from 3 to 1 and changed the area type of Arlington Cemetery from 3 to 6. Unfortunately, this change was mistakenly left out of the year-2007 model runs done for the 2.3.33-

2.3.36 models. In the future, as we update the travel model, we plan to re-introduce these two area-type override values (and possibly some others, as appropriate).

While calibrating the trip generation model, a series of area-type adjustments were added to the model, as seen in Table 26.[34]

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[34] Ronald Milone to Files, "Performance of trip generation models," Memorandum, November 18, 2010.

The following names are associated with the six area types:

Table 25 Description of each area type and examples of each area type

Area Type	Name	Examples
1	High mixed employment and population density	1. Downtown DC, between Georgetown, Florida Ave., and 11th St. NE & SE 2. Old Town Alexandria 3. The Rosslyn/Court House area of Arlington Co. 4. Pentagon City area of Arlington Co. 5. Downtown Bethesda, Maryland 6. Center of Tysons Corner, Virginia
2	Medium/high mixed density	1. A majority of DC outside the downtown core 2. A majority of Arlington Co., south of Lee Highway 3. A majority of Alexandria 4. Areas of Tysons Corner just beyond the center 5. Annapolis, Maryland 6. Downtown Frederick, Maryland 7. Parts of Reston and Herndon, Virginia, along the Dulles Access/Toll Road
3	Medium employment density	1. Parts of upper NW DC near Rock Creek Park 2. Parts of Arlington along Lee Highway 3. National Airport 4. The Pentagon 5. Arlington Cemetery 6. BWI Airport 7. Potomac Mills mall in Woodbridge, Virginia
4	Medium population density	1. Parts of upper NW DC near Rock Creek Park 2. Parts of north Arlington 3. SE DC near the Capitol Heights Metrorail station 4. Chevy Chase, Maryland, near the DC border
5	Low density	1. Area along McArthur Boulevard in DC 2. Upper north Arlington Co. 3. Fort Hunt section of Fairfax Co. 4. Dulles Airport 5. Andrews Air Force Base
6	Rural	1. Great Falls, Virginia 2. Much of Loudoun Co., Virginia 3. Most of Fauquier Co., Virginia 4. Much of Charles, St. Mary's, and Calvert Counties, Maryland 5. Most of Frederick and Carroll Co., Maryland

Table 26 Area-type adjustments developed in trip generation calibration

Motorized Production Adjustments

AreaType->	1	2	3	4	5	6
HBW	1.1358	1.1180	1.0554	0.9175	0.9577	0.9307
HBS	0.8092	0.9504	1.0793	0.9059	1.0751	0.8620
HBO	1.1067	1.1181	1.0303	0.9647	1.0109	0.8324
NHB	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
NHO	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Motorized Attraction Adjustments

AreaType->	1	2	3	4	5	6
HBW	1.0765	0.8478	0.9612	1.1045	0.9871	1.0383
HBS	0.7952	1.0967	1.1577	0.8770	0.9437	0.5187
HBO	1.1542	1.1304	0.9307	1.0635	1.0480	0.8032
NHB	1.1457	0.8686	0.9843	1.5731	1.1860	1.0919
NHO	0.7953	1.0652	1.0724	0.9180	1.0899	0.7224

Nonmotorized Production Adjustments

AreaType->	1	2	3	4	5	6
HBW	1.4424	1.1007	1.0554	0.9175	0.9577	0.9307
HBS	1.2222	1.2677	1.0793	0.9059	1.0751	0.8619
HBO	0.9363	1.3047	1.0303	0.9647	1.0109	0.8325
NHB	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
NHO	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Nonmotorized Attraction Adjustments

AreaType->	1	2	3	4	5	6
HBW	1.2809	1.0087	1.1436	1.3141	1.1746	1.2354
HBS	1.0758	1.2904	1.3709	1.0385	1.1175	0.6141
HBO	0.6886	1.2374	1.0476	1.1970	1.1796	0.9041
NHB	1.0477	1.0620	0.8302	1.3269	1.0004	0.9211
NHO	1.2008	1.0651	0.8146	0.6974	0.8280	0.5488

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In model application, these are supplemented with a series of jurisdiction-level production and attraction modification factors (p-mods and a-mods).

4.5 Non-Motorized Production Trip Model

The trip rates developed in trip generation reflect both motorized and non-motorized travel. The inclusion of non-motorized trips was intended to allow the modeler the ability to relate land use policy (e.g. land use mix, density, etc.) to the level of walking and bicycling, and its explicit effect on the reduction of motorized travel. However, the decision was also made early on that non-motorized trips should not be carried forth into trip distribution and mode choice steps given that the non-motorized

trips are extremely dissimilar in spatial scale compared to that of motorized travel (non-motorized trips predominantly occur within zones, or between adjacent zones). In Version 2.2 travel model, non-motorized trips were estimated using a fixed percentage developed based on area type and were only modeled for home-based work trips.[35]

In Version 2.3 of the model, non-motorized trip are estimated for all purposes. In addition, walking environment factors, sometimes referred to as pedestrian environment factors or PEFs, are considered in modeling these trips. Walking environment can be captured using parameters that can be estimated based on a GIS street layer and include block density, ratio of 4-way intersections to cul-de-sacs, and major/minor street density. All these parameters were considered in the non-motorized model, however, only block density proved to be a significant predictor of non-motorized trip percentage.

The percentage of non-motorized trips was modeled using linear regression for high density areas (area types 1 and 2). For other area types, too few non-motorized trips were observed to produce any meaningful model results and thus fixed percentages of non-motorized trips were assumed for each area type as shown in Table 27.[36] For area types 1 and 2, HBW and HBS/HBO models were estimated as shown in Table 28 and Table 29. Note that the no non-motorized trip models are developed at the production end for non-home-based trips.

Table 27 Production End Non-Motorized Trip Percentages for Area Types 3-6

Area Type	HBW	HBS	HBO	NHW	NHO	Total
3	2.45%	2.79%	8.19%	4.69%	4.20%	5.00%
4	1.15%	2.32%	7.36%	2.04%	3.99%	4.52%
5	0.42%	1.06%	5.10%	2.41%	3.10%	3.00%
6	0.81%	0.17%	3.58%	3.07%	1.77%	2.08%

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[35] Ronald Milone et al., *TPB Travel Forecasting Model, Version 2.2: Specification, Validation, and User's Guide*, 4–8.
[36] Mary Martchouk to Mark Moran, "Validation of Non-Motorized Trip Model," Memorandum, October 27, 2010; Mary Martchouk to Mark Moran, "Development of the Non-motorized Trip End Model," Memorandum, October 7, 2010.

Table 28 HBW Non-Motorized Production-End Trip Model

Variable	Definition	Coefficient	Std. Error	T- stat.	P-value	Avg. Value
Constant		-0.00388	0.009633	-0.402	0.6875	
POPDEN10	One-mile floating population density (persons/sq. mile)	2.20E-06	1.12E-06	1.963	0.0496	8943
EMPDEN10	One-mile floating employment density (employees/sq. mile)	3.54E-06	1.85E-07	19.148	0	16520
BLKDEN05	Street block density (blocks/sq. mile)	0.000474	0.000124	3.82	0.0001	71.99
Adjusted R^2		0.44				
Number of Observations		758				

Table 29 Home-Based Shop (HBS) and Home-Based Other (HBO) Non-Motorized Production Trip Model

Variable	Definition	Coefficient	Std. Error	T- stat.	P-value	Avg. Value
Constant		-0.00870	0.01148	-0.758	0.4485	
POPDEN10	One-mile floating population density (persons/sq. mile)	1.110E-05	1.37E-05	8.141	0	8812
EMPDEN10	One-mile floating employment density (employees/sq. mile)	2.582E-06	2.30E-06	11.243	0	16150
BLKDEN05	Street block density (blocks/sq. mile)	0.00083426	0.00013	5.527	0	70.53
Adjusted R^2		0.40				
Number of Observations		786				

4.6 Trip Attraction Model

The trip attraction models are linear regression equations that use land use data, including employment and population, to predict the number of attractions in a TAZ. The equations were developed using district-level data from the 2007/2008 Household Travel Survey. Trip attractions are estimated by trip

purpose and two area type groupings (area types 1-2 and area types 3+).[37] The resulting trip attractions models are shown below.

HBW_Attr_1-2 = 1.118* TOTEMP

HBW_Attr_3+= 0.8546* TOTEMP

HBS_Attr_1-2= 1.995*RETEMP+ 0.301*TOTPOP

HBS_Attr_3+= 3.102*RETEMP+ 0.221*TOTPOP

HBO_Attr_1-2= 0.425*NONRETEMP+ 1.012*TOTPOP

HBO_Attr_3+= 1.084*NONRETEMP+ 0.588*RETEMP+ 0.777*TOTPOP

NHW_Attr_1-2= 0.944*RETEMP+ 0.557*OFFEMP+ 0.656*OTHEREMP

NHW_Attr_3+= 0.807*RETEMP+ 0.522*OFFEMP+ 0.507*OTHEREMP

NHO_Attr_1-2= 0.097*NONRETEMP+ 1.498*RETEMP+ 0.300*TOTPOP

NHO_Attr_3+= 0.178*NONRETEMP+ 2.784*RETEMP+ 0.184*TOTPOP

4.7 Non-motorized Attraction Trip Model

The non-motorized trip model on the attraction trip end is estimated similarly to the non-motorized trip model on the production trip end. For area types 3-6, a fixed percentage of non-motorized trips is assumed for each area type as shown in Table 30. For area types 1 and 2, the non-motorized trips are predicted as a function of the land use and walkability factors. The models are split by trip purpose into HBW, HBS/HBO/NHO, and NHW. However, since there are too few HBW non-motorized trip attractions, a fixed percentage of 4.87% is assumed. The HBS/HBO/NHO and NHW models are shown in Table 31 and Table 32.

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[37] Mary Martchouk to Mark Moran, "Development of Trip Attraction Models," Memorandum, September 14, 2010.

Table 30 Attraction End Non-Motorized Trip Percentages for Area Types 3-6

Area Type	HBW	HBS	HBO	NHW	NHO	Total
3	1.71%	1.48%	6.19%	4.59%	4.26%	3.87%
4	2.33%	4.14%	9.28%	1.95%	3.87%	6.42%
5	0.77%	1.45%	5.67%	2.16%	3.19%	3.67%
6	1.41%	0.74%	5.28%	3.46%	1.23%	3.42%

Table 31 HBS/HBO/NHO Non-Motorized Attraction Trip Model

Variable	Definition	Coefficient	Std. Error	T- stat.	P-value	Avg. Value
Constant		-0.0157	0.00953	-1.647	0.0995	
POPDEN10	One-mile floating population density (persons/sq. mile)	1.08E-05	1.18E-04	9.203	0	8612
BLKDEN05	Street block density (blocks/sq. mile)	0.001294	0.000125	10.35	0	68.87
Adjusted R^2		0.37				
Number of Observations		822				

Table 32 NHW Non-Motorized Attraction Trip Model

Variable	Definition	Coefficient	Std. Error	T- stat.	P-value	Avg. Value
Constant		-0.00383	0.012245	-0.312	0.7547	
POPDEN10	One-mile floating population density (persons/sq. mile)	5.41E-06	1.48E-04	3.665	0.0002	8769
EMPDEN10	One-mile floating employment density (employees/sq. mile)	5.34E-06	2.30E-05	23.196	0	18003
BLKDEN05	Street block density (blocks/sq. mile)	0.001217	0.000165	7.382	0	70.43
Adjusted R^2		0.57				
Number of Observations		756				

4.8 Home-based Trip Attraction Income Disaggregation Model

The Version 2.3 trip distribution and mode choice models are applied by income level for the home-based trip purposes. Trip production stratification by income is straightforward since trip productions

are developed by income, along with size and vehicle availability levels. However, the trip attraction model calculates total trip attractions for each TAZ, and so, a technique is necessary for apportioning the total attractions among the four income levels, for each home-based purpose.

The approach for apportioning trip attractions by income level is one that assumes that the zonal income distribution is not substantially different from the regional income distribution. The approach does, however, allow for the income variation by area type which is an important consideration. Ideally, it would be desirable to know the type of employment in each TAZ as a basis for the distributing HBW attractions by income, or the type of retail employment as a basis for distributing HBS attractions by income. Unfortunately, this type of information is not currently available as an input to the travel model and cannot be considered.

The income distribution of HBW, HBS, and HBO trip attractions by area type is shown on Table 33, Table 34, and Table 35, respectively. These tables were summarized from the 2007/08 HTS. Table 33 indicates that 12.95% of regional attractions are comprised of income level 1 attractions. Table 33 also indicates that the regional proportion varies somewhat by area type. For example, the proportion of income level 1 attractions in area type 1 (high density urban) is about 9.6% of all attractions in area type 1, and this differential is reflected in the ratios shown at the bottom of Table 33 (the ratio of 9.4% to 12.95% is 0.74). This information will be used to perform the apportioning of total motorized attractions by income level. In application, the technique is will be performed for each purpose as follows:

1. Total motorized attractions will be computed for a TAZ.
2. The TAZ level trip attractions will be calculated by income level, by purpose, using the following equation:

Equation 3 Trip Attraction by Income Level

Attractions(L) = Total Attractions * Regional Pct(L) * Ratio (L,AT)

where:

Attractions(L)	= income level L trip attractions
Total Attractions	= Total trip attractions
Regional Pct(L)	= Regional percent of trip attractions of income L
Ratio (L,T)	= Ratio of area type T pct. of income L attractions to the regional pct.

3. The income-based attractions computed in step 2 will be normalized to the step 1 total.

The regional income percentage and the area type-based ratios for each HB purpose are read into the trip generation program as a parameter table (or a "lookup table"). After all TAZs have been processed, the zonal trip attractions in each income group are scaled to match the computed trip production totals. This method assures that the income distribution of attractions within area types will agree with that of the 2007/08 HTS. It is assumed that this distribution will remain stable over time.

Table 33 HBW Motorized Trip Attractions by Area Type and Income

Area Type	Income1	Income2	Income3	Income4	Total
1	80,191	241,965	287,102	222,871	832,129
2	101,088	288,627	309,459	204,419	903,593
3	147,866	350,939	345,579	195,381	1,039,764
4	30,640	67,420	44,367	28,069	170,496
5	61,816	139,199	133,200	49,754	383,969
6	34,570	73,482	63,813	19,652	191,517
Total	**456,170**	**1,161,633**	**1,183,521**	**720,146**	**3,521,469**

Income Distribution of HBW Trip Attractions by Area Type

Area Type	Income1	Income2	Income3	Income4	Total
1	9.64%	29.08%	34.50%	26.78%	100.00%
2	11.19%	31.94%	34.25%	22.62%	100.00%
3	14.22%	33.75%	33.24%	18.79%	100.00%
4	17.97%	39.54%	26.02%	16.46%	100.00%
5	16.10%	36.25%	34.69%	12.96%	100.00%
6	18.05%	38.37%	33.32%	10.26%	100.00%
Total	**12.95%**	**32.99%**	**33.61%**	**20.45%**	**100.00%**

Ratio of Area Type Income Distribution to the Regional Distribution

Area Type	Income1	Income2	Income3	Income4	
1	0.7439	0.8815	1.0266	1.3097	
2	0.8636	0.9683	1.0190	1.1062	
3	1.0978	1.0232	0.9889	0.9189	
4	1.3873	1.1988	0.7743	0.8050	
5	1.2428	1.0990	1.0322	0.6336	
6	1.3935	1.1631	0.9914	0.5018	

Source: 2007/2008 HTS

Table 34 HBS Motorized Trip Attractions by Area Type and Income

Area Type	Income1	Income2	Income3	Income4	Total
1	20,757	42,349	37,159	27,709	127,974
2	95,882	191,413	204,988	128,509	620,791
3	165,345	381,588	368,510	159,232	1,074,675
4	56,739	117,664	112,012	58,191	344,607
5	72,449	211,873	201,293	60,035	545,650
6	30,362	54,583	60,979	22,475	168,398
Total	**441,533**	**999,471**	**984,940**	**456,151**	**2,882,095**

Income Distribution of HBS Trip Attractions by Area Type

Area Type	Income1	Income2	Income3	Income4	Total
1	16.22%	33.09%	29.04%	21.65%	100.00%
2	15.45%	30.83%	33.02%	20.70%	100.00%
3	15.39%	35.51%	34.29%	14.82%	100.00%
4	16.46%	34.14%	32.50%	16.89%	100.00%
5	13.28%	38.83%	36.89%	11.00%	100.00%
6	18.03%	32.41%	36.21%	13.35%	100.00%
Total	**15.32%**	**34.68%**	**34.17%**	**15.83%**	**100.00%**

Ratio of Area Type Income Distribution to the Regional Distribution

Area Type	Income1	Income2	Income3	Income4	
1	1.0587	0.9542	0.8499	1.3677	
2	1.0085	0.8890	0.9663	1.3076	
3	1.0046	1.0239	1.0035	0.9362	
4	1.0744	0.9844	0.9511	1.0670	
5	0.8668	1.1197	1.0796	0.6949	
6	1.1769	0.9345	1.0597	0.8433	

Source: 2007/2008 HTS

Table 35 HBO Motorized Trip Attractions by Area Type and Income

Area Type	Income1	Income2	Income3	Income4	Total
1	62,588	104,036	102,072	91,767	360,463
2	232,338	416,417	418,281	285,700	1,352,736
3	207,625	572,863	552,918	310,960	1,644,367
4	136,070	326,709	315,535	187,180	965,495
5	151,018	504,410	521,081	241,014	1,417,524
6	60,220	235,598	277,858	106,643	680,319
Total	**849,860**	**2,160,033**	**2,187,745**	**1,223,265**	**6,420,904**

Income Distribution of HBO Trip Attractions by Area Type

Area Type	Income1	Income2	Income3	Income4	Total
1	17.36%	28.86%	28.32%	25.46%	100.00%
2	17.18%	30.78%	30.92%	21.12%	100.00%
3	12.63%	34.84%	33.62%	18.91%	100.00%
4	14.09%	33.84%	32.68%	19.39%	100.00%
5	10.65%	35.58%	36.76%	17.00%	100.00%
6	8.85%	34.63%	40.84%	15.68%	100.00%
Total	**13.24%**	**33.64%**	**34.07%**	**19.05%**	**100.00%**

Ratio of Area Type Income Distribution to the Regional Distribution

Area Type	Income1	Income2	Income3	Income4	
1	1.3112	0.8579	0.8312	1.3365	
2	1.2976	0.9150	0.9075	1.1087	
3	0.9539	1.0357	0.9868	0.9927	
4	1.0642	1.0059	0.9592	1.0178	
5	0.8044	1.0577	1.0790	0.8924	
6	0.6684	1.0294	1.1987	0.8231	

Source: 2007/08 HTS

4.9 Truck Model

The origin/destination truck trip generation rates are based on area type and land activity variables as shown in Table 36.   The truck trip generation model also includes provisions to remove external trucks generated because external truck travel is accounted for exogenously. The truck trip generation process also includes network checks provisions to ascertain whether or not truck access from each TAZ to the highway network is valid. There are some zonal centroids in the regional network that have a single connection to a parkway where trucks are prohibited. In these types of cases, truck trip generation is suppressed.   Finally, the truck model also considers a limited number of special generator TAZs, or locations where truck traffic generation is known to be more intensive.   Global trip generation adjustments are applied to the special generator TAZs.   The medium truck generation is factored by 2.70 while heavy trucks are factored by 5.3.

Table 36 Truck trip generation rates as a function of truck type, area type, and land use category[38]

Vehicle Type	Area Type	Land Use Category				
		Office	Retail	Industrial	Other	HH
Medium Truck (Single Unit 6+ Tires)	1 (CBD)	0.004	0.088	0.088	0.014	0.070
	2 - 4	0.005	0.125	0.125	0.020	0.100
	5	0.006	0.150	0.150	0.024	0.120
	6	0.006	0.150	0.150	0.024	0.120
Heavy Truck (All Combination Vehicles)	1 (CBD)	0.001	0.027	0.055	0.002	0.011
	2 - 4	0.002	0.039	0.078	0.003	0.015
	5	0.002	0.043	0.086	0.003	0.017
	6	0.002	0.043	0.086	0.003	0.017

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4.10 Commercial Vehicle Model

The trip generation of zonal commercial vehicle trips is developed with the equation shown below:[39]

Equation 4 Trip generation of commercial vehicle trips

COM productions =
(0.056*indemp + 0.168*offemp + 0.494*retemp + 0.082*othemp + 0.130* HH)*ATFAC

(attractions = productions, by zone)

       where:

            indemp = industrial employment
            offemp = office employment
            retemp = retail employment
            othemp = other employment
            HH = households
            ATFAC = area type adjustment factor:

Area type	Factor
1	1.05
2	0.90
6	1.20

Note: no factor is applied to area types 3-5.

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[38] Allen, *Development of a Model for Truck Trips*.
[39] Allen, *Development of a Model for Commercial Vehicle Trips*, 46.

Chapter 5 Trip Distribution

The Version 2.3 trip distribution model involves a standard gravity model approach and the use of a composite (highway and transit) travel time impedance measure. The model also employs income stratification as well as special external (i.e., external-to-internal, X/I, and internal-to-external, I/X) auto and truck distribution models. The Version 2.3 trip distribution process is identical to that of Version 2.2, except that, first, the truck F-Factors have been revised,[40] and, second, the output formats of trip table have been changed from an integer format to a real number format (two-decimals).

5.1 Model Structure

The Version 2.3 trip distribution model is used to develop zonal trip tables corresponding to the eight basic trip purposes:

- HBW, HBS, HBO, NHW, and NHO motorized person trips,
- Commercial vehicle trips, and
- Medium and heavy truck trips.

The Version 2.3 trip distribution process consists of several different distribution models that are developed for special travel markets within the eight basic purposes. As can be seen in Table 37, there are 17 markets for internal (I-I) trips and 13 markets for external (I-X, X-I) trips, which leads to 30 trip distribution markets.

Table 37 Trip distribution markets

Purpose/Mode	Internal (I-I) trips	External (I-X, X-I) trips
HBW person	4 income strata	2 facility types: interstate and arterial
HBS person	4 income strata	2 facility types: interstate and arterial
HBO person	4 income strata	2 facility types: interstate and arterial
NHW person	1 (non-stratified)	2 facility types: interstate and arterial
NHO person	1 (non-stratified)	2 facility types: interstate and arterial
Commercial vehicles	1 (non-stratified)	1 (non-stratified)
Medium truck	1 (non-stratified)	1 (non-stratified)
Heavy truck	1 (non-stratified)	1 (non-stratified)
Total internal/ext. markets	**17**	**13**
Total markets modeled	**30**	

For the current calibration effort, 14 of the 30 trip distribution markets have been re-calibrated using the observed motorized trips from the 2007/2008 Household Travel Survey data and year 2007 highway

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[40] Allen, *Development of a Model for Truck Trips*.

and transit networks (See Table 38).[41] These 14 markets account for the vast majority of motorized travel in the region. The external distribution models were not re-estimated as no external survey data has been recently collected for these markets. Similarly, the internal trip distribution markets for commercial vehicles and trucks were not re-estimated. Consequently, the "legacy" friction factor (F-factor) curves used in the Version 2.2 model will be maintained for the other 16 markets. The commercial vehicle and truck models calibrated in 2008 on the 2,191-TAZ area system were preserved and adapted to operate on the 3,722-TAZ area system.[42]

Table 38 Trip distribution markets that were re-calibrated

Purpose/Mode	Internal Person Models
HBW person	4 Income Strata
HBS person	4 Income Strata
HBO person	4 Income Strata
NHW person	1 (non-stratified)
NHO person	1 (non-stratified)
Total Markets	14

5.2 Internal Motorized Person Models

The Version 2.3 trip distribution model includes income stratification for the home-based trip purposes. The model also makes use of a composite time formulation involving both highway and transit travel times. The composite time formulation is desirable since many corridors in the Washington region are well served by transit and the consideration of highway time only (as has been used in some previous model versions) has the potential to understate accessibility. The definition of the composite time is:

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[41] Ron Milone to Files, "Version 2.3 Trip Distribution Calibration," Memorandum, January 2, 2011.
[42] Ronald Milone to Hamid Humeida and Mark Moran, "Conversion Truck Modeling Inputs for the 3722 System," Memorandum, March 26, 2010; Hamid Humeida to Files, "Development of an equivalency file to convert truck modeling inputs from the 2191 TAZ system to the new 3722 TAZ system," Memorandum, April 16, 2010.

Equation 5 Composite time

$$CT_i = \cfrac{1}{\cfrac{1}{HT + TollT_i} + \cfrac{P_i}{TT}}$$

where

CT_i = Composite time for income level i
HT = Congested highway time (minutes), including terminal time
$TollT_i$ = Time equivalent (minutes)of tolls associated with the minimum-time path for income i
P_i = Regional transit share of income i for the trip purpose
TT = Metrorail-related transit time (min.), including in-vehicle and out-of-veh. time components

The highway and transit times used in the formulation vary by purpose. AM peak highway/transit times are used for the HBW purpose and midday highway/transit times are used for the remaining HBS, HBO, NHW and NHO purposes. The highway time (HT) includes both over-the-network times as well as terminal times, e.g., parking and retrieving a vehicle, which vary from 1 to 5 minutes depending on the area type of the origin/destination. Since the trip distribution model not only distributes trips between zones, but also determines the number of trips that stay within each zone, the average travel time for intra-zonal trips must be estimated. The intra-zonal highway times have been set to 85% of the minimum inter-zonal time. The previous assumption (50% of the minimum intra-zonal time) was found to yield an overestimation in intra-zonal travel and so the percentage was increased to better approximate the observed intra-zonal proportions. The regional share of transit trips made by each income group (P_i) is shown in Table 39 as percents. The table indicates that work transit shares vary by income, from 0.1483 to 0.1851. The transit percentages for the remaining purposes vary by income group from 0.0104 to 0.1239. Since these values are relatively small, the effect of highway times will be generally more pronounced on the overall composite time function compared to the effect of transit times for most interchanges.

Table 39 Internal Motorized Trips and Transit Percentages by Purpose and Mode

		Income Level				
Purpose	**Mode**	**<50k**	**50k - 100k**	**100k - 150k**	**>150k**	**Total**
HBW	Transit	84,443	181,611	199,065	106,767	571,886
	Auto Person & Transit	456,170	1,161,633	1,183,520	720,145	3,521,468
	Transit Percentage	*18.51%*	*15.63%*	*16.82%*	*14.83%*	*16.24%*
HBS	Transit	35,553	18,377	11,572	4,748	70,250
	Auto Person & Transit	441,532	999,471	984,941	456,151	2,882,095
	Transit Percentage	*8.05%*	*1.84%*	*1.17%*	*1.04%*	*2.44%*
HBO	Transit	105,308	49,816	41,030	19,324	215,478
	Auto Person & Transit	849,860	2,160,034	2,187,745	1,223,266	6,420,905
	Transit Percentage	*12.39%*	*2.31%*	*1.88%*	*1.58%*	*3.36%*
NHW	Transit	20,858	38,214	51,402	29,110	139,584
	Auto Person & Transit	183,863	549,589	557,211	320,450	1,611,113
	Transit Percentage	*11.34%*	*6.95%*	*9.22%*	*9.08%*	*8.66%*
NHO	Transit	35,845	10,999	12,305	6,216	65,365
	Auto Person & Transit	478,859	1,050,166	950,672	437,335	2,917,032
	Transit Percentage	*7.49%*	*1.05%*	*1.29%*	*1.42%*	*2.24%*
All	Transit	282,007	299,017	315,374	166,165	1,062,563
	Auto Person & Transit	2,410,284	5,920,893	5,864,089	3,157,347	17,352,613
	Transit Percentage	*11.70%*	*5.05%*	*5.38%*	*5.26%*	*6.12%*

Source: 2007/08 HTS,   Ref: 2007_HTS_Trips_by_Mode&Income.xlsx

Some points can be made regarding the composite time function. First, for interchanges that are not served by transit, the composite time function reflects highway time. Second, the presence of transit service will generally contribute a small benefit to the travel time, since the regional transit shares are relatively small. Nonetheless, the composite time function will still reflect some travel time benefit with the presence of competitive transit service. This benefit would not be captured with an impedance measure based on highway time alone.

The highway time in the composite time function consists of both over-the-network time combined with terminal times (both production and attraction-end times). The highway time also includes toll values accumulated along the path that have been transformed into equivalent minutes.

The time-cost equivalents are provided by income level and purpose, and are shown on Table 40. These equivalents were developed using 2007 ACS income data and are described in greater detail in Chapter 2 ("Set-Up Programs and Highway Network Building") of the Version 2.3 model user's guide.

The basis of the $TollT_i$ term calculation is specified in Table 40. The table indicates the average time valuation (minutes per 2007 dollar) assigned to a toll value by income level and trip type (in 2007

dollars). The table indicates, for example, that a $1.00 toll equates to 8.7 minutes of travel time for a traveler in income level 1. More generally, the table indicates that travelers commuting to work are less sensitive to tolls than non-work-bound travelers because the time valuation of commuters is relatively high. The table also reflects the intuitive generalization that lower income travelers are more sensitive to tolls than the higher income travelers. Table 41 indicates assumed average time valuations by time period and mode. The values shown on Table 41 are not used in the distribution step, but will be used in the traffic assignment process, where income is not considered but highway mode is considered.

Table 40 Time Valuation (Minutes/2007$) by Purpose and Income Level

HH Income Quartile Range (1)	Mid-Point of HH Income Range	Hourly Rate per Worker (2)	2007 Time Valuation (Minutes per Dollar)	
			Work Trips (75% V.O.T.)	Non-work (50% V.O.T.)
$ 0 - $ 50,000	$25,000	$9.23	8.7	13.0
$ 50,000 - $ 100,000	$75,000	$27.70	2.9	4.3
$100,000 - $150,000	$125,000	$46.17	1.7	2.6
$150,000 +	$175,000	$64.64	1.2	1.9

Notes:
(1) Income groups based on 2007 ACS-based quartiles
(2) Hourly rate based on 1,920 annual hours/worker * 1.41 workers/HH = 2,707 hrs/HH
(3) Median 2007 Annual Income for modeled area is $84,280

Table 41 Time valuation (minutes per year 2007 dollar) by vehicle type and time period, used in traffic assignment

	Equivalent minutes per dollar			
Mode	AM Peak	Midday	PM Peak	Night
SOV	2.5	3.0	3.0	3.0
HOV 2-occupant auto	1.5	4.0	2.0	4.0
HOV 3+occupant auto	1.0	4.0	1.0	4.0
Light duty commercial vehicle	2.0	2.0	2.0	2.0
Truck	2.0	2.0	2.0	2.0
Auto serving airport passenger	2.0	2.0	2.0	2.0

Time_Valuation_V2.3.xls

5.3 External Auto Person , commercial vehicle, and truck models

The external trip distribution models segment markets by purpose and facility. Facilities are distinguished as interstates (or interstate-like facilities) and arterial facilities. The rationale behind this distinction is that arterial facilities tend to serve more localized traffic associated with shorter trip lengths while interstate travel is associated with longer trip lengths. In contrast, the external commercial vehicle and truck models (medium and heavy) are not segmented by facility types.

The highway time is used as the impedance measure in the distribution of external trips. AM peak time is used for the HBW purpose and midday times are used for all remaining purposes. The external calibration does not make use of time penalties added into the impedance files. However, the impedances are altered in that extremely large time values were inserted into internal and through (I-I, X-X) interchanges to preclude those types of interchanges from occurring in the trip distribution process.

5.4 Friction Factor Summary

The process of calibrating F-factors for each purpose and income strata was established after the observed trip files and network files were prepared. Developing F-factors is a trial-and-error process. Test F-factors are used in a gravity model (GM) execution and then subsequently adjusted based on a comparison of observed and estimated trip lengths made for each one-minute increment of travel time. The calculation used to adjust the F-factor is as follows:

Equation 6 Friction factor calibration

$F_{adjusted}$ = F_{used} * Observed Pct./Estimated Pct.

where

$F_{adjusted}$	= Adjusted F-factor to be used in a future GM execution
F_{used}	= Tested F-factor used in a previous GM execution
Observed Pct.	= Percentage of observed trips observed
Estimated Pct.	= Percentage of estimated trips resulting from the use of the test F-factors

The resulting adjusted F-curve typically appears as a "saw-tooth" looking function because the observed trip percent is subject to varying degrees of sampling error from one impedance unit to the next. An

irregular function is not desirable for modeling. Consequently, a nonlinear curve fitting is used for "smoothing" the adjusted F-factor curve.

The Gamma function was selected for smoothing the adjusted F-factor function. The form of the function is:

$$F_i = A \times I^B \times e^{-GI}$$

where

F_i = "Smoothed", adjusted F-factor at impedance unit I
I = travel impedance (usually time in minutes)
A, B, G = Gamma function coefficients to be statistically estimated
e = Euler's number; base of natural logarithms

The resulting Gamma coefficients are listed on Table 42. Friction factors are also shown graphically in Figure 9, Figure 10, Figure 11, and Figure 12.

Table 42 Estimated Gamma Distribution Values by Purpose and Income Strata

Purpose	Strata	Beta	Gamma
HBW	Income 1	-0.95818	-0.04622
	Income 2	-1.41425	-0.02571
	Income 3	-1.49461	-0.01920
	Income 4	-1.88024	-0.00835
HBS	Income 1	-2.46334	-0.07853
	Income 2	-1.33371	-0.12170
	Income 3	-1.99113	-0.09033
	Income 4	-2.91461	-0.06704
HBO	Income 1	-1.83692	-0.09635
	Income 2	-1.92946	-0.07128
	Income 3	-1.72297	-0.08637
	Income 4	-2.44221	-0.05837
NHW		-2.34915	-0.01478
NHO		-1.77486	-0.07430
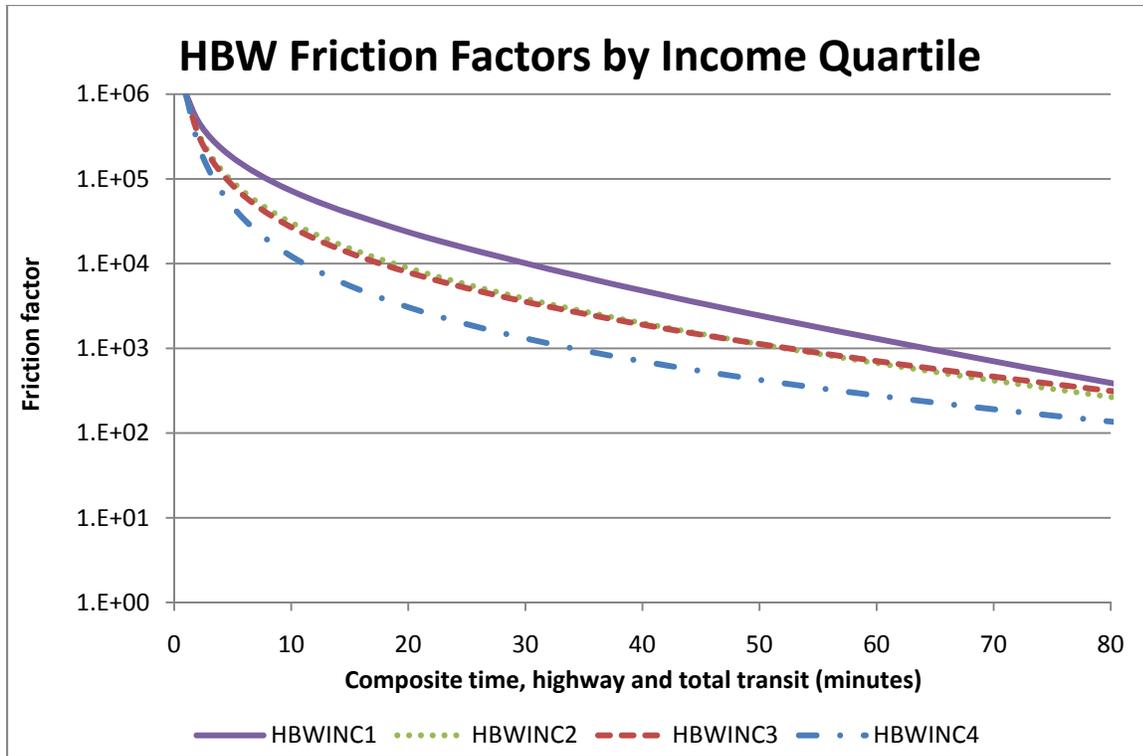
Figure 9 HBW Friction Factors
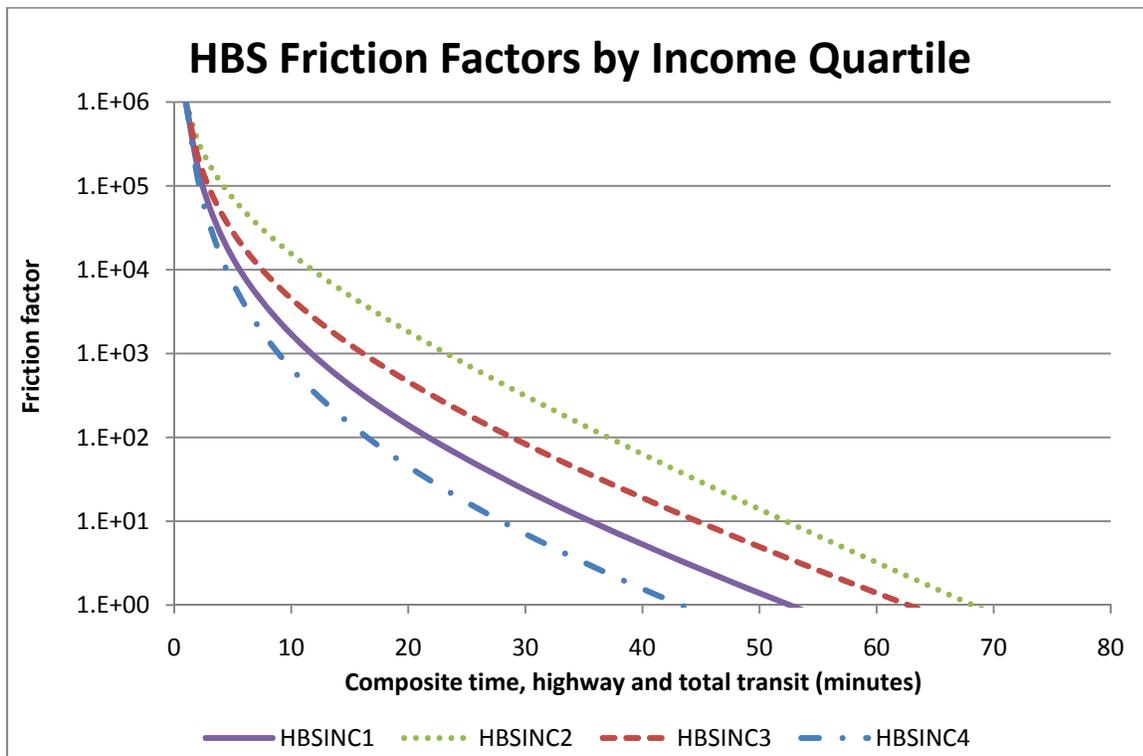
Figure 10 HBS Friction Factors
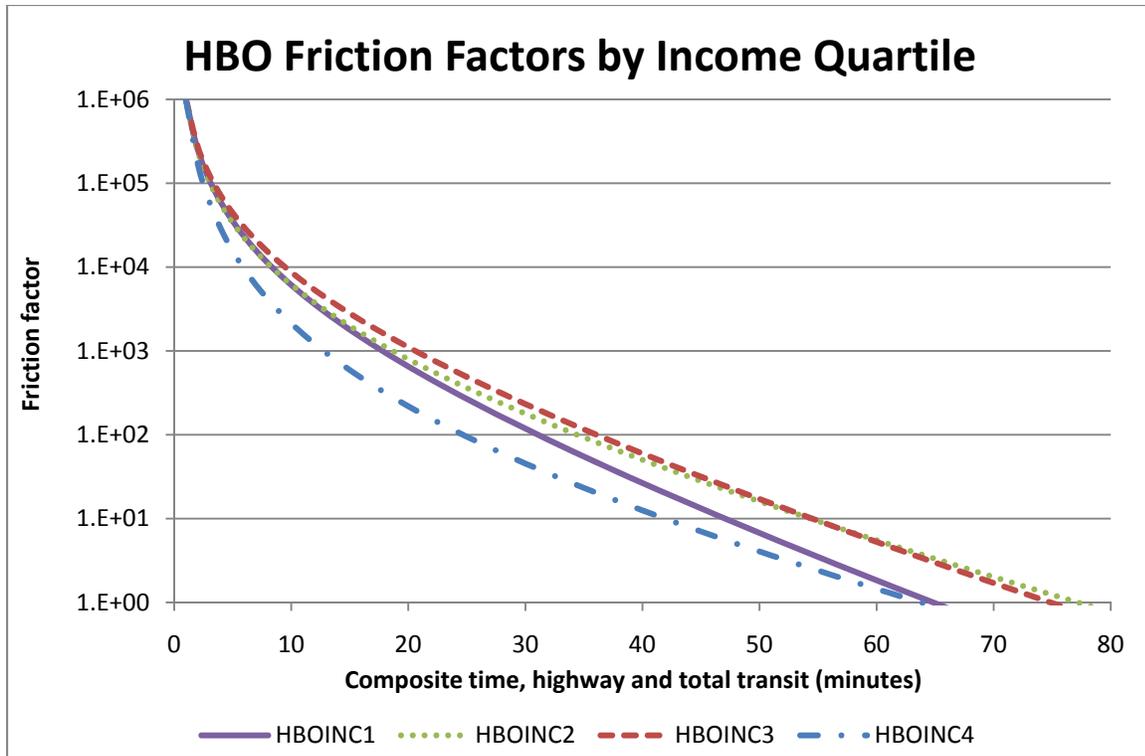
Figure 11 HBO Friction Factors
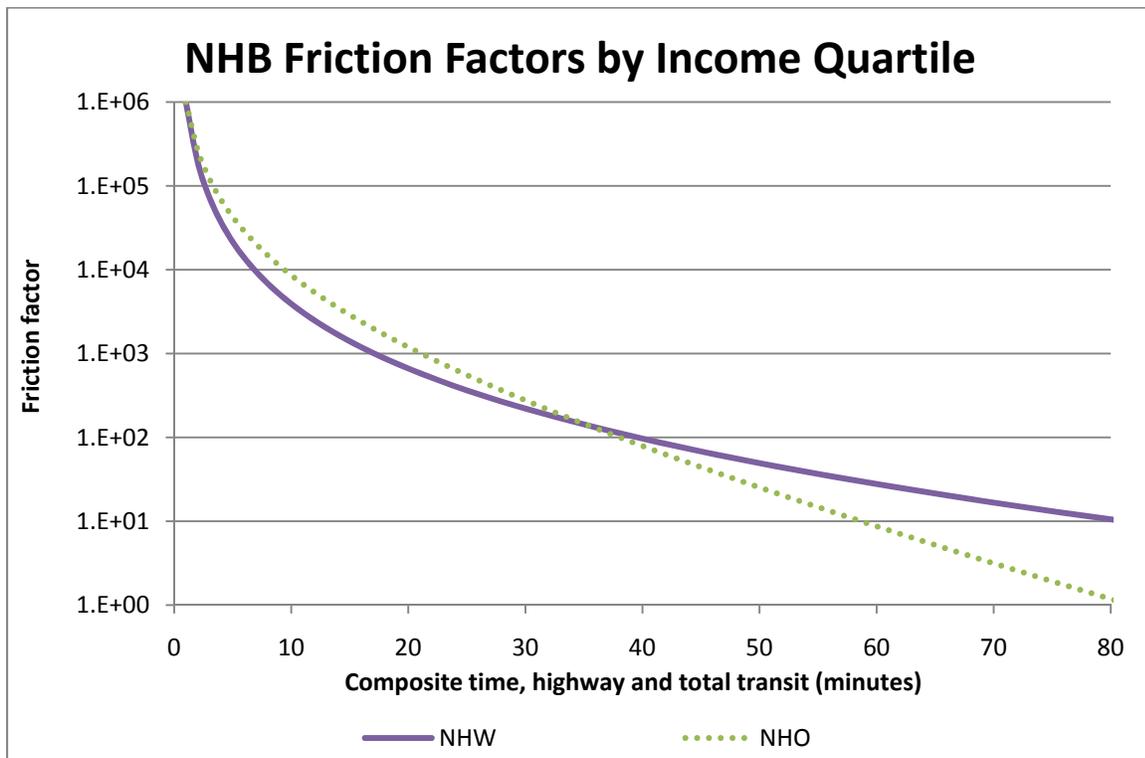
Figure 12 NHB Friction Factors

Table 43 presents a summary of estimated and observed trip lengths and intra-zonal percentages resulting from the calibrated F-factors, which are reasonable.

Table 43 Regional Estimated and Observed Trip lengths and Intra-zonal Percentages

Purpose	Income Level	HTS Trips	Trip Length in Composite mins.			Intrazonal Percentage		
			Est.	Obs.	Est.-Obs.	Est.	Obs.	Est.-Obs.
HBW	1	456,200	33.69	35.58	-1.89	3.12	3.22	-0.10
	2	1,161,600	46.54	47.21	-0.67	3.00	2.92	0.08
	3	1,183,500	52.47	51.33	1.14	2.02	1.97	0.05
	4	720,100	53.57	52.21	1.36	1.41	1.62	-0.21
HBS	1	441,500	16.56	16.81	-0.25	9.13	9.33	-0.20
	2	999,500	16.82	17.17	-0.35	8.98	9.84	-0.86
	3	984,900	17.30	17.70	-0.40	7.88	7.68	0.20
	4	456,200	16.83	17.13	-0.30	6.37	5.19	1.18
HBO	1	849,900	16.73	18.31	-1.58	9.36	7.90	1.46
	2	2,160,000	17.61	17.86	-0.25	11.60	11.06	0.54
	3	2,187,700	17.15	17.77	-0.62	9.92	12.15	-2.23
	4	1,223,300	17.00	17.92	-0.92	9.56	9.12	0.44
NHW	(n/a)	1,611,100	24.63	23.58	1.05	10.63	7.44	3.19
NHO	(n/a)	2,917,000	17.13	17.50	-0.37	17.33	14.61	2.72

The calibration procedure is described in more detail in a recent memorandum,[43] which includes trip-length frequency distributions comparing estimated and observed trips.

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[43] Ron Milone to Files, "Version 2.3 Trip Distribution Calibration."

Chapter 6 Mode choice

6.1 Overview

A mode choice model is used to apportion motorized person trips by travel mode. The mode choice model in the TPB Version 2.3 Travel Model on the 3,722-TAZ area system is a 15-choice, nested-logit mode choice (NLMC) model. The model includes three auto modes (drive alone, shared ride 2-person, and shared ride 3+person) and four transit modes (commuter rail, all bus, all Metrorail, and combined bus/Metrorail) by three modes of access to transit (park and ride, kiss and ride, and walk), as shown in Figure 13.
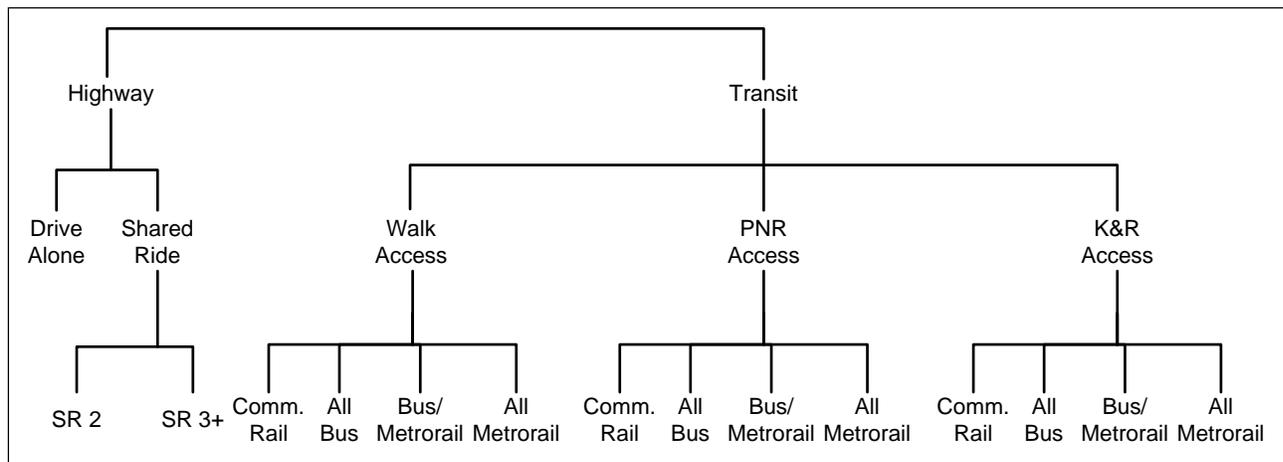
Figure 13 Nesting structure of the nested-logit mode choice model in the Version 2.3 travel model

Ref: "I:\ateam\nest_log\NestedChoice_Struct4.vsd"

The definition of high-occupancy vehicle (HOV) trips has changed, compared to the definition that was used in Version 2.2 and before. Previously, HOV trips coming out of the mode choice model referred to *only those that use HOV facilities for a substantial portion of their trip*. Similarly, in previous models, the definition of low-occupancy vehicle (LOV) included both drive-alone and carpools (provided the carpools did not use a preferential HOV facility). By contrast, in the Version 2.3 NLMC model, the term LOV refers to only the drive-alone trips. Similarly, HOV refers to all shared-ride 2 (2-person carpools) and shared-ride 3 (3+ person carpools), irrespective of whether they use an HOV facility or not. Table 44 shows some of the main differences between the Version 2.2 and Version 2.3 mode choice models, including the aforementioned HOV/LOV difference.

Table 44 Differences between the Version 2.2 and Version 2.3 mode choice models

Item	Ver. 2.2 mode choice model	Ver. 2.3 mode choice model
Structure	Sequential multinomial logit (SMNL)	Nested logit (NL)
Number of choices	5	15
Definition of high-occupancy vehicle (HOV) trips	Only those trips that use HOV facilities for a substantial portion of their trip	All shared-ride 2-person carpools and shared-ride 3+ person carpools, irrespective of whether they use an HOV facility or not
Definition of low-occupancy vehicle (LOV) trips	Both drive-alone and carpool trips (provided the carpools do not use a preferential HOV facility)	Only drive-alone trips (SOVs)
Access modes to transit	Walk & drive	Walk, PNR, KNR
Short/long walk to transit	0.3333 mile; 1.0 mile	0.5 mile; 1.0 mile

In terms of access to transit, park-and-ride (PNR) access means driving to transit and parking a motor vehicle at the PNR lot, for the purpose of boarding a transit vehicle at the transit stop. Similarly, kiss-and-ride (KNR) access, also known as "ride to transit," means accessing transit by driving in cases where one either 1) is dropped-off/picked-up or 2) rides with a PNR driver. Motorized person trips are those that occur in motorized vehicles, such as cars, trains, buses, and subways. Motorized trips exclude walk and bike trips. However, as noted above, walking is represented in the model as one of the three access modes to transit. The NLMC model is applied at the zone-to-zone interchange level after trip distribution and before highway and transit assignment (i.e., within what is known as the "speed feedback loop" of the four-step model). The model is applied using a Fortran program named AEMS (AECOM mode split modeling package).[44] AEMS is completely parametric, i.e., all characteristics for any given mode choice model are specified in a control file. Characteristics represented in the control file include nesting structure, market segmentation, utility/disutility functions, and the values of coefficients

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[44] AECOM Consult, Inc., *AECOM Consult Mode Choice Computation Programs, AEMS, Users Guide*, Draft report (Fairfax, Virginia: AECOM Consult, Inc., April 5, 2005).

and constants. AEMS can handle models with any nesting structure and up to 15 choices.[45] AEMS and its control files are described in more detail in the Version 2.3 travel model user's guide.

There are five NLMC models – one for each trip purpose: home-based work (HBW), home-based shop (HBS), home-based other (HBO), non-home-based work (NHW), and non-home-based other (NHO). Each of the five models shares the same nesting structure (shown in Figure 13), but each has its own set of coefficients and constants, discussed later in this chapter. In model application, the inputs to the TPB Version 2.3 nested logit mode choice model are

- Motorized person trips, segmented by four income levels and 20 geographic market segments, in production/attraction format (these are output from the trip distribution step);
- Highway "skims" (i.e., zone-to-zone travel times and costs), which come from the highway path building and skimming process;
- Transit "skims," which come from the transit path building and skimming process; and
- Zonal attributes, such as parking cost, terminal time (i.e., the time to park and "unpark" a car), and the percent of each zone that is within walking distance to transit (where two walking distances are defined: short and long).

The HBW mode choice model was calibrated with and is applied with transit and highway skims corresponding to the AM peak period. The non work (i.e., HBS, HBO, NHW, and NHO) mode choice models were calibrated with and are applied with transit and highway skims corresponding to the midday period.

Two of the most significant changes between the NLMC model and its predecessor (the sequential multinomial logit, or SMNL, mode choice model found in the Version 2.2 travel model) are that the NLMC model handles 15 choices (up from five, previously) and the NLMC model provides sufficiently detailed output, such that a transit assignment can be performed.

6.2 Treatment of LRT, BRT, and streetcar

Note that the nesting structure of the TPB Version 2.3 NLMC model does not include branches for specialized transit modes, such as light-rail transit (LRT), bus rapid transit (BRT), and streetcar. From this, one might conclude that the mode choice model is not designed to deal with these special transit modes. In fact, **the model is designed to deal with these special transit modes**.[46] This section of the report discusses how these modes are treated in both the mode choice model and the transit path skimming process that feeds the mode choice model.   This is the scheme that was developed by AECOM in 2004-2005 and has been retained by TPB staff. One of the underlying assumptions is that "premium" transit modes (e.g., Metrorail, commuter rail, LRT, BRT, and streetcar) will typically travel faster than buses, since they have one or more of these characteristics:

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[45] A newer version of AEMS is now available that can handle up to 18 choices.

[46] This is issue, which is discussed in the user's guide, is not very relevant for the calibration of the model, since the year-2007 networks used for calibration did not have any LRT, BRT, or streetcar. However, this topic is included in the calibration report so that it is clear that the model is designed to deal with these specialized transit modes.

- A dedicated right-of-way, at least for part, if not all, of the route
- Traffic signal priority
- Superior acceleration/deceleration (compared to buses)

6.2.1 Network representation

In terms of network representation, LRT is typically coded as "mode 5." BRT and streetcar are coded as "mode 10," referred to in some parts of the model as the "new" mode. The thought is that LRT will travel mainly on its own grade-separated right-of-way (ROW), where it does not have to interact with road traffic. By contrast, it is assumed that streetcar will travel mostly in mixed traffic, i.e., it will share its at-grade right-of-way with road traffic. It is believed that AECOM chose to include BRT with streetcar, since although BRT will often include some grade-separated rights-of-way for the trunk-line portion of the route, the beginning and ending of the BRT route are likely to be in mixed traffic, making it more similar to the streetcar.

In cases where a travel demand modeler is coding a new transit line representing a "premium" transit mode,[47] the modeler must add "transit-only" links to the transit network to represent the new service, since the line requires a dedicated ROW which is not part of the highway network. In the past, one would have added these transit-only links to the rail link file (rail_link.bse). However, with the advent of TPB staff using an ESRI geodatabase to manage the highway and transit networks, the rail_link.bse file no longer exists. For a modeler working at COG, one should add transit-only links directly into the highway/transit network geodatabase. For a modeler working external to COG (who will not have access to the COGTools ArcGIS add-in for managing the geodatabase), one should modify the text *.tb files that are output from the create_support_files.s Cube Voyager script.[48]

The "station file" (station.dbf) contains information about transit stations in the modeled area. More formally, the station file contains information about Metrorail stations, commuter rail stations, light rail stations, bus rapid transit stations/stops, streetcar stations/stops, express-bus bus stops, and park-and-ride (PNR) lots that serve these stations/stops. One must add Mode 5 and Mode 10 station nodes to the station file using a mode code of "L" for LRT/Mode 5 and "N" for New/BRT/streetcar/Mode 10. Mode 5 and 10 stations do not require a station centroid number.[49] In cases where Mode 10 routes share a street segment with local bus and where one would like the Mode 10 routes to be "combined" in terms of TP+/Voyager computing effective headways, the station node numbers of the Mode 10 routes should be the same as those used for the bus stops on the link(s) of interest.

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[47] Such as Metrorail (Mode 3), commuter rail (Mode 4), LRT (Mode 5), and BRT/streetcar (Mode 10).

[48] Meseret Seifu to Files, "Creating a station file," Memorandum, July 11, 2011.

[49] Manish Jain to Ronald Milone and Mark Moran, "MWCOG network coding guide for Nested Logit Model (revised Oct. 2010)," Memorandum, February 2008, 10.

6.2.2 Transit path building and skimming, mode choice, and transit assignment

Treatment of LRT, BRT, and streetcar: In transit path building and skimming, mode choice, and transit assignment, the following two rules apply:[50]

- Mode 5 is treated like Metrorail (Mode 3)
- Mode 10 is treated like local bus (Mode 1)

6.2.3 Fares

Treatment of LRT, BRT, and streetcar: Fares for Mode 5 and Mode 10 are computed like those for local bus (Mode 1).

6.3 Background

The nested-logit mode choice model in the TPB Version 2.3 travel model nested-logit mode choice model is a descendant of an earlier nested-logit model developed by AECOM Consult, Inc. for the Washington Metropolitan Area Transit Authority (WMATA). The TPB nested-logit mode choice model and its predecessor, the AECOM/WMATA nested logit mode choice model, share many traits, but also have some key differences. Table 45 summarizes the key differences between these two models. More information can be found on pages 6-2 to 6-8 of the earlier Version 2.3 model documentation.[51]

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[50] Ibid.

[51] Ronald Milone et al., *TPB Travel Forecasting Model, Version 2.3: Specification, Validation, and User's Guide*, Draft report (Washington, D.C.: Metropolitan Washington Council of Governments, National Capital Region Transportation Planning Board, June 30, 2008), 6–2 to 6–8.

Table 45 Comparison of characteristics found in both the AECOM/WMATA NLMC model and the TPB NLMC model

Item	AECOM/WMATA NLMC	TPB NLMC
Travel modes	15 (3 auto, 12 transit)	Same
Nesting structure	3 levels, including auto by occupancy and transit by access mode	Same
Model application code	AEMS Fortran program	Same
How the mode choice model is applied	As a post process to the regional travel model	Within the speed feedback loop of the regional travel model (i.e., after trip distribution and before traffic assignment)
Trip purposes	3 (HBW, HBS/O, and NHB)	5 (HBW, HBS, HBO, NHW, and NHO)
Types of travel skims	2 (AM peak period and off peak period)	2 (AM peak period and **midday** period)
Number of mode choice models	6 (HBW AM, HBW OP, HBS/O AM, HBS/O OP, NHB AM, and NHB OP)	5 (HBW AM, HBS MD, HBO MD, NHW MD, and NHO MD)
Geographic market segmentation	7 superdistricts; 20 production/attraction interchanges	Same
Economic market segmentation	Households stratified by income (four levels)	Same
Revised transit access coding	- Additional information to describe transit stations; - A new way to code sidewalks and walk-access-to-transit links; - A new way to code drive-access-to-transit links; - Additional coding detail around Metrorail stations with "park and ride" access; and - Revised procedures for calculating the percent of each zone that is within walking distance to transit	Same, except the item in the fourth bullet has not been adopted: Additional coding detail around Metrorail stations with "park and ride" access;
Calibration year	2002	2007/2008
Data used for calibration	2002 WMATA Metrorail survey; 2000 Regional bus survey; Boarding counts for express bus and commuter rail	2008 Metrorail Survey; 2008 Regional Bus Survey, supplemented by the Fairfax Connector Bus Survey; 2007-2008 On-Board Survey of Maryland Transit Administration (MTA) Riders; 2005 Virginia Railway Express (VRE) Passenger Survey
Calibration approach	Calibrated by AECOM for 6 models applied as a post process	Re-calibrated by TPB staff for 5 models. Applied as an integral part of the speed feedback loop
Calibration programs	Used the Fortran program CALIBMS to automate the process of calculating nesting constants	Same

6.4 Detailed description of the TPB nested-logit mode choice model

The NLMC model in TPB's Version 2.3 Travel Model can be thought of as consisting of three parts:

1. Choice set and nesting structure
2. Market segmentation
3. Utility equations

6.4.1 Choice set and nesting structure

The choice set and nesting structure of the NLMC model in the Version 2.3 travel model was already described in section 6.1   on page 6-1. The treatment of LRT, BRT, and streetcar was covered in 6.2   on page 6-3.

6.4.2 Market segmentation

The TPB NLMC model is market segmented by household income level and geography. This two-way market segmentation scheme was developed by AECOM Consult, Inc. for the AECOM/WMATA NLMC model and was retained by TPB staff.

Income-level market segmentation

The income segmentation is the same that is used for the first two steps of the travel model (i.e., trip generation and trip distribution), namely households are segmented by the four household income quartiles, which are shown in Table 10.[52]

Table 46 Household income quartiles computed from the ACS

Quartile	Income range (2007 dollars)
First	Less than $50,000
Second	$50,000 to $99,999
Third	$100,000 to $149,999
Fourth	$150,000 or more

Geographic market segmentation

AECOM Consult, Inc. divided the modeled area into seven superdistricts, which have been retained by the TPB staff for the mode choice model in the Version 2.3 Travel Model: [53]

1. DC core
2. VA core
3. DC urban
4. MD urban
5. VA urban
6. MD suburban
7. VA suburban

These seven superdistricts are shown in Figure 14 and in Table 47. Table 47 shows the equivalency between the seven NLMC superdistricts and the new 3,722-TAZ area system.

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[52] Hamid Humeida to Files, "Analysis of data from the American Community Survey (ACS): Households by household income, household size, and vehicle availability," Memorandum, March 19, 2010.
[53] Bill Woodford, "Development of Revised Transit Components of Washington Regional Demand Forecasting Model" (presented at the Transit Modeling Meeting, held at the Metropolitan Washington Council of Governments, Washington, D.C., December 1, 2004), 30.

Superdistricts used in the COG/TPB nested-logit mode choice model
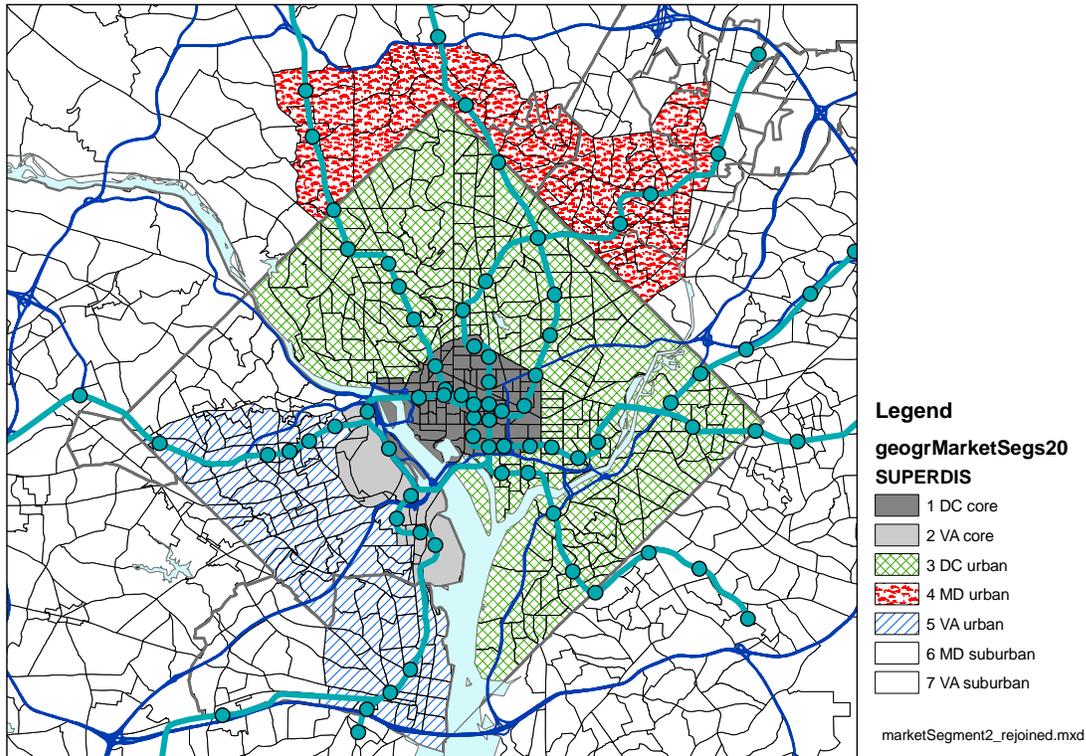
Figure 14 Seven superdistricts used in the Version 2.3 nested-logit mode choice model

Ref: "I:\ateam\nest_log\marketSegment2_rejoined.mxd",
"I:\ateam\nest_log\marketSegment2_rejoined_forBlackAndWhite.emf"

Table 47 Equivalency between nested-logit mode choice superdistricts and TPB TAZ 3,722

No.	Name	TAZs (TPB TAZ 3,722)
1	DC core	1-4,6-47,49-63,65,181-287,374-381
2	VA core	1471-1476,1486-1489,1493,1495-1504,1507,1508,1510,1511
3	DC urban	5,48,51,64,66-180,210-281,288-373,382-393
4	MD urban	603,606,612-628,630-640,662-664,669,670,913,916,917,939-957,959,961-982,985,
4	MD urban	986
5	VA urban	1405-1422,1427-1435,1448,1452,1454-1464,1477-1485,1490-1492,1494,1505,1506,
5	VA urban	1509,1512-1545,1569-1609
6	MD suburban	394-602,604,605,607-611,629,641-661,665-668,671-912,914,915,918-938,958,960,
6	MD suburban	983,984,987-1404,2820-3102,3104-3409
7	VA suburban	1423-1426,1436-1447,1449-1451,1453,1465-1470,1546-1568,1610-2554,2556-2628,
7	VA suburban	2630-2819,3410-3477,3479-3481,3483-3494,3496-3675

Ref: "I:\ateam\nest_log\equiv_tpbTaz3722_nlmc_superdistr.txt" and "I:\ateam\nest_log\Market_segment_NewTAZs_sorted.xlsx"

Although seven market areas could lead to 49 (= 7 x 7) geographic interchanges, AECOM Consult, Inc. grouped them into the 20 paired production/attraction areas shown in Table 48 and Table 49. Another way to view the 20 geographic market segments is shown in Table 50.

Table 48 Production and attraction market segments used in the TPB Version 2.3 NLMC model

Production Areas   **Attraction Areas**

1. DC Core / Urban   1. DC Core

2. MD Urban   2. VA Core

3. VA Core / Urban   3. Urban

4. MD Suburban   4. Suburban

5. VA Suburban

Ref: "I:\ateam\nest_log\marketSeg.xls"

Table 49 20 geographic market segments used in the TPB nested-logit mode choice model

Market Seg No.	Prod Superdis	Attr Superdis	Production Area	Attraction Area
1	1,3	1	DC	DC core
2	1,3	2	DC	VA core
3	1,3	3,4,5	DC	Urban DC, MD, VA
4	1,3	6,7	DC	Suburban MD, VA
5	4	1	MD urban	DC core
6	4	2	MD urban	VA core
7	4	3,4,5	MD urban	Urban DC, MD, VA
8	4	6,7	MD urban	Suburban MD, VA
9	2,5	1	VA core/urban	DC core
10	2,5	2	VA core/urban	VA core
11	2,5	3,4,5	VA core/urban	Urban DC, MD, VA
12	2,5	6,7	VA core/urban	Suburban MD, VA
13	6	1	MD suburban	DC core
14	6	2	MD suburban	VA core
15	6	3,4,5	MD suburban	Urban DC, MD, VA
16	6	6,7	MD suburban	Suburban MD, VA
17	7	1	VA suburban	DC core
18	7	2	VA suburban	VA core
19	7	3,4,5	VA suburban	Urban DC, MD, VA
20	7	6,7	VA suburban	Suburban MD, VA

Ref: "I:\ateam\nest_log\marketSeg.xls"

Table 50 Equivalency between seven super-districts and the 20 geographic market segments

		1 DC core	2 VA core	3 DC urban	4 MD urban	5 VA urban	6 MD suburban	7 VA suburban
1	DC core	1	2	3	3	3	4	4
3	DC urban	1	2	3	3	3	4	4
4	MD urban	5	6	7	7	7	8	8
2	VA core	9	10	11	11	11	12	12
5	VA urban	9	10	11	11	11	12	12
6	MD suburban	13	14	15	15	15	16	16
7	VA suburban	17	18	19	19	19	20	20

Ref: "I:\ateam\nest_log\superDistr_marketSeg.xlsx"

6.4.3 Utility equations

The TPB mode choice model is a discrete-choice, logit mode choice model. These types of models are based on what is known as utility theory (see, for example, Ben-Akiva and Lerman; or Koppelman and Bhat).[54] [55] Utility is a measure of value or benefit to an individual decision maker. According to the utility maximization rule, an individual will select the alternative from his or her set of available alternatives that maximizes his or her utility. This implies that individual *t* will always choose alternative *i* over all alternatives *j* if the utility of alternative *i* is greater than that for all alternatives *j*. In reality, the decision rule is rarely so deterministic. Consequently, most choice theory used in transportation planning is probabilistic. So, as shown in the equation below, the true utility of alternative i to decision maker t is the sum of two elements: a deterministic portion of the utility (V) and an error term (ε) that captures the unobserved characteristics of both the alternative and the individual decision maker.

Equation 7 True utility of an alternative expressed as the sum of deterministic utility and an error term

$$U_{it} = V_{it} + \epsilon_{it}$$

where
U_{it} = the true utility of alternative i to decision maker t
V_{it} = the deterministic or observable portion of the utility estimated by the analyst
ϵ_{it} = the error or portion of the utility that is unknown to the analyst

Assumptions about this error term turn out to be quite important, since this determines the type of mathematical model that is used. For example, if one assumes that this error term is distributed as a normal distribution, then the model is a multinomial probit model (MNP). If one assumes that the error terms are Gumbel distributed, then the model is multinomial logit (MNL).

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[54] Moshe Ben-Akiva and Steven Lerman, *Discrete Choice Analysis: Theory and Application to Travel Demand*, 1st ed. (The MIT Press, 1985).
[55] Frank S. Koppelman and Chandra Bhat, *A Self Instructing Course in Mode Choice Modeling: Multinomial and Nested Logit Models* (U.S. Department of Transportation, Federal Transit Administration, January 31, 2006).

Generally, it is assumed that the utility equation for each mode/alternative can be expressed as a linear combination of attributes of the mode/alternative (e.g., travel time and travel cost) and attributes of the individual/decision maker (e.g. income, number of autos owned):

Equation 8 Systematic utility of using alternative/mode i for individual t

$$V_{it} = \beta_0 + \beta_1 Z_{it1} + \beta_2 Z_{it2} + \cdots + \beta_n Z_{itn}$$

$where$
V_{it} = systematic utility of using alternative/mode i for individual t
$Z_{it} = f(X_i, S_t)$, with X_i = attributes of alternative/mode i; S_t = characteristics of individual t
β_0 = alternative-specific constant for alternative/mode i
β_i = coefficient for a given attribute of the alternative or characteristic of the individual

A binomial logit mode would have two choices. A multinomial model would have three or more choices. For example, a simple binary-logit mode choice model for auto and bus might look like the following:

Equation 9 Systematic utility of auto and bus in a simple binary logit mode choice model

$$V_{auto} = Const_{auto} - 0.03 * IVTT_{auto} - 0.0043 * Cost_{auto}$$
$$V_{bus} = \qquad\qquad - 0.03 * IVTT_{bus} - 0.0043 * Cost_{bus}$$

The alternative-specific constant accounts for the average effects of all variables affecting mode choice that are not explicit explanatory variables in the model (e.g., comfort, dependability, convenience). The number of alternative-specific constants must not exceed the number of alternatives minus one (N − 1). The predictions of the model are the same, regardless of which utility equation is the one chosen to be without the alternative-specific constant. The coefficients of the attributes of the alternatives may be either generic or alternative-specific. In the example above, both IVTT (in-vehicle travel time) and cost are generic since they occur in both utility equations and have the same coefficient value in both utility equations.

For a multinomial logit (MNL) model, to convert the estimated utilities into probabilities, we use the standard logit formula:

Equation 10 Probability of choosing alternative i over alternatives j for a multinomial logit mode choice model

$$\Pr(i) = \frac{\exp(V_i)}{\sum_{j=1}^{J} \exp(V_j)}$$

where
$\Pr(i)$ = probability of the decision maker choosing alternative i
V_j = systematic component of the untility of alternative j
J = set of available alternatives
$\exp(x) = e^x$, where e is Euler's number, ≈ 2.71828

The MNL model has been criticized, however, for its Independence of Irrelevant Alternatives (IIA) property, which implies equal competition between all pairs of alternatives, which is inappropriate in

many situations (See, for example, Koppelman and Bhat, p. 157). This limitation of the MNL model is due to the assumption of the independence of the error terms in the utility equations. The most widely used solution to this problem is to use the nested logit (NL) model, also known as the "hierarchical logit," which groups or nests subsets of alternatives that are more similar to each other with respect to excluded characteristics. Consequently, alternatives in a common nest are more competitive with each other than alternatives outside of the nest. The derivation of the NL model is based on the assumption that some of the alternatives share common components in their random error terms.

The NL model gives rise to a parameter which is not part of the MNL model: nesting coefficients. Nesting coefficients are often denoted by the Greek letter theta (θ, which we will use) or sometimes the Greek letter phi (Φ) or mu (μ). Nesting coefficients are known by a number of different terms, including logsum parameters, logsum coefficients, dissimilarity parameters, or inclusive value parameters. These are discussed in more detail in section 0.0.0 on page 6-15.

Both MNL and NL models have constant terms or alternative-specific constants. In the Version 2.3 mode choice model, these are referred to as "nesting *constants*." These are discussed in more detail in a later section (section 0.0.0 on page 6-16). There is generally one utility equation for each alternative or mode. The number of alternative-specific constants can be up to one less than the number of alternatives (N-1). However, when the model is market segmented, the number of nesting constants is increased because each alternative in each market segment has its own equation. For example, in the case of the Version 2.3 mode choice model, since the model is market segmented by 20 geographic market areas, the maximum number of nesting constants per trip purpose is $20 * (15 - 1) = 280$.

Different types of nested-logit mode choice models and their use by AEMS.EXE

Nested-logit, or hierarchical logit, models come in two different flavors:[56]

- McFadden Utility Maximizing Nested Logit (UMNL) model
- Daly Non-Normalized Nested Logit (NNNL) model

The default for the AEMS mode choice model application program is to use the McFadden UMNL model. The AEMS command COEF is used to specify coefficient values in the utility equations. Below is an example from the HBW AEMS control file (For brevity, only columns 1-87 are shown. Also, the comment line beginning with the word "*CHOICE" is also shown, since it helps one read the COEF line/command):

```
*CHOICE         1>DR ALONE  SR2       SR3+      WK-CR     WK-BUS    WK-BU/MR  WK-MR
COEF01:IVTT     1>-0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128  -0.02128
```

By contrast, the AEMS command NSTC is used to define nesting coefficients and nesting constants. Below is an example from the HBW AEMS control file:

```
NSTC 12 1TRANSIT   >     0.5    3.72445
```

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[56] Frank S. Koppelman and Chieh-Hua Wen, "Different Nested Logit Models: Which Are You Using?" (presented at the 77th Annual Transportation Research Board Meeting, January 11-15, 1998, Washington, D.C., 1997).

The nesting *coefficient* value is 0.5 and the nesting *constant* value is 3.72445. According to the AEMS documentation:

> By default, AEMS is based on the McFadden structure of a nested logit model. As such, all
> coefficients and constants used in the disutility function (**except Nest-specific constants specified
> with the NSTC**) command are specified in terms of their equivalent top-level, main mode choice
> values. Prior to computing lower level disutilities, all coefficients and constants are divided by the
> product of all pertinent nest coefficients to create an equivalent lower-level coefficient. If the
> Daly formulation (coefficients are specified in terms of their bottom-level value), then the "DALY
> Coef" command can be used to override the default.[57]

Since the nest-specific constants and coefficients that are specified using the NSTC command are
structured in the Daly way (not McFadden), they sometimes need to be converted to the McFadden-
equivalent form. This will be noted later in this documentation.

Time and cost coefficients

The time and cost coefficients used in the utility equations are shown in Table 51.

Table 51 Time and cost coefficients in the Version 2.3 nested-logit mode choice model

Variable		Trip Purpose (5)				
		HBW	HBS	HBO	NHBW	NHBO
In-vehicle time	ivt	-0.02128	-0.02168	-0.02322	-0.02860	-0.02860
Auto access time	aat	-0.03192	-0.03252	-0.03483	-0.04290	-0.04290
Walk access time	ovtwa	-0.04256	-0.04336	-0.04644	-0.05720	-0.05720
Other out-of-vehicle time*	ovtot	-0.05320	-0.05420	-0.05805	-0.07150	-0.07150
Cost - Income group 1	costinc1	-0.00185	-0.00202	-0.00202	-0.00994	-0.00994
Cost - Income group 2	costinc2	-0.00093	-0.00101	-0.00101	-0.00994	-0.00994
Cost - Income group 3	costinc3	-0.00062	-0.00067	-0.00067	-0.00994	-0.00994
Cost - Income group 4	costinc4	-0.00046	-0.00051	-0.00051	-0.00994	-0.00994
* Includes boarding penalty						

Ref: "I:\ateam\nest_log\NLmcTimeCostCoef5.xlsx"

Some of the coefficients in Table 51 are statistically estimated, others are set using professional
judgment and rules of thumb. Before discussing which are statistically estimated and which are set
using professional judgment, it is useful to understand how calibration approaches have changed in the
past few years.

In previous mode choice models developed by TPB staff (e.g., the sequential, multinomial-logit mode
choice model in the Version 2.1 and Version 2.2 travel models), coefficients in the utility equations of
the mode choice model were statistically estimated using a maximum likelihood estimation (MLE)
technique (in this case, using Alogit software). Following the estimation of coefficients, TPB staff would
check the reasonableness of coefficients by using various rules of thumb. For example, one rule of

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[57] AECOM Consult, Inc., *AECOM Consult Mode Choice Computation Programs, AEMS, Users Guide*, Draft report
(Fairfax, Virginia: AECOM Consult, Inc., April 5, 2005), 14.

thumb is that the ratio of the out-of-vehicle travel time coefficient to the in-vehicle travel time coefficient (C_{ovtt}/C_{ivtt}) should be between 2.0 and 3.0. This rule of thumb has always been used by TPB staff in mode choice model estimation and has also been proposed by the Federal Transit Administration.[58] In cases where the estimated coefficients did not agree with the rule of thumb, one was left to ponder the cause of the discrepancy. For example: Was there a problem with the estimation data? Was a utility equation misspecified? Was the estimation software not used correctly? Did the discrepancy in the ratio value represent a true difference in travel behavior of Washington, D.C. area travelers compared to other travelers in the U.S.? Or, since the values of the coefficients are, in part, a function of the other coefficients in the utility equation, would a different set of utility variables have resulted in coefficient values that met the rule of thumb? Due to issues such as these, and the increased interest in getting proposed transit projects to pass muster with the FTA, many consulting firms and agencies have started taking a new approach in calibrating mode choice models: namely, using a combination of statistically estimated coefficients and coefficients that are set by fiat, typically based on rules of thumb (See, for example, FTA discussion piece/paper #16).[59] This latter approach is what was used by AECOM when they calibrated their nested-logit mode choice model in 2004-2005, and it is also the approach used by TPB staff in calibrating the NLMC model.

The in-vehicle time (IVT) coefficients are all about -0.02 and were statistically estimated using Alogit software. These come from earlier estimation work done by TPB staff, for the 2.1C and 2.1D travel models. These values are in the range of values expected by FTA, which expects IVT coefficients in the range of -0.03 to -0.02.[60] [61] The next three time coefficients have been set as multiples of the IVT coefficient. For example, the auto access time coefficient is set equal to 1.5 times the IVT coefficient, indicating that time spent in a car for accessing transit is perceived as 1.5 times as burdensome as time spent in the transit vehicle itself. Similarly, the walk-access time coefficient is set equal to 2.0 time the IVT coefficient, indicating that time spent walking to access transit is perceived as 2.0 times as burdensome as time spent in the transit vehicle. Lastly, the other-out-of-vehicle time coefficient is set to a value of 2.5 times the IVT coefficient. These last two out-of-vehicle time coefficients conform to FTA expectations that the ratio of C_{ovt}/C_{ivt} should be between 2.0 and 3.0, unless an agency can provide compelling evidence to the contrary. Next come four cost coefficients, one per household income group (income group 1, 2, 3, and 4). The first cost coefficient, like the IVT coefficient, was statistically estimated from a previous version of the regional travel model. The remaining three cost coefficients, in the case of the three home-based purposes, are set as factors of the cost coefficient for income group 1. Specifically, the cost coefficient for income group 2 is equal to ½ the cost coefficient for income group 1.

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[58] Jim Ryan, "Travel Forecasting for New Starts: The FTA Perspective", April 7, 2004, 55; Federal Transit Administration, "12 - Early Quality-of-Service Analysis of the Alternatives" (presented at the Travel Forecasting for New Starts Proposals Workshop, Minneapolis, Minnesota, June 16, 2006), 38, http://www.fta.dot.gov/planning/newstarts/planning_environment_5402.html.

[59] Federal Transit Administration, "Discussion-piece #16, Calibration and Validation of Travel Models for New Starts Forecasting" (presented at the Workshop on Travel Forecasting for New Starts Proposals, Minneapolis, Minnesota, 2006), http://www.fta.dot.gov/planning/newstarts/planning_environment_5402.html.

[60] Ryan, "Travel Forecasting for New Starts: The FTA Perspective," 53.

[61] Federal Transit Administration, "12 - Early Quality-of-Service Analysis of the Alternatives," 37.

Similarly, the cost coefficient for income group 3 is equal to 1/3 the cost coefficient for income group 1, and the cost coefficient for income group 4 is equal to 1/4 the cost coefficient for income group 1.

Income constants

The TPB NLMC model also uses a set of income constants, which were developed for the AECOM/WMATA NLMC model and retained for use in the TPB model (See Table 52). AECOM introduced the income constants to help reduce the high number of modeled boardings in Northwest DC.[62]

Table 52 Income constants used in the TPB Ver. 2.3 NLMC model

Mode	Income stratification		
	Low	**Middle**	**High**
All auto modes	0.0	0.0	0.0
Walk to commuter rail	2.0	0.0	-2.0
Walk to all bus	2.0	0.0	-2.0
Walk to bus/Metrorail	2.0	0.0	-2.0
Walk to all Metrorail	2.0	0.0	-2.0
PNR and KNR to transit	0.0	0.0	0.0

Ref: O:\model_dev\nest_log\NLmcTimeCostCoef5.xlsx

The income constants apply to all trip purposes. "Low income" means income group 1. "Middle income" means income groups 2 and 3. "High income" means income group 4. These income constants have the effect of increasing the probability (due to the +2.0) that low income travelers will choose walk to transit and decreasing the probability (due to the -2.0) that high income travelers will choose walk to transit.

Nesting coefficients

As stated earlier, the NL model gives rise to a parameter which is not part of the MNL model: nesting coefficients. Nesting coefficients are often denoted by the Greek letter theta (θ, which we will use) or sometimes the Greek letter phi (Φ) or mu (μ). Nesting coefficients are known by a number of different terms, including logsum parameters, logsum coefficients, dissimilarity parameters, or inclusive value parameters. The nesting coefficients (θ) in a nested-logit mode choice model are a function of the underlying correlation between the unobserved components for pairs of alternatives in a nest, and they characterize the degree of substitutability between those alternatives. The values of the nesting constants should lie between 0 and 1, as indicated in Table 53.

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[62] Bruce Williams, "Revised Calibration Results with Additional Revisions to Transit Components of Washington Regional Demand Forecasting Model" (presented at the Transit Modeling Meeting, held at the Metropolitan Washington Council of Governments, Washington, D.C., March 2, 2005), 5.

Table 53 Interpretation of nesting coefficient values in nested-logit mode choice models

Nesting coefficient value	Implication
$0 < θ < 1$	The range of acceptable values for θ. Decreasing values of θ indicate increased substitution among alternatives in a nest.
$θ = 0$	Implies perfect correlation between pairs of alternatives in the nest
$θ = 1$	Zero correlation among mode pairs in the nest. This means the nested-logit (NL) model becomes a multinomial logit (MNL) model.
$θ > 1$	Reject the nested-logit model

The TPB Ver. 2.3 NL mode choice model has seven nests, which are numbered as shown in Figure 15. The number of nesting coefficients in a nest is equal to the number of choices in each nest. The model has seven nests, but the number of choices in each nest varies from two to four. The total number of nesting coefficients in the model is 21. All the nesting coefficients in the TPB NL MC model have been set, by fiat, to a value of either 0.5 or 1.0, as can be seen in Figure 15. The nodes shown with a nesting coefficient value of 1.0 are those at the bottom of a tree (i.e., without any sub-nodes), which is effectively the same as having no nesting coefficient. By contrast, those nodes with nesting constants values of 0.5 are those which have sub-nodes. The top-level equivalent of the nesting coefficients can be calculated by multiplying the nesting coefficient values of the two layers, i.e., 0.5 * 0.5 = 0.25, which is in the range of what would be considered reasonable by the FTA.

Nesting constants
In general, the maximum number of alternative-specific constants is equal to the number of alternatives minus one (N - 1). In the case of the Version 2.3 mode choice model, since the model is market segmented by 20 geographic market areas, the maximum number of nesting constants per trip purpose is 20 * (15 – 1) = 280. Calibrating the nested-logit mode choice model essentially consists of estimating these nesting constant values.

6.4.4 Other details

Information about revised transit access coding conventions, transit path-building procedures, and the treatment of parking costs and terminal times can be found in the user's guide.
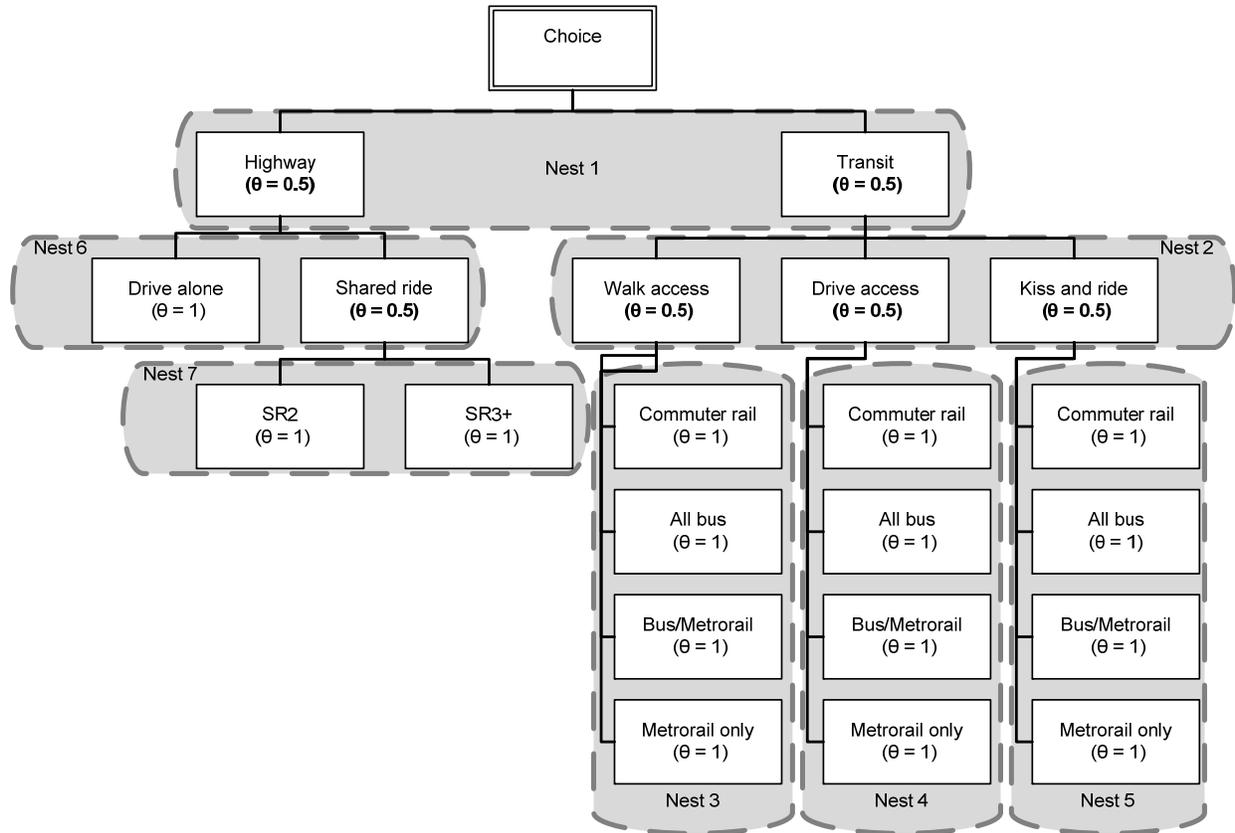
Figure 15 Nesting coefficient values used in the TPB Ver. 2.3 NL mode choice model

Ref: "I:\ateam\nest_log\test_nest_struct_v6_nests_v5.vsd"

6.5 Calibration process

In late June 2011, the TPB's models application staff began using the new Version 2.3 Travel Model in its first production use at COG, namely the air quality conformity (AQC) determination of the 2011 CLRP. This production work was first undertaken with "build" 27 of the model, i.e., Version 2.3.27. While performing this work, staff on the models application team noticed that the new model seemed to be underestimating high-occupancy vehicle (HOV) trips in the I-395/I-95 corridor in Virginia. Since the auto person trip targets used for the NLMC model calibration had come from the 2007/2008 HTS, it appeared that the HTS did not have a sufficient number of samples to adequately portray HOV behavior in that corridor. Consequently, TPB staff developed a way to adjust the HOV trips based on the 2000 CTPP data. After this adjustment was made, the mode choice model was re-calibrated and a new build of the travel model, #33, was created (i.e., Ver. 2.3.33). This section of the report documents the mode choice model calibration that was done following the HOV adjustment. The details of the latest mode choice model calibration can be found in a draft technical report.[63]

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[63] Mark S. Moran, *TPB Version 2.3 Travel Model: Calibrating the nested-logit mode choice model after making adjustments to HOV auto person trip targets*, Draft Internal Technical Report (Washington, D.C.: National Capital Region Transportation Planning Board, Metropolitan Washington Council of Governments, October 27, 2011).

To calibrate the TPB NLMC model, one assumes that the time and cost coefficients are known. One also assumes that the income constants and nesting coefficients are known. Thus, the calibration consists of finding a set of nesting constants that allow the NLMC model to most closely replicate the observed market shares (known as "targets"). An automated routine, implemented as a Fortran program named CALIBMS, is used to perform the calibration.[64] The output of the CALIBMS calibration process is a set of nesting constants (280 constants for each of the five trip purposes). Once one has run CALIBMS, one should ideally check the values of the output nesting constants to make sure that none of the constants is overly large. In cases where overly large nesting constants are found, their values should be overridden with more moderate values. Checking and possibly overriding the value of the output nesting constants is very time consuming, since it involves lots of professional judgment and there are no hard and fast rules dictating which values are too large. Consequently, for this current calibration effort, due to time limitations, the nesting constants estimated by CALIBMS have been taken as is and no override values have been used.

6.5.1 Observed data and calibration targets

A "calibration target" is a control total representing the number of person trips, for an average weekday, for each trip purpose (5), travel mode (15), and geographic market segment (20). Calibration targets can be divided into two groups: transit person trips and auto person trips. Our transit person trip calibration targets come from on-board transit surveys. Our auto person trip calibration targets come from the 2007/2008 HTS. Although it would be more consistent to get both transit person trip targets and auto person trip targets from one source, such as the HTS, the reality is that by using on-board transit surveys for the transit person trip targets, we were able to take advantage of more data (compare ca. 5,000 unweighted transit person trips in the HTS verus ca. 50,000 unweighted transit person trips in the on-board transit surveys; see Table 58). The HTS was used for the auto person trip targets, since it was the best known source of information. However, as stated ealier, it appears that the HTS did not have a sufficient number of samples to adequately portray HOV behavior in the I-95/I-395 corridor in Virginia. Consequently, TPB staff developed a way to adjust the HOV trips based on the 2000 CTPP data.

Transit person trip targets
The following on-board transit surveys were used to develop transit person trip targets:

- 2008 Metrorail Survey[65]
- 2008 Regional Bus Survey (supplemented by the Fairfax Connector Bus Survey)[66] [67] [68]

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[64] AECOM Consult, Inc., *CALIBMS: Nested Mode Split Model Constant Calibrator for AEMS (AECOM Consult Mode Choice Computation Programs), Users Guide*, Draft report (AECOM Consult, Inc., June 2006).
[65] WB&A Market Research, "2008 Metrorail Passenger Survey", 2008.
[66] Robert E. Griffiths, "2008 Regional Bus Survey: Preliminary Results" (presented at the Travel Forecasting Subcommittee of the Technical Committee of the National Capital Region Transportation Planning Board, held at the Metropolitan Washington Council of Governments, Washington, D.C., May 22, 2009).
[67] NuStats, *2008 Regional Bus Survey: Draft Report* (Austin, Texas: Metropolitan Washington Council of Governments, June 2009).

- 2007-2008 On-Board Survey of Maryland Transit Administration (MTA) Riders, which would include survey information from riders of the Maryland Area Regional Commuter (MARC) train service[69]
- 2005 Virginia Railway Express (VRE) Passenger Survey[70]

Since the calibration year is 2007, it is preferable to have a survey from that year. In some cases this was not possible (e.g., no survey was conducted in 2007) or not desirable (e.g., a survey in another year was of better quality), or both. In the case of Metrorail, there was, in fact, a 2007 Metrorail Passenger Survey,[71] but it was believed that the 2008 survey had more complete information. For example, the 2008 survey, in contrast with the 2007 survey, included production-end mode of access to the first transit vehicle for every observation.[72] The 2008 Metrorail survey[73] was collected by WB&A, geocoded by Rummel, Klepper & Kahl, LLP (RK&K), and cleaned by Parsons Brinckerhoff (PB). The final survey included 35,966 records, which were expanded to 786,813 daily Metrorail trips (the average number of trips in September 2008).[74] Survey results were not factored to 2007 conditions, given the closeness of the two years.

Information about bus-only trips was obtained from the 2008 Regional Bus Survey (supplemented by the Fairfax Connector Bus Survey). Again, data was not explicitly factored to year-2007 conditions. Details can be found in a recent memo.[75] Commuter rail information was obtained from the 2007-2008 MTA survey (which included MARC commuter rail riders) and the 2005 VRE survey (which included VRE commuter rail riders). The MTA survey was collected by NuStats and provided to MWCOG by PB. The total number of MARC survey records after it was cleaned and geocoded by PB was 1,915, which were then expanded to 26,451 trips. Although VRE conducts a survey on an annual basis, the 2007 survey was "Deemed Statistically Invalid," according to the VRE website (http://www.vre.org/feedback/cs_survey/survey_results_index.htm). We have used the 2005 survey and factored the results to year-2007 conditions.[76] The transit person trip control totals ("targets") can be seen in **Error! Reference source not found.**.

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[68] Clara Reschovsky, *Analysis of 2008 Bus Survey Data, WMATA On-Board Survey*, Internal Report (Washington, D.C.: Metropolitan Washington Council of Governments, National Capital Region Transportation Planning Board, June 30, 2010).

[69] NuStats, *Baltimore 2007-2008 On-Board Study: Final Report* (Austin, Texas: Maryland Transit Administration, December 2008).

[70] Virginia Railway Express, *2005 Passenger Survey* (Virginia Railway Express, n.d.), http://www.vre.org/feedback/cs_survey/survey_results_index.htm.

[71] WB&A Market Research, *2007 Metrorail Passenger Survey Final Report* (Washington Metropolitan Area Transit Authority, October 16, 2007).

[72] Mary Martchouk to Mark S. Moran, "Developing Transit Calibration Targets for 2007," Memorandum, June 2, 2010, 5.

[73] WB&A Market Research, "2008 Metrorail Passenger Survey."

[74] Martchouk to Mark S. Moran, "Developing Transit Calibration Targets for 2007."

[75] Mary Martchouk to Mark Moran, "Developing Bus-only Calibration Targets for 2007," Memorandum, August 17, 2010.

[76] Martchouk to Mark S. Moran, "Developing Transit Calibration Targets for 2007," 8–9.

Table 54 Transit person trip control totals ("targets") for 2007, average weekday

	HBW (Peak)	HBS (Midday)	HBO (Midday)	NHBW (Midday)	NHBO (Midday)	TOTAL
WK-CR	1,851	21	210	0	400	2,483
PNR-CR	16,645	0	259	0	208	17,112
KNR-CR	1,473	0	197	0	217	1,887
ALL CR	19,970	21	666	0	825	21,482
WK-BUS	171,836	18,432	87,043	23,685	16,226	317,222
PNR-BUS	15,966	81	3,029	354	1,522	20,953
KNR-BUS	4,554	199	2,004	1,425	880	9,063
ALL BUS	192,356	18,712	92,077	25,465	18,628	347,238
WK-BUS/MR	132,144	2,486	23,694	12,417	3,960	174,701
PNR-BUS/MR	27,525	112	2,700	1,482	560	32,379
KNR-BUS/MR	9,248	136	1,731	1,211	1,003	13,329
ALL BUS/MR	168,916	2,733	28,125	15,110	5,524	220,408
WK-MR	194,164	4,854	46,905	56,578	16,428	318,928
PNR-MR	137,984	469	15,658	7,270	1,562	162,943
KNR-MR	42,791	145	4,437	4,378	1,832	53,582
ALL MR	374,939	5,468	66,999	68,226	19,822	535,454
GRAND TOTAL	**756,181**	**26,934**	**187,867**	**108,801**	**44,798**	**1,124,582**

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Auto person trip targets

As stated earlier, the auto person trip targets have generally been developed from COG's 2007/2008 Household Travel Survey (HTS). In the beginning of 2011, the mode choice model was calibrated twice – first, to an observed auto person trip table and then, second, to a simulated auto person trip table that was based on the observed trip table from the HTS. In the first of these two calibrations, conducted in January 2011, the auto person trip targets were developed by loading the weighted HTS on a year-2007 highway network. In the second of these two calibrations, instead of using an observed trip table, TPB staff used a simulated trip table. A third re-calibration was done in April 2011 as part of an update to the Version 2.3 travel model (Ver2.3.17_3722TAZ). Finally, this is the forth re-calibration in 2011 of the mode choice model.

Table 55 shows the regional control totals for the auto person targets <u>before</u> the HOV adjustment was made. Table 56 shows the regional control totals for the auto person targets <u>after</u> the HOV adjustment was made. And Table 57 shows the difference in regional control totals for the auto person targets (after HOV adjustment minus before HOV adjustment).

Table 55 Year-2007 auto targets from a simulated trip table: Before updating HOV trips

	HBW (Peak)	HBS (Midday)	HBO (Midday)	NHBW (Midday)	NHBO (Midday)	TOTAL
DRIVE ALONE	2,488,139	1,310,755	2,142,698	1,172,254	1,261,823	8,375,669
SR2	274,299	936,969	2,353,079	261,343	977,302	4,802,992
SR3+	9,228	593,357	1,770,683	6,393	615,484	2,995,145
TOTAL AUTO	**2,771,666**	**2,841,081**	**6,266,460**	**1,439,990**	**2,854,609**	**16,173,806**

Sources:

O:\model_dev\Ver2.3.16_3722TAZ\Prepare_MC_Targets\Create_Targets_3722to7Mrkts.s

Create_Targets_3722to7Mrkts.s/txt

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Table 56 Year-2007 auto targets from a simulated trip table: After updating HOV trips

	HBW (Peak)	HBS (Midday)	HBO (Midday)	NHW (Midday)	NHO (Midday)	TOTAL
DRIVE ALONE	2,341,573	1,247,599	2,489,989	1,061,425	1,300,863	8,441,449
SR2	311,741	866,266	1,998,391	210,143	895,477	4,282,018
SR3+	119,813	727,923	1,778,874	169,857	658,899	3,455,366
TOTAL AUTO	**2,773,127**	**2,841,788**	**6,267,254**	**1,441,425**	**2,855,239**	**16,178,833**

Sources:

X:\modelRuns\fy12\Ver2.3.28\Prepare_MC_Targets\Create_Targets_3722to7Mrkts.s

X:\modelRuns\fy12\Ver2.3.28\Prepare_MC_Targets\Create_Targets_3722to7Mrkts.txt

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Table 57 Year-2007 auto targets from a simulated trip table: Difference

	HBW (Peak)	HBS (Midday)	HBO (Midday)	NHW (Midday)	NHO (Midday)	TOTAL
DRIVE ALONE	-146,566	-63,156	347,291	-110,829	39,040	65,780
SR2	37,442	-70,703	-354,688	-51,200	-81,825	-520,974
SR3+	110,585	134,566	8,191	163,464	43,415	460,221
TOTAL AUTO	**1,461**	**707**	**794**	**1,435**	**630**	**5,027**

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It is clear that HOV2 auto person trips (shared ride, 2-person: SR2) have increased for HBW, but decreased for the other four trip purposes. By contrast, HOV3+ auto person trips have increased for all five trip purposes.

Comparison with the mode choice model calibration for the Version 2.2 Travel Model

One key point to remember is that the NL MC model in the Version 2.3 travel model was calibrated using different data sources from those used to calibrate the multinomial-logit (MNL) mode choice

model in the Version 2.2 travel model. Thus the travel patterns in the calibration data are different. The Version 2.2 mode choice model was calibrated using the 1994 COG/TPB Household Travel Survey and validated using the 2000 Census Transportation Planning Package (CTPP). By contrast, the Version 2.3 mode choice model was calibrated to year-2007 conditions, with the primary data set being the 2008 Metrorail Survey. As for the Version 2.3 mode choice model, there was some debate over whether to use the 2007/2008 HTS or the most recent on-board transit surveys. It was decided to use the on-board transit surveys since they contained more observations. For example, the 2007/2008 HTS contained about 5,500 transit trip records[77] (and this survey was twice the size of the 1994 HTS – 11,000 households vs. 4,800 households). By contrast, the transit on-board surveys provided about 51,000 transit trip records, of which about 35,000 were from the Metrorail Survey (see Table 58).

Table 58 Transit surveys used to calculate transit trip targets

Transit Survey	Submode Targets	Number of Records
2008 Metrorail Survey	Metrorail, Metrorail/Bus	34,852
2007 Bus Survey	Bus-only	10,959
2007 MARC Survey (MTA Baltimore Transit Survey)	Commuter Rail	1,594
2005 VRE Survey	Commuter Rail	3,646
Total	**All**	**51,051**

6.5.2 Calibration results

Calibration results come in the form of both the nesting constants, which are the output of the CALIBMS process, and the resultant trips by mode coming from the calibrated model. Nesting constants are discussed first.

Nesting constants

The calibration result shown in this section of the report comes from the calibration to a simulated trip table, which was derived from the earlier calibration to an observed trip table, and which was adjusted so that HOV trips in the I-95/I-395 corridor would be closer to observed travel. The automated calibration process, which involves running AEMS and CALIBMS 105 times (21 times for each trip purpose), takes about 16 hours on a relatively new travel model server (TMS5).

The output of the calibration process is the set of nesting constants, which are shown on Table 59, Table 60, Table 61, Table 62 and Table 63 on pages 6-23 through 6-24. A positive nesting constant has the effect of increasing trips in the given category and a negative nesting constant has the effect of decreasing trips in the given category. The values shown on these five tables are "top-level equivalent" or "McFadden-style" nesting constants, as described later in this report.

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[77] Mary Martchouk to Mark Moran, "Comparison of Transit Trips from 2007/2008 HTS to Transit Surveys," Memorandum, August 17, 2010.

Table 59 Top-level equivalent nesting constants for HBW

		1 DC CORE /URBAN-DC CORE	2 DC CORE /URBAN-VA CORE	3 DC CORE /URBAN-URBAN	4 DC CORE /URBAN-OTHER	5 MD URBAN-DC CORE	6 MD URBAN-VA CORE	7 MD URBAN-URBAN	8 MD URBAN-OTHER	9 VA CORE /URBAN-DC CORE	10 VA CORE /URBAN-VA CORE	11 VA CORE /URBAN-URBAN	12 VA CORE /URBAN-OTHER	13 MD OTHER-DC CORE	14 MD OTHER-VA CORE	15 MD OTHER-URBAN	16 MD OTHER-OTHER	17 VA OTHER-DC CORE	18 VA OTHER-VA CORE	19 VA OTHER-URBAN	20 VA OTHER-OTHER
1	LOV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	HOV2	-0.6475	-0.8885	-0.7258	-0.9290	-0.7687	-0.7366	-0.8516	-1.0610	-0.7346	-0.8955	-0.9395	-1.0988	-0.8009	-0.9175	-1.0008	-1.1245	-1.0091	-1.0527	-1.2452	-1.1986
3	HOV3+	-1.0368	-1.1322	-1.0351	-1.2435	-1.2138	-1.3765	-1.2834	-1.3288	-1.2215	-1.2382	-1.3203	-1.3532	-1.1325	-1.2476	-1.4153	-1.4882	-1.4039	-1.4882	-1.8867	-1.7174
4	WLK CR	3.5226	3.7520	5.2652	0.5927	2.4165	1.5886	1.2664	-0.2560	0.6870	0.9474	2.1387	0.1999	0.6617	-0.9022	-0.3731	-1.3222	-0.8786	-0.4825	-1.0120	-2.4355
5	WLK BUS	3.3621	0.7368	4.4084	0.7443	0.8042	-0.5625	0.9143	0.0040	1.7415	0.2990	0.9942	-0.9730	0.4786	0.1050	0.5097	-0.3769	0.0324	0.6315	-0.0965	-0.8282
6	WLK BU/MR	3.3594	2.9895	4.5288	0.6581	1.0518	0.4517	0.8046	-0.2439	2.7286	-0.1491	1.1228	-0.7191	0.3402	-0.1582	0.1727	-0.7370	0.3058	0.4007	0.0755	-1.2334
7	WLK METRO	3.7245	4.4161	6.6777	6.3964	3.3885	2.2606	2.1782	1.7391	7.0301	1.7313	5.3527	4.2353	2.5352	1.1731	2.0659	0.0001	3.5149	2.3678	2.7608	1.6577
8	PNR CR	1.7439	1.1563	2.0443	1.1578	-0.1275	-0.0741	-1.3708	-1.7033	0.8930	-1.7066	-0.9942	-2.7197	-0.2006	-0.9141	-1.2882	-2.2732	-1.2458	-0.3778	-1.0881	-2.9333
9	KNR CR	0.9501	-0.3696	1.0130	0.6870	-0.8766	-0.6199	-2.7533	-2.3325	-0.1173	-2.5799	-1.7356	-2.1574	-1.7840	-2.8841	-2.5516	-3.0663	-2.5593	-1.7863	-2.3885	-4.0106
10	PNR BUS	1.2296	1.1563	0.2375	-0.7797	-1.3329	-0.0741	-2.1327	-1.4883	0.9620	-1.3830	-1.2903	-2.1637	-1.4998	0.2222	-0.7523	-2.0418	-0.5947	0.1492	-0.7623	-3.7583
11	KNR BUS	0.3721	-0.3696	0.0649	-0.0819	-0.7092	-0.6199	-1.6631	-1.3812	-0.1173	-2.5799	-1.7356	-1.6621	-2.3454	-0.8670	-1.4715	-2.3484	-1.6635	-1.1464	-1.7715	-3.2251
12	PNR BU/MR	2.0549	1.3523	0.6590	-0.3941	0.2423	0.0821	-1.4609	-1.9400	0.9445	-1.7066	-0.8751	-2.7197	0.0624	0.2087	-0.6898	-1.9721	-0.3605	-0.1731	-0.7226	-3.1537
13	KNR BU/MR	1.4927	1.8540	1.2523	-0.5941	0.8316	-0.6199	-0.9510	-2.0382	2.0120	-2.5799	-1.7170	-2.8128	-1.0181	-0.8589	-1.4571	-2.4166	-1.4020	-1.2014	-1.6813	-3.6261
14	PNR METRO	1.8423	1.3398	2.6326	1.1883	0.0417	0.1450	-1.0457	-1.2029	0.7958	-1.2090	-0.9391	-0.4426	0.1423	0.5162	-0.3259	-1.8244	-0.4196	-0.1242	-0.5981	-2.2028
15	KNR METRO	0.0568	-0.4652	1.0409	0.3674	-0.9545	-0.4838	-1.6602	-2.4586	-0.1838	-2.5074	-1.5965	-1.6178	-0.6760	-0.5804	-0.8838	-1.9996	-0.9161	-0.5918	-0.9130	-1.7239

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Table 60 Top-level equivalent nesting constants for HBS

		1 DC CORE /URBAN-DC CORE	2 DC CORE /URBAN-VA CORE	3 DC CORE /URBAN-URBAN	4 DC CORE /URBAN-OTHER	5 MD URBAN-DC CORE	6 MD URBAN-VA CORE	7 MD URBAN-URBAN	8 MD URBAN-OTHER	9 VA CORE /URBAN-DC CORE	10 VA CORE /URBAN-VA CORE	11 VA CORE /URBAN-URBAN	12 VA CORE /URBAN-OTHER	13 MD OTHER-DC CORE	14 MD OTHER-VA CORE	15 MD OTHER-URBAN	16 MD OTHER-OTHER	17 VA OTHER-DC CORE	18 VA OTHER-VA CORE	19 VA OTHER-URBAN	20 VA OTHER-OTHER
1	LOV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	HOV2	-0.2181	0.1246	-0.3638	-0.0280	-1.8025	0.0000	-0.2774	-0.2092	0.0407	0.0875	-0.2103	-0.2743	-0.5100	0.7810	0.0318	-0.1004	-0.1576	-0.0820	-0.1571	0.0266
3	HOV3+	-0.4391	-0.6890	-0.5409	-0.1268	-1.8024	0.0000	-0.3380	-0.4800	-0.7497	-0.0770	-0.3778	-0.6392	-1.3217	0.5363	-0.0827	-0.1491	-0.1809	-0.0275	-0.5797	-0.0055
4	WLK CR	-1.4928	-3.3614	-1.3004	-1.5545	-1.2625	3.4099	-1.6224	-3.5022	-1.2153	-2.8401	-1.7222	-3.3057	-3.0106	-2.3672	-1.1163	-1.7360	-0.5315	-13.6922	-1.8627	-2.4004
5	WLK BUS	-1.3389	-3.3614	-1.4014	-1.5289	-1.7177	3.4099	-1.5759	-2.9079	-1.2153	-1.5160	-2.0717	-2.6120	-1.7998	-2.3672	-1.0677	-1.6711	0.1539	-6.9792	-2.1257	-1.9842
6	WLK BU/MR	-1.3277	-3.3614	-1.2434	-2.3707	-1.0285	3.4099	-1.3290	-3.5022	-1.2153	-2.8401	-2.1495	-3.3057	-1.8744	-0.7047	-1.6500	-2.8297	-0.5315	-13.6922	-1.7785	-15.5283
7	WLK METRO	-1.8033	-2.4159	-1.1502	-1.9728	-1.3060	6.3627	-2.1533	-3.5499	0.0857	-2.8401	-0.9580	-3.3057	-3.0106	-2.3672	-0.8805	-3.0810	2.0025	-13.6922	-0.7788	-2.2279
8	PNR CR	-3.3402	-3.5711	-3.9673	-3.0870	-4.0713	1.7768	-4.3941	-4.3462	-2.5372	-4.9591	-5.9279	-4.5681	-2.6457	-4.3471	-4.5335	-9.6759	-2.4953	-21.2351	-6.9078	-48.7669
9	KNR CR	-4.5282	-3.5711	-3.7396	-3.0870	-4.0713	1.7768	-4.3941	-4.5472	-4.1181	-4.9591	-3.8815	-4.5681	-2.8085	-4.3471	-4.8979	-6.7078	-3.8446	-21.2740	-5.9793	-50.9109
10	PNR BUS	-3.3402	-3.5711	-3.9673	-3.0870	-4.0713	1.7768	-4.3941	-4.3462	-2.5372	-4.9591	-5.9279	-4.5681	-0.7967	-4.3471	-4.5335	-6.4989	-2.4953	-16.9609	-6.9078	-43.5299
11	KNR BUS	-4.5282	-3.5711	-3.4459	-3.0870	-4.0713	1.7768	-4.3941	-2.2755	-4.1181	-4.9591	-3.8815	-4.5681	-2.8085	-4.3471	-4.8979	-4.8555	-3.8446	-21.2740	-5.9793	-45.1316
12	PNR BU/MR	-3.3402	-3.5711	-2.6245	-3.0870	-4.0713	1.7768	-4.3941	-4.3462	-2.5372	-4.9591	-5.9279	-4.5681	-1.4084	-4.3471	-4.5335	-9.6759	-0.1697	-21.2351	-6.9078	-48.7669
13	KNR BU/MR	-4.5282	-3.5711	-3.0237	-3.0870	-4.0713	1.7768	-4.3941	-4.5472	0.5982	-4.9591	-3.8815	-4.5681	-1.6098	-4.3471	-3.5251	-6.7078	-3.8446	-21.2740	-5.9793	-50.9109
14	PNR METRO	-2.6756	-3.5711	-3.0172	-3.0870	-4.0714	1.7768	-4.3941	-4.3462	-2.5372	-4.9591	-3.9481	-4.5681	-2.9740	-4.3471	-3.7347	-9.6759	-3.1030	-21.2351	-5.5357	-48.7669
15	KNR METRO	-4.3494	-3.5711	-4.4245	-3.0870	-4.0714	1.7768	-4.3941	-4.5472	-4.1181	-4.9591	-3.8815	-4.5681	-3.0673	-4.3471	-4.7914	-6.7078	-3.8446	-21.2740	-5.9793	-50.9109

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Table 61 Top-level equivalent nesting constants for HBO

		1 DC CORE /URBAN-DC CORE	2 DC CORE /URBAN-VA CORE	3 DC CORE /URBAN-URBAN	4 DC CORE /URBAN-OTHER	5 MD URBAN-DC CORE	6 MD URBAN-VA CORE	7 MD URBAN-URBAN	8 MD URBAN-OTHER	9 VA CORE /URBAN-DC CORE	10 VA CORE /URBAN-VA CORE	11 VA CORE /URBAN-URBAN	12 VA CORE /URBAN-OTHER	13 MD OTHER-DC CORE	14 MD OTHER-VA CORE	15 MD OTHER-URBAN	16 MD OTHER-OTHER	17 VA OTHER-DC CORE	18 VA OTHER-VA CORE	19 VA OTHER-URBAN	20 VA OTHER-OTHER
1	LOV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	HOV2	0.0034	-0.2118	-0.0935	-0.3155	-0.2409	0.0000	0.0102	0.0339	0.0300	0.0250	-0.0211	-0.1062	-0.1469	-0.2942	-0.1269	0.0255	-0.3325	0.0512	-0.1185	0.0285
3	HOV3+	-0.1795	-0.4702	-0.1578	-0.3385	-0.5435	0.0000	-0.0795	-0.1473	-0.0615	-0.0158	-0.1036	-0.1653	-0.1659	-0.0649	-0.2046	-0.0262	-0.8013	0.0122	-0.2453	0.0012
4	WLK CR	0.4667	0.1148	-0.2602	-0.0131	0.9060	5.8749	-0.1976	-1.2549	3.3086	-1.1812	-0.6963	-0.6633	3.3733	-0.1920	-0.2506	-1.1209	2.1275	-0.1814	-0.0266	-1.1798
5	WLK BUS	0.4563	-1.6518	-0.1991	-0.9584	0.0398	4.9872	-0.4361	-1.2518	1.2751	-3.3999	-1.3550	-1.8236	0.4450	-0.1920	-0.1254	-0.6810	1.7382	-1.1023	-0.7758	-1.0207
6	WLK BU/MR	0.5675	-0.2731	-0.3744	-1.0003	0.4680	6.2542	-0.5338	-1.5312	1.6494	-2.9351	-0.2677	-1.4974	-0.1028	-0.6484	-0.5055	-0.9605	1.4764	-1.2245	0.3266	-2.6095
7	WLK METRO	0.4532	0.2791	-0.3183	-0.1886	1.3047	6.0828	0.3838	-0.8687	3.9252	-0.6841	0.2250	0.6455	0.6328	0.4117	-0.6152	-1.3785	3.1486	0.9706	1.4791	-0.6079
8	PNR CR	-0.8570	-0.8819	-2.1790	-2.6533	-1.5736	2.0556	-2.9215	-2.6526	-0.2220	-4.1839	-4.3915	-5.0254	0.1019	-0.0277	-1.5197	-4.2895	-0.6041	-2.0205	-2.1351	-26.6494
9	KNR CR	-2.2446	-1.8904	-3.0535	0.9144	-2.4825	2.0556	-4.2611	-4.2814	-1.1019	-4.1839	-4.5417	-3.6492	-1.4714	-0.3236	-1.7240	-4.1518	-1.3749	-3.3118	-2.6030	-27.0285
10	PNR BUS	-1.4624	-0.8819	-2.9743	-1.5313	-1.5736	2.0556	-2.6022	-0.4789	-0.2220	-4.1839	-4.3915	-5.0254	0.6523	-0.0277	-1.9082	-3.3783	0.2861	-3.2869	-2.4818	-24.6711
11	KNR BUS	-1.4289	-0.8449	-2.7167	-2.3011	-2.4825	2.0556	-3.2540	-2.3793	-1.1019	-4.1839	-3.3668	-3.9663	-1.7535	-0.3236	-1.6897	-3.2278	-1.3749	-3.3118	-2.2320	-24.7543
12	PNR BU/MR	-1.0877	-0.8819	-1.8439	-2.6533	0.8838	2.0556	-3.1864	-2.6526	0.1410	-4.1839	-2.2474	-5.0254	1.4849	2.4809	-1.6573	-11.0084	0.7202	-1.0667	-2.0080	-29.6818
13	KNR BU/MR	-0.3786	-1.8904	-2.8338	-2.4146	0.2222	2.0556	-4.2611	-3.6220	2.6965	-4.1839	-4.5417	-3.6492	-0.5682	0.2620	-1.9287	-3.8595	-0.5318	-1.2663	-2.1152	-29.0856
14	PNR METRO	-0.8001	-0.8819	-2.0472	-1.4026	-1.5222	2.0556	-3.1023	-2.6526	-0.2270	-4.1839	-3.0119	-2.3781	-0.7699	-0.1946	-2.0897	-4.1104	-0.7710	-1.9707	-1.8295	-13.6230
15	KNR METRO	-2.5774	-1.9117	-3.2210	-1.9281	-2.5435	2.0556	-4.2766	-4.2814	-1.6634	-4.1839	-4.0078	-2.4149	-1.9475	-0.2336	-2.6675	-4.1282	-1.4864	-3.2991	-2.5710	-13.7843

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Table 62 Top-level equivalent nesting constants for NHW

		1 DC CORE /URBAN-DC CORE	2 DC CORE /URBAN-VA CORE	3 DC CORE /URBAN-URBAN	4 DC CORE /URBAN-OTHER	5 MD URBAN-DC CORE	6 MD URBAN-VA CORE	7 MD URBAN-URBAN	8 MD URBAN-OTHER	9 VA CORE /URBAN-DC CORE	10 VA CORE /URBAN-VA CORE	11 VA CORE /URBAN-URBAN	12 VA CORE /URBAN-OTHER	13 MD OTHER-DC CORE	14 MD OTHER-VA CORE	15 MD OTHER-URBAN	16 MD OTHER-OTHER	17 VA OTHER-DC CORE	18 VA OTHER-VA CORE	19 VA OTHER-URBAN	20 VA OTHER-OTHER
1	LOV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	HOV2	-2.4376	-1.5657	-2.0310	-2.0077	-3.8841	0.0000	-2.2594	-1.8822	-2.4765	-1.9004	-2.1911	-2.1279	-3.6029	-2.2104	-2.7180	-1.3908	-3.9866	-3.9037	-2.7655	-1.3649
3	HOV3+	-3.5455	-1.9487	-2.3634	-3.2005	-3.7904	0.0000	-2.7406	-2.3435	-3.1951	-2.4839	-3.1260	-3.0600	-5.0775	-4.2154	-3.9865	-1.9164	-5.3697	-6.0925	-4.1766	-1.9571
4	WLK CR	-1.6903	-0.4053	-0.3370	1.7025	-2.0220	6.2062	-1.5944	-0.1703	-2.0894	-1.0396	-1.6799	-0.8202	-1.7455	-0.9505	-1.4634	-0.3105	-1.2490	-3.3652	-1.6986	-1.2128
5	WLK BUS	-1.9595	-0.4053	-0.4801	-0.5447	-1.8584	6.2062	-1.5470	0.1920	-2.0894	-1.4982	-1.9253	-2.0126	-2.0160	-0.9505	-1.2400	-0.0919	-2.3222	-3.9255	-2.6994	-1.3645
6	WLK BU/MR	-0.6114	1.7337	0.1905	0.3267	-1.0794	8.8945	-0.1273	-0.0709	-0.5114	-0.6410	-0.6534	-1.2615	-1.4502	-0.0940	-0.8682	-0.8592	-1.4804	-3.1791	-1.5834	-0.2274
7	WLK METRO	-1.7094	-0.3752	-0.2642	3.0591	-2.1822	6.1449	-1.9032	-1.1478	-1.9452	-0.9863	-1.7099	0.6712	-1.7701	-1.5237	-2.2838	-1.6032	-0.4143	-2.9653	-0.1749	0.9161
8	PNR CR	-2.6406	-0.7167	-1.6196	1.6398	-3.3384	2.8065	-3.6695	-3.1487	-2.2962	-2.4258	-3.7777	-0.7243	-2.9853	-2.1610	-2.9937	-4.1550	-2.4409	-3.7939	-4.2744	-5.8461
9	KNR CR	-3.4200	-1.1675	-2.2434	-0.2994	-4.4639	2.8065	-3.7179	-3.3772	-3.7569	-5.3010	-5.6579	-2.5389	-3.9190	-2.6049	-3.0810	-2.2037	-3.5800	-4.9894	-4.5255	-5.6336
10	PNR BUS	-2.7937	-0.7167	-3.0221	0.4159	-3.3384	2.8065	-4.5837	-3.1487	-2.2962	-2.4258	-3.7777	-1.6842	-2.9853	-2.1610	-2.7769	-4.3793	-3.8261	-5.4111	-4.2744	-5.1085
11	KNR BUS	-2.8981	-1.1675	-1.5993	-0.1074	-4.4639	2.8065	-2.6372	-3.3772	-3.7569	-2.6255	-3.2875	-1.2885	-2.8625	-2.6049	-2.0398	-1.3391	-3.5800	-4.9894	-4.5255	-4.3488
12	PNR BU/MR	-2.1902	-0.7244	-2.0208	0.0927	-1.4416	2.8065	-1.9062	-3.1487	-0.3921	0.1998	-1.3897	-1.3045	0.2511	-2.1610	-0.5615	-3.8897	-0.8536	-1.7350	-1.8885	-6.0620
13	KNR BU/MR	-1.1556	-1.1675	-0.8441	-1.1516	-4.4639	2.8065	-1.2887	-3.3772	-2.3751	-5.3010	-5.6579	-2.9415	-2.1199	-0.6721	-1.6133	-1.7721	-2.3873	-2.8043	-2.9213	-5.4754
14	PNR METRO	-2.6848	-0.6501	-1.4107	2.2379	-3.4506	2.8065	-4.3716	-2.6083	-2.7644	-1.9506	-3.6536	0.0965	-3.2444	-2.1325	-3.3581	-4.0099	-2.5813	-3.7801	-3.8424	-5.8461
15	KNR METRO	-3.7972	-1.1531	-2.7023	-0.0656	-4.4231	2.8065	-5.4254	-2.8775	-3.8119	-5.6346	-5.9060	-3.6840	-4.0520	-2.8441	-4.0099	-4.6996	-3.2268	-4.4158	-4.2103	-5.6336

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Table 63 Top-level equivalent nesting constants for NHO

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		DC CORE / URBAN- DC CORE	DC CORE / URBAN- VA CORE	DC CORE / URBAN- URBAN	DC CORE / URBAN- OTHER	MD URBAN- DC CORE	MD URBAN- VA CORE	MD URBAN- URBAN	MD URBAN- OTHER	VA CORE / URBAN- DC CORE	VA CORE / URBAN- VA CORE	VA CORE / URBAN- URBAN	VA CORE / URBAN- OTHER	MD OTHER- DC CORE	MD OTHER- VA CORE	MD OTHER- URBAN	MD OTHER- OTHER	VA OTHER- DC CORE	VA OTHER- VA CORE	VA OTHER- URBAN	VA OTHER- OTHER
1	LOV	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	HOV2	-2.2404	-1.2452	-1.3467	-1.1410	-3.1344	0.0000	-1.1515	-0.9380	-2.5265	-1.8987	-1.5496	-1.0076	-2.2877	0.0000	-1.3530	-0.4546	-3.3001	-1.1960	-1.7771	-0.4119
3	HOV3+	-3.3165	-2.7461	-1.9886	-2.0087	-4.8406	0.0000	-2.0389	-1.7496	-4.2143	-3.0188	-2.3954	-1.5215	-3.3084	0.0000	-2.0412	-0.7840	-5.2859	-1.8159	-2.7387	-0.7341
4	WLK CR	-2.7103	14.4532	-1.3012	3.8052	-3.8066	5.6246	-2.0853	0.8939	4.5942	-2.7925	-1.8710	-0.5412	5.8333	5.8435	2.2363	0.4785	-2.0189	-2.8030	-2.5317	-2.2029
5	WLK BUS	-2.7298	2.1756	-1.3548	-0.3841	-3.6153	5.6246	-1.9184	-0.6535	-0.6371	-3.9149	-2.5782	-2.9590	-2.9345	5.8435	-1.5897	-0.8081	-2.0189	-2.3898	-3.1561	-1.9266
6	WLK BU/MR	-1.5929	14.6844	-1.0196	0.2155	-3.8372	5.6246	-1.5135	-0.7223	0.8046	-2.7925	-1.7510	-2.9326	-2.8937	5.8435	-1.3104	-2.1187	-1.4854	-1.4768	-1.2410	-8.5635
7	WLK METRO	-2.8907	14.8040	-1.2693	0.9272	-3.8252	7.1431	-2.6014	-2.6241	5.3324	-2.4153	-1.3204	-1.2713	-3.7450	7.4533	-2.8427	-3.1104	-0.6206	-2.8030	-2.3442	-0.4109
8	PNR CR	-3.2036	11.3868	-2.7009	5.5366	-5.1009	2.7278	-4.4368	-3.3171	0.1334	-3.9554	-3.2669	-3.0443	-1.4415	9.9027	-2.0066	-3.6171	-2.7488	-5.0527	-5.0799	-25.0794
9	KNR CR	-4.0443	12.4264	-2.9376	6.5793	-5.8969	2.7278	-4.5538	-4.1205	-1.7831	-4.1493	-3.8767	-5.2161	-3.0747	10.3516	-2.9328	-5.1200	-3.2226	-5.8118	-5.3164	-20.7873
10	PNR BUS	-3.1549	11.3868	-2.8778	-1.7849	-5.1009	2.7278	-2.3237	-3.3171	0.1334	-3.9554	-3.2669	-3.0443	-3.7766	9.0661	-3.7922	-1.9278	-2.7488	-5.0527	-5.0799	-19.6462
11	KNR BUS	-2.9282	12.4264	-2.4805	-0.5501	-5.8969	2.7278	-3.2365	-1.3829	-1.7831	-4.1493	-3.8767	-2.7129	-3.7336	6.6043	-2.9570	-2.9143	-3.2226	-5.8118	-5.3164	-17.1340
12	PNR BU/MR	-2.1972	11.3868	-1.5707	-1.7849	-2.9949	2.7278	-4.4368	-3.3171	0.7842	-3.9554	-3.2669	-3.0443	-1.9992	19.2582	-1.1466	-3.6171	-1.4001	-5.0527	-3.9203	-25.0794
13	KNR BU/MR	-2.8527	12.4264	-1.7376	-0.8011	-5.8969	2.7278	-4.5538	-4.1205	2.6833	0.9938	-1.7953	-5.2161	-2.4275	6.6043	-1.1044	-5.1200	-1.4696	-5.8118	-5.3164	-20.7873
14	PNR METRO	-3.3138	12.0154	-3.8882	-1.6944	-5.3412	2.7278	-4.4368	-3.3171	0.3752	-3.9554	-3.2669	-3.0443	-4.4164	5.3409	-4.3497	-3.6171	-2.6974	-4.3444	-3.8118	-25.0794
15	KNR METRO	-4.4196	12.6442	-3.3930	-1.6450	-5.8166	2.7278	-5.0141	-4.1205	-2.6233	-4.8077	-5.3551	-5.2161	-5.2742	4.9954	-4.4617	-5.1200	-3.7608	-5.8118	-4.2009	-17.6239

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Computing top-level nesting constants and calculating implied minutes of impedance

As stated earlier, the default for the AEMS mode choice model application program is to use the McFadden UMNL model for coefficient values (specified in the AEMS control file using the COEF command) and the Daly NNNL model format for nesting coefficients and nesting constants (specified in the AEMS control file using the NSTC command). Consequently, one will often want to convert from the Daly-style nesting constant values to the McFadden-style nesting constant values (also known as "top-level" nesting constant values). This section of the report describes how to do this transformation, which is also done in formulas found on the spreadsheet page entitled "NSTCconst" found in the newSegSumm5purps*.xlsx Excel file.

To compute the top-level value of the nesting constants, we use the formula shown in Equation 11.

Equation 11 Equation for calculating the top-level equivalent value of a nesting constant

Higher level constant = { (lower level nest constant) * (higher level nest coefficient) + (higher level nest constant) } and so on, up to top nest level

To help illustrate this, we will perform a sample calculation. Figure 16 contains a nested-logit mode choice model with the same structure as the TPB NLMC model, but with hypothetical values for the nesting constants and nesting coefficients. Nest 4 is the PNR or drive-access to transit nest. The nesting constant values shown on the branches of the tree are in Daly format (e.g., the raw values that are produced by the CALIBMS program) and need to be converted to McFadden (top-level) format. Figure 16, the lower-level nesting constant for the PNR bus/Metrorail choice is -2.50368. To convert this value to its upper-level equivalent, we multiply it by the nesting *coefficient* of the next higher level (the PNR nest, which has a nesting coefficient value of 0.5). Then we add the nesting constant value of the PNR nest (-3.25564). Next, we multiply the result by the nesting coefficient of the next level up (the transit nest, whose nesting coefficient value is also 0.5). And finally, we add the nesting coefficient for the transit nest (3.01841), giving a result of 0.7647. This calculation can be seen below and on Figure 16.

Sample calculation:

PNR BU/MR (top level) = { (-2.50368)*(0.5) + (-3.25564) } * (0.5) + (3.01841) = 0.7647

In addition, to calculate the implied minutes of impedance, we divide the top-level constant value by the IVT coefficient, as shown in Equation 12.

Equation 12 Equation for calculating the implied minutes of impedance of a top-level nesting constant

Implied minutes of impedance = (top level const) / IVT coefficient

Thus, continuing with the example,

Implied minutes of impedance = 0.7647/-0.02128 = 35.9 minutes.

Top-level constants are computed as follows:

Higher level constant = { (lower level nest constant) * (higher level nest coefficient) + (higher level nest constant) } and so on, up to top nest level

Sample calculations with hypothetical values:

PNR BU/MR (top level) = { (-2.50368)*(0.5) + (-3.25564) } * (0.5) + (3.01841) = 0.7647

Implied minutes of impedance = (top level const) / IVTT coeff = 0.7647/-0.02128 = 35.9 min.
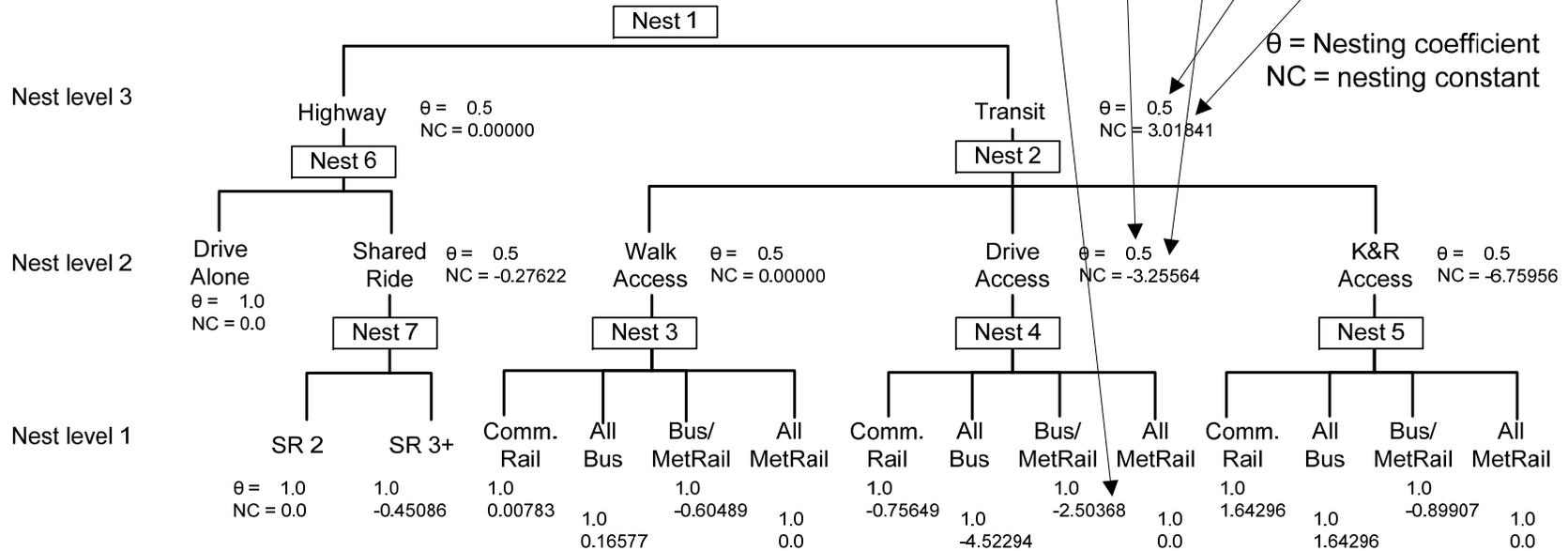
Figure 16 Example of calculating top-level nesting constant values and implied minutes of impedance

Trips by mode

Table 64 shows person trips summarized by travel mode and trip purpose, summarized for all 20 geographic market segments. The total number of year-2007 estimated person trips is 17,330,543. The total number of year-2007 estimated transit person trips in Table 64 is 1,107,185, which is about 1.6% below the observed target value.

Table 64 Person trips summarized by travel mode and trip purpose, summed for all 20 geographic market segments

	Mode	HBW Target	HBW Model	HBS Target	HBS Model	HBO Target	HBO Model	NHW Target	NHW Model	NHO Target	NHO Model	ALL Target	ALL Model
	DR ALONE	2,341,574	2,360,603	1,247,598	1,250,215	2,489,986	2,492,548	1,061,426	1,063,213	1,300,863	1,303,491	8,441,447	8,470,070
	SR2	311,741	315,351	866,268	868,063	1,998,390	2,000,328	210,142	210,410	895,478	897,067	4,282,019	4,291,219
	SR3+	119,813	121,668	727,922	729,607	1,778,874	1,780,536	169,857	170,225	658,899	660,034	3,455,365	3,462,070
	WK-CR	1,849	1,809	21	77	210	399	0	407	400	368	2,480	3,059
All 20 Segments	WK-BUS	171,834	176,138	18,433	16,784	87,044	86,047	23,685	24,067	16,224	15,907	317,220	318,944
	WK-BU/MR	132,142	138,821	2,487	2,709	23,696	23,882	12,417	12,330	3,960	4,248	174,702	181,989
	WK-MR	194,165	159,582	4,853	4,720	46,904	46,109	56,579	55,968	16,428	15,826	318,929	282,206
	PNR-CR	16,647	16,948	0	57	260	529	0	67	208	248	17,115	17,849
	KNR-CR	1,472	1,515	0	27	197	265	0	60	216	345	1,885	2,212
	PNR-BUS	15,967	16,325	82	684	3,030	3,127	355	409	1,523	1,625	20,957	22,169
	KNR-BUS	4,553	4,768	199	323	2,004	2,440	1,426	1,475	880	1,020	9,062	10,027
	PNR-BU/MR	27,525	27,972	112	467	2,700	3,086	1,482	1,462	559	687	32,378	33,673
	KNR-BU/MR	9,248	9,652	136	350	1,733	1,997	1,210	1,200	1,003	1,136	13,330	14,335
	PNR-MR	137,984	139,762	469	496	15,657	15,721	7,271	7,248	1,563	1,942	162,944	165,168
	KNR-MR	42,794	44,292	146	417	4,436	4,456	4,378	4,379	1,831	2,011	53,585	55,554
	Total Person	3,529,308	3,535,205	2,868,726	2,874,995	6,455,121	6,461,470	1,550,228	1,552,920	2,900,035	2,905,954	17,303,418	17,330,543
	Total Transit	756,180	737,582	26,938	27,111	187,871	188,058	108,803	109,072	44,795	45,362	1,124,587	1,107,185
	Transit Pct	21.4%	20.9%	0.9%	0.9%	2.9%	2.9%	7.0%	7.0%	1.5%	1.6%	6.5%	6.4%

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Table 65 shows the total person trips summarized by market segment. The model seems to replicate the observed data well at the geographic market segment level, which is not surprising, since the model was calibrated to the geographic market segments.

Table 65 Total person trips summarized by market segment

Market Segment	HBW Target	HBW Model	HBS Target	HBS Model	HBO Target	HBO Model	NHW Target	NHW Model	NHO Target	NHO Model	ALL Target	ALL Model
1	134,401	134,443	19,489	19,516	87,614	87,638	73,639	73,702	40,293	40,326	355,436	355,625
2	12,048	12,052	2,259	2,263	9,262	9,263	8,584	8,592	1,963	1,959	34,116	34,129
3	79,327	79,375	85,883	85,882	290,451	290,407	87,235	87,404	109,738	109,835	652,634	652,902
4	50,639	51,001	43,584	44,229	83,410	83,779	57,228	57,477	46,839	48,080	281,700	284,565
5	27,134	27,140	1,951	1,949	11,089	11,090	4,712	4,720	3,567	3,574	48,453	48,473
6	2,690	2,690	32	149	183	874	192	637	35	174	3,132	4,525
7	34,407	34,463	31,704	31,724	87,461	87,468	32,336	32,367	36,942	36,985	222,850	223,007
8	28,197	28,310	29,115	29,247	63,122	63,256	26,792	26,831	39,057	39,204	186,283	186,849
9	52,353	52,362	2,285	2,291	16,151	16,141	11,905	11,913	2,986	2,983	85,680	85,690
10	16,258	16,259	8,202	8,203	21,647	21,647	16,987	16,986	7,613	7,613	70,707	70,708
11	40,690	40,744	53,655	53,749	119,875	119,902	44,977	45,013	45,523	45,611	304,720	305,018
12	37,238	37,308	33,573	33,746	68,500	68,685	33,800	33,876	39,006	39,318	212,117	212,933
13	253,810	253,898	9,499	9,632	62,394	62,457	18,619	18,741	12,216	12,428	356,538	357,156
14	31,972	31,992	1,250	1,272	8,456	8,469	2,700	2,713	295	803	44,673	45,250
15	255,819	256,817	65,623	66,141	257,639	258,249	51,200	51,505	71,695	72,349	701,976	705,059
16	1,153,303	1,155,451	1,377,580	1,378,889	2,935,938	2,938,054	575,180	575,774	1,411,540	1,412,393	7,453,541	7,460,562
17	177,725	177,806	6,142	6,342	39,527	39,584	9,448	9,530	2,441	2,588	235,283	235,850
18	48,637	48,645	6,448	6,468	22,379	22,394	6,951	6,968	4,190	4,205	88,605	88,681
19	162,085	162,713	45,211	46,140	127,689	128,316	28,602	28,712	32,517	33,007	396,104	398,888
20	930,575	931,736	1,045,241	1,047,163	2,142,334	2,143,798	459,141	459,459	991,579	992,516	5,568,870	5,574,673
Total Person	3,529,308	3,535,205	2,868,726	2,874,995	6,455,121	6,461,470	1,550,228	1,552,920	2,900,035	2,905,954	17,303,418	17,330,543
Total Transit	756,180	737,582	26,938	27,111	187,871	188,058	108,803	109,072	44,795	45,362	1,124,587	1,107,185
Transit Pct	21.4%	20.9%	0.9%	0.9%	2.9%	2.9%	7.0%	7.0%	1.5%	1.6%	6.5%	6.4%

Table 66 shows *transit* person trips summarized by market segment. As stated before, at the regional level, the model appears to be underestimating total transit by about 1.6%. In terms of the five trip purposes, the estimated transit person trips for all five trip purposes match reasonably well at the regional level, with the largest discrepancy being a 2.5% underestimation of HBW transit person trips compared to the observed target.

Table 66 Transit person trips summarized by market segment

Market Segment	HBW Target	HBW Model	HBS Target	HBS Model	HBO Target	HBO Model	NHW Target	NHW Model	NHO Target	NHO Model	ALL Target	ALL Model
1	121,156	121,179	2,516	2,519	32,693	32,702	29,816	29,856	9,430	9,440	195,611	195,696
2	10,475	10,399	145	144	3,142	3,130	4,281	4,292	1,880	1,818	19,923	19,784
3	71,016	70,358	6,941	6,940	41,914	41,908	24,992	25,043	11,535	11,545	156,398	155,795
4	20,938	18,330	1,238	1,254	5,028	5,032	6,633	6,433	2,681	2,751	36,518	33,801
5	20,376	20,133	202	201	3,493	3,477	2,089	2,094	467	468	26,627	26,372
6	1,753	1,739	32	126	183	773	192	581	35	153	2,195	3,372
7	15,410	15,271	900	898	6,656	6,633	2,084	2,087	1,014	1,015	26,064	25,905
8	6,056	5,953	390	391	2,659	2,663	1,901	1,904	1,056	1,061	12,062	11,972
9	46,277	45,188	197	196	7,689	7,575	5,427	5,431	2,540	2,442	62,130	60,832
10	7,160	7,086	247	253	938	930	2,977	2,976	586	585	11,908	11,830
11	20,454	18,903	1,397	1,386	5,681	5,648	4,626	4,633	2,260	2,251	34,418	32,821
12	5,473	4,851	466	476	1,991	1,966	1,703	1,685	374	375	10,007	9,353
13	122,128	118,903	377	392	11,153	11,117	4,701	4,731	966	987	139,325	136,130
14	14,072	13,967	27	28	1,436	1,433	493	496	295	715	16,323	16,639
15	68,062	66,519	1,779	1,792	16,478	16,521	3,984	4,013	2,077	2,096	92,380	90,942
16	42,095	42,095	5,444	5,450	21,809	21,825	4,505	4,510	3,970	3,981	77,823	77,862
17	76,030	72,423	218	218	7,192	7,078	3,220	3,202	753	786	87,413	83,707
18	21,412	20,955	21	32	1,061	1,052	676	677	123	126	23,293	22,843
19	41,081	39,395	597	601	6,262	6,193	1,838	1,803	871	884	50,649	48,876
20	24,756	23,933	3,804	3,811	10,413	10,403	2,665	2,625	1,882	1,883	43,520	42,655
Total Transit	756,180	737,582	26,938	27,111	187,871	188,058	108,803	109,072	44,795	45,362	1,124,587	1,107,185

Table 67 shows transit person trips summarized by transit submode. It appears that Metrorail is slightly underestimated at the regional level, summed across all five trip purposes (502,928 versus 535,458 observed, or about 6%), whereas bus and bus/Metrorail are slightly overestimated at the regional level, by about 1% for bus and 4% for bus/Metrorail.

Table 67 Transit person trips summarized by transit submode

	HBW		HBS		HBO		NHW		NHO		ALL	
Mode	Target	Model	Target	Model	Target	Model	Target	Model	Target	Model	Target	Model
CR	19,968	20,272	21	160	667	1,193	0	534	824	961	21,480	23,120
MR	374,943	343,635	5,468	5,633	66,997	66,286	68,228	67,595	19,822	19,779	535,458	502,928
BUS	192,354	197,231	18,714	17,791	92,078	91,615	25,466	25,951	18,627	18,552	347,239	351,140
BUS/MR	168,915	176,444	2,735	3,526	28,129	28,965	15,109	14,992	5,522	6,070	220,410	229,997
Total Person	3,529,308	3,535,205	2,868,726	2,874,995	6,455,121	6,461,470	1,550,228	1,552,920	2,900,035	2,905,954	17,303,418	17,330,543
Total Transit	756,180	737,582	26,938	27,111	187,871	188,058	108,803	109,072	44,795	45,362	1,124,587	1,107,185
Transit Pct	21.4%	20.9%	0.9%	0.9%	2.9%	2.9%	7.0%	7.0%	1.5%	1.6%	6.5%	6.4%

Table 68 shows transit person trips summarized by access mode to transit. At the regional level, when summed across all five trip purposes, transit person trips by the walk-access mode are underestimated by about 3%, but transit person trips by the PNR and KNR access modes are overestimated, by about 2% and 6% respectively.

Table 68 Transit person trips summarized by access mode to transit

	HBW		HBS		HBO		NHW		NHO		ALL	
Mode	Target	Model	Target	Model	Target	Model	Target	Model	Target	Model	Target	Model
WALK	499,990	476,349	25,794	24,290	157,854	156,437	92,681	92,772	37,012	36,349	813,331	786,198
PNR	198,123	201,006	663	1,704	21,647	22,462	9,108	9,185	3,853	4,502	233,394	238,859
KNR	58,067	60,226	481	1,116	8,370	9,159	7,014	7,115	3,930	4,511	77,862	82,128
Total Person	3,529,308	3,535,205	2,868,726	2,874,995	6,455,121	6,461,470	1,550,228	1,552,920	2,900,035	2,905,954	17,303,418	17,330,543
Total Transit	756,180	737,582	26,938	27,111	187,871	188,058	108,803	109,072	44,795	45,362	1,124,587	1,107,185
Transit Pct	21.4%	20.9%	0.9%	0.9%	2.9%	2.9%	7.0%	7.0%	1.5%	1.6%	6.5%	6.4%

Chapter 7 Time-of-Day Model

The time-of-day model for the Version 2.3 travel model apportions daily vehicle trips among four modeled time-of-day periods, prior to the traffic assignment step. This chapter presents the details of the model and the development of the peaking factors. The actual peak-hour factors for the four time-of-day periods can be found on Table 77 on page 8-18.

7.1 Model Structure

The time-of-day model, which follows the mode choice model, addresses the temporal dimension of travel. The model distributes daily trips by purpose and mode to specific periods of the day, in preparation for the traffic assignment step. The four modeled time periods considered in the Version 2.3 model are defined as the AM peak period (6 – 9 AM), the midday period (9 AM – 3 PM), the PM peak period (3 PM – 7 PM) and the nighttime/early morning period (7 PM – 6 AM). Note that the AM peak period is defined as being three hour long (as it was in Version 2.2), but the PM peak period is now defined as being four hours long (compared to three hours in Version 2.2).[78]

The distribution of daily trips to specific time periods are made with time-in-motion factors developed from the 2007/2008 HTS. The factors, shown as Table 70, have been developed on the basis of purpose, mode, and directionality of the trip (with respect to the home-end and non-home ends of the trip). After applying the travel model, including the time-of-day-specific traffic assignment, it was found that the model was overestimating travel in the AM and PM peaks, and underestimating travel in the midday and night periods. Consequently, the time-of-day factors were adjusted so that the traffic assignment more closely matched the observed VMT. The resulting, adjusted time-of-day factors are shown in Table 71.

The truck and various non-modeled auto driver travel markets are also converted from daily trip tables to the four time periods using a system of temporal factors. The factors are summarized in Table 69.

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[78] Mark S. Moran to Ronald Milone, "Choosing the breakpoints for and duration of time-of-day periods used in the Version 2.3 travel model," Memorandum, October 21, 2010.

Table 69 Version 2.3 Temporal Factors (Percentages) For Truck and Non-Modeled Travel Markets

Time Period	Travel Market							
	Comm. Vehicle	Medium Truck	Heavy Truck	X-X Auto Dr	Taxi Auto Dr	Tourist Auto Dr	School Auto Dr	Airport Auto Dr
AM	18.70	25.00	20.00	18.70	18.70	18.70	18.70	23.10
MD	32.63	45.00	50.00	32.63	32.63	32.63	32.63	36.57
PM	32.89	20.00	10.00	32.89	32.89	32.89	32.89	25.38
NT	15.78	10.00	20.00	15.78	15.78	15.78	15.78	14.95

Note: Medium & Heavy truck factors were updated as part of the truck modeling update

The temporal factors shown for medium and heavy trucks were recently updated as part of the revised truck modeling effort.[79] The remaining temporal factors were based on professional judgment.   The directional splits for the above auto trips are 50/50 (all time periods). The directional X/I and IX split for external commercial and truck trips 70/30, 30/70, and 50/50, for the AM, PM, and off-peak periods, respectively.

In application, these factors are assumed to remain *constant* over time. Although it is reasonable to expect, that congestion will encourage traffic spreading from the AM and PM periods to the off-peak, the peak spreading phenomenon is complex and not well understood in the profession.   Instead of addressing this issue in the regional model, TPB accounts for peak spreading issues in its travel model post-processor (also known as the mobile emissions post processor), where hourly volume and speed estimates are formulated.[80]

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[79] Allen, *Development of a Model for Truck Trips*.

[80] Hamid Humeida, "Emissions post processor used for the Air Quality Conformity Determination of the 2008 CLRP and the FY2009-2014 TIP," Memorandum, April 27, 2009; Ronald Milone and Hamid Humeida to Files, "Mobile Emissions Post-Processor Description and Results," Memorandum, May 26, 2009.

Table 70 Initial, Household Travel Survey-based temporal travel distributions by purpose, mode, and direction

Purpose	Mode	Direction	AM	MD	PM	NT
HBW	Auto Driver	Home-NonHome	66.53	19.99	4.17	9.31
		NonHome-Home	1.41	8.16	70.77	19.66
	Drive Alone	Home-NonHome	67.06	19.69	3.89	9.36
		NonHome-Home	1.59	8.20	69.67	20.54
	Carpool Person	Home-NonHome	58.06	25.85	7.90	8.19
		NonHome-Home	0.25	8.69	75.95	15.11
	Transit	Home-NonHome	74.63	16.70	0.81	7.86
		NonHome-Home	0.19	2.78	79.88	17.15
HBS	Auto Driver	Home-NonHome	15.43	41.71	28.17	14.69
		NonHome-Home	1.49	32.12	38.24	28.15
	Drive Alone	Home-NonHome	20.84	43.46	22.08	13.62
		NonHome-Home	2.10	33.17	39.24	25.49
	Carpool Person	Home-NonHome	6.38	37.49	40.09	16.04
		NonHome-Home	0.30	29.26	35.89	34.55
	Transit	Home-NonHome	35.42	43.24	14.49	6.85
		NonHome-Home	0.36	25.76	38.85	35.03
HBO	Auto Driver	Home-NonHome	24.26	38.71	25.24	11.79
		NonHome-Home	6.96	27.53	35.58	29.93
	Drive Alone	Home-NonHome	22.43	42.19	23.05	12.33
		NonHome-Home	9.34	29.41	31.68	29.57
	Carpool Person	Home-NonHome	33.57	30.60	26.06	9.77
		NonHome-Home	2.37	22.94	45.92	28.77
	Transit	Home-NonHome	41.28	41.23	13.20	4.29
		NonHome-Home	0.52	23.33	43.54	32.61
NHW	Auto Driver	Home-NonHome	12.33	43.14	38.80	5.73
		NonHome-Home	12.33	43.14	38.80	5.73
	Drive Alone	Home-NonHome	12.93	42.82	38.36	5.89
		NonHome-Home	12.93	42.82	38.36	5.89
	Carpool Person	Home-NonHome	12.46	41.92	39.87	5.75
		NonHome-Home	12.46	41.92	39.87	5.75
	Transit	Home-NonHome	17.35	24.71	51.08	6.86
		NonHome-Home	17.35	24.71	51.08	6.86
NHO	Auto Driver	Home-NonHome	4.07	55.33	29.87	10.73
		NonHome-Home	4.07	55.33	29.87	10.73
	Drive Alone	Home-NonHome	4.92	57.58	28.17	9.33
		NonHome-Home	4.92	57.58	28.17	9.33
	Carpool Person	Home-NonHome	3.69	47.29	35.48	13.54
		NonHome-Home	3.69	47.29	35.48	13.54
	Transit	Home-NonHome	5.92	39.82	45.49	8.77
		NonHome-Home	5.92	39.82	45.49	8.77

Table 71 Final temporal travel distributions by purpose, mode, and direction

Purpose	Mode	Direction	AM	MD	PM	NT
HBW	Auto Driver	Home-NonHome	57.88	22.89	3.76	15.47
		NonHome-Home	1.14	8.73	59.62	30.51
	Drive Alone	Home-NonHome	58.38	22.56	3.50	15.56
		NonHome-Home	1.28	8.72	58.32	31.68
	Carpool Person	Home-NonHome	50.09	29.35	7.07	13.49
		NonHome-Home	0.21	9.59	66.01	24.19
	Transit	Home-NonHome	66.36	19.55	0.74	13.35
		NonHome-Home	0.16	3.06	69.35	27.43
HBS	Auto Driver	Home-NonHome	12.09	43.04	22.89	21.98
		NonHome-Home	1.10	30.82	28.90	39.18
	Drive Alone	Home-NonHome	16.42	45.06	18.03	20.49
		NonHome-Home	1.57	32.31	30.10	36.02
	Carpool Person	Home-NonHome	4.99	38.58	32.49	23.94
		NonHome-Home	0.21	27.13	26.20	46.46
	Transit	Home-NonHome	29.42	47.26	12.46	10.86
		NonHome-Home	0.25	23.98	28.47	47.30
HBO	Auto Driver	Home-NonHome	19.58	41.12	21.11	18.19
		NonHome-Home	5.07	26.41	26.87	41.65
	Drive Alone	Home-NonHome	17.89	44.28	19.05	18.78
		NonHome-Home	6.81	28.18	23.91	41.10
	Carpool Person	Home-NonHome	28.09	33.70	22.60	15.61
		NonHome-Home	1.76	22.35	35.23	40.66
	Transit	Home-NonHome	35.16	46.21	11.65	6.98
		NonHome-Home	0.37	22.15	32.56	44.92
NHW	Auto Driver	Home-NonHome	10.26	47.22	33.44	9.08
		NonHome-Home	10.26	47.22	33.44	9.08
	Drive Alone	Home-NonHome	10.75	46.85	33.05	9.35
		NonHome-Home	10.75	46.85	33.05	9.35
	Carpool Person	Home-NonHome	10.39	46.01	34.45	9.15
		NonHome-Home	10.39	46.01	34.45	9.15
	Transit	Home-NonHome	14.97	28.06	45.68	11.29
		NonHome-Home	14.97	28.06	45.68	11.29
NHO	Auto Driver	Home-NonHome	3.17	56.75	24.12	15.96
		NonHome-Home	3.17	56.75	24.12	15.96
	Drive Alone	Home-NonHome	3.85	59.34	22.86	13.95
		NonHome-Home	3.85	59.34	22.86	13.95
	Carpool Person	Home-NonHome	2.89	48.41	28.60	20.10
		NonHome-Home	2.89	48.41	28.60	20.10
	Transit	Home-NonHome	4.85	42.88	38.57	13.70
		NonHome-Home	4.85	42.88	38.57	13.70

Chapter 8 Traffic Assignment/Feedback

The traffic assignment step is used to load a trip table onto the highway network in order to produce network link flows and speeds. The traffic assignment process of the Version 2.3 model is detailed in this chapter.

8.1 Updated features

Table 72 compares how traffic assignment features have changed from Version 2.2 to Version 2.3. Following the table is 1) a brief discussion of some of these items, and 2) more detailed descriptions of some features.

Table 72 A comparison of traffic assignment features in the Version 2.2 and 2.3 travel models

Feature	Version 2.2	Version 2.3
Methodology	Static, user equilibrium traffic assignment	Same
Algorithm	Frank-Wolfe	Bi-conjugate Frank-Wolfe
Volume delay function	Conical	Same
Queuing delay function	Yes, sigmoid curve	None
User classes	5	6 (added commercial vehicles)
Time of day periods	AM, PM, off peak	AM, PM, midday, and night time
Number of time-of-day/user-class traffic assignments	5 (See Figure 18)	6 (See Figure 19)
Convergence criterion	60 user equilibrium iterations per time-of-day period	A relative gap of 10^{-3} (0.001) or 300 user equilibrium iterations, whichever is attained first
Speed feedback iterations	7 (pump prime, i1, i2, i3, i4, i5, i6)	5 (pump prime, i1, i2, i3, i4)
Two-step traffic assignment (see section 8.3 on page 8-3)	Yes	Yes
Double run of the travel model to address Northern Virginia HOV/HOT lane policy (see section 8.4 on page 8-7)	Yes	Yes
Number of zone-to-zone interchanges	$2,191^2$ = 4,800,481	$3,722^2$ = 13,853,284 (increased by a factor of 2.86 or 186%)
Free-flow capacity and speed lookup tables		Updated

The Version 2.3 travel model traffic assignment process uses a static, user-equilibrium traffic assignment, implemented with a Frank-Wolfe algorithm. The bi-conjugate Franke-Wolfe algorithm, which yields faster convergence and run times, was used in the initial model tests. However, after implementation of distributed processing (Cube Cluster), it was found to yield different results with and without distributed processing. If the issue can be resolved by the software vendor, TPB staff plans to revert back to using the bi-conjugate Frank-Wolfe algorithm in the Version 2.3 travel model. The Version 2.3 traffic assignment uses a conical volume delay function, but foregoes the queuing delay function that had been added to the Version 2.2 travel model (see discussion later in the chapter). Whereas the

Version 2.2 traffic assignment process used five user classes, the Version 2.3 model uses six user classes (commercial vehicles is now its own user class). For the Version 2.2 traffic assignment, the convergence/stopping criterion was simply to stop after 60 user equilibrium (UE) iterations. In Version 2.3, there is a dual convergence/stopping criterion: attain a relative gap of 10^{-3} (0.001) or 300 user equilibrium iterations, whichever comes first. This means that the Version 2.3 traffic assignment reaches a more converged solution than was the case with Version 2.2 and it also means that the six user classes should be similarly converged if the assignment stops after reaching the relative gap stopping criterion. By contrast, in Version 2.2, since each user class went to 60 UE iterations, some of the five were more converged than others, as is shown later in this chapter.

The Version 2.3 traffic assignment continues to use both the two-step traffic assignment and the double run of the travel model to address Northern Virginia HOV/HOT lane policy, both of which are discussed in greater detail later in this chapter.   The maximum TAZ number has increased from 2,191 to 3,722, a 70% increase. However, traffic assignment run times scale with the matrix size, so there has been an increase of 186% or a factor of 2.86. In the past, half of the model run time was spent on traffic assignment. Although we have not computed what this percentage is for the new model, we do know that a typical run time for the entire Version 2.2 travel model (traffic assignment and other steps) on our travel model server was about 18 hours and the new model takes about 80 hours (a factor of 4.4). If the model is distributed over 4 cores (using Cube Cluster as discussed in the User's Guide), model run time decreases to 47 hours. The increased run times are primarily due to the increased size of the matrices, the increased convergence in traffic assignment, the addition of a sixth user class in traffic assignment, and the fact that we now use four time-of-day periods (up from the previous three). For reference when model run times are discussed, the specifications or "specs" of the travel model server used by the models development staff (TMS3) are shown in Table 73.

Table 73 Specs of travel model server tms3

Item	Spec
Processor name and speed	Intel Xeon W5580 CPU @ 3.20GHz
Number of processors in system	2
Active cores per processor	4
Total number of cores	8
L2 Cache	4 x 256 KB
System Bus Frequency	133 MHz
Memory	4.0 GB
Hard drive	Network attached storage (NAS, O drive), 1.99 TB
Operating system	Windows Server Standard, SP2, 32-bit

Ref: O:\model_dev\computer_specs_2011-01.xlsx

8.2 Model structure

The traffic assignment step is executed five times during a given model run. The first assignment is called the "pump prime" traffic assignment. The last four traffic assignments, which occur as part of the speed feedback loop, are called iteration 1, 2, 3, and 4. For each of the five traffic assignments, there are actually four individual traffic assignments, one for each time-of-day period:

- AM peak period (3 hours: 6:00 AM to 9:00 AM)
- Midday period (6 hours: 9:00 AM to 3:00 PM)
- PM peak period (4 hours: 3:00 PM to 7:00 PM)
- Night/early morning period (11 hours: 7:00 PM to 6:00 AM)

The trips loaded in each time period are comprised of all purposes, as allocated by the time-of-day model. The trip tables that are loaded to the network are segmented into six user classes:

1. Single-occupant vehicles (SOVs)
2. Two-occupant HOVs
3. Three or more-occupant HOVs
4. Commercial vehicles
5. Medium/heavy truck
6. Airport auto driver

In Version 2.2, there were only five user classes, since the commercial vehicles category was grouped with medium/heavy truck. The primary reason for distinguishing truck markets is to allow for the option of using passenger car equivalents (PCEs) in the traffic assignment process. The use of PCE's has not yet been implemented, but they will be considered in future developmental work.

8.3 Two-step traffic assignment

To better understand the two-step assignment, it is necessary to discuss its development as part of the Version 2.2 travel model. The Version 2.2 traffic assignment process prior to the fall of 2008 consisted of three separate assignment executions: AM peak period, PM peak period, and the off-peak period (See Figure 17). The stopping criterion used was a fixed number UE iterations per time period (i.e., 60). To respect the various highway path options and prohibitions in the Washington region, five separate markets or "user classes" (trip tables) were loaded during each assignment execution:

1. Single-occupant vehicles, including commercial vehicles (SOV),
2. 2-occupant vehicles (HOV2),
3. 3+occupant vehicles (HOV3+),
4. Trucks (medium and heavy), and
5. Airport passenger vehicles.

	# UE Iterations	Period	Trip Markets Assigned
Assignment 1	60	AM	1 SOV 2 HOV 2-Occ. 3 HOV 3+-Occ. 4 Trucks 5 Airport Pax
Assignment 2	60	PM	1 SOV 2 HOV 2-Occ. 3 HOV 3+-Occ. 4 Trucks 5 Airport Pax
Assignment 3	60	Off-Peak	1 SOV 2 HOV 2-Occ. 3 HOV 3+-Occ. 4 Trucks 5 Airport Pax

Figure 17 Traffic assignment in the Version 2.2 Travel Model prior to fall 2008: three assignments, each with five market segments (user classes), resulting in 180 user equilibrium iterations

Source: Ronald Milone and Mark Moran, "TPB Models Development Status Report" (Presentation at the Travel Forecasting Subcommittee presented at the Travel Forecasting Subcommittee, Washington, D.C., November 21, 2008).

This type of assignment is known as a multi-class assignment.   Although separate link volumes are developed for each of the five markets, the final loaded links file ultimately contains total volumes, speeds, and volume-to-capacity (V/C) ratios for each time period. The Version 2.2 travel model includes a speed feedback loop. The AM and off-peak SOV restrained times resulting from the traffic assignment step are fed back into trip generation (via transit accessibility), trip distribution, and mode choice. In standard application of the travel model, the four-step process is executed a total of seven times, hence seven traffic assignments.[81] The first of these traffic assignments is known as the "pump prime" assignment, since it primes the pump, or gets the process started. The pump prime assignment uses free-flow link speeds (based on a lookup table) and exogenous mode choice percentages (i.e., the mode choice model is not run). In the six subsequent applications of the four-step model, congested link speeds are used and the mode choice model is executed. A link-level "method of successive averaging" (MSA) process is applied after each successive highway assignment process to ensure that highway volumes (and hence speeds) will stabilize. The MSA averaging is performed on the basis of total (non-segmented) link volumes, and is performed individually for each time period.

In the fall of 2008, as part of air quality conformity work, the traffic assignment process was modified to improve the assignment of HOV/HOT traffic on the Capital Beltway in Virginia and the I-395 Shirley

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[81] The total number of all-or-nothing traffic assignments is 1,260 (= 7 speed feedback loops x 3 time-of-day periods x 60 UE iterations). Traffic assignment accounts for over half of the model run time.

Highway.[82] The previous process, describe above included three traffic assignments by time period with five user classes, resulting in 180 UE iterations per speed feedback iteration, or 1,260 UE iterations per model run. The revised process, shown in Figure 18, splits the AM traffic assignment into two parts: non-HOV 3+ (i.e., SOV, HOV2, trucks, and airport passengers) and HOV 3+. Similarly, the PM traffic assignment is also split into the same two parts: non-HOV 3+ and HOV3+. This new traffic assignment process is sometimes referred to as the "two-step assignment," since it splits the AM and PM assignment each into two parts.[83] The result is five (not three) traffic assignments, with either four, one, or five user classes, depending on which assignment is being conducted. The fifth traffic assignment, representing the off-peak period, includes all five trip markets – it is only the AM and PM peak assignments where the non-HOV 3+ and HOV 3+ are split out. This results in 300 UE iterations per speed feedback iteration, or 2,100 UE iterations per model run (a 67% increase).

In the first step of the two-step assignment (assignments #1 and #3), non-HOV 3+ traffic (i.e., SOV, HOV 2, truck, and airport passenger trips) is assigned to all facilities (HOV and general purpose). In the second step, HOV 3+ traffic is assigned to HOT lanes and other facilities on the partially loaded network. The pre-assignment of non-HOV 3+ traffic results in congested link speeds for the general purpose lanes. This means that HOV 3+ traffic has a greater incentive to use HOV facilities, which results in improved HOV 3+ loadings on priority-use and general-use facilities.

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[82] Ronald Milone and Mark Moran, "TPB Models Development Status Report" (presented at the Travel Forecasting Subcommittee of the Technical Committee of the National Capital Region Transportation Planning Board, held at the Metropolitan Washington Council of Governments, Washington, D.C., November 21, 2008).
[83] Jinchul Park to Files, "Two Step Traffic Assignment for HOT Lane Modeling in 2008 CLRP," Memorandum, December 2, 2008.

	# UE Iterations	Period	Trip Markets Assigned
Assignment 1	60	AM	1 SOV 2 HOV 2-Occ. 3 Trucks 4 Airport Pax
Assignment 2	60	AM	1 HOV 3+-Occ.
Assignment 3	60	PM	1 SOV 2 HOV 2-Occ. 3 Trucks 4 Airport Pax
Assignment 4	60	PM	1 HOV 3+-Occ.
Assignment 5	60	Off-Peak	1 SOV 2 HOV 2-Occ. 3 HOV 3+-Occ. 4 Trucks 5 Airport Pax

Figure 18 Traffic assignment in the Version 2.2 Travel Model after fall 2008: five assignments, with one, four, or five user classes, resulting in 300 user equilibrium iterations

Source: Ronald Milone and Mark Moran, "TPB Models Development Status Report" (Presentation at the Travel Forecasting Subcommittee presented at the Travel Forecasting Subcommittee, Washington, D.C., November 21, 2008).

The Version 2.3 travel model continues to use the same two-step assignment shown in Figure 18, except that there are six assignments, not five, as discussed in section 8.2 . The new traffic assignment process is described in Figure 19.

	# UE Iterations	Period	User classes
Assignment 1	Rel. gap= 10^{-3} OR 300 UE	AM	1. SOV 2. HOV 2 3. Trucks 4. Commercial Vehicles 5. Airport PAX
Assignment 2	Rel. gap= 10^{-3} OR 300 UE	AM	1. HOV 3+
Assignment 3	Rel. gap= 10^{-3} OR 300 UE	PM	1. SOV 2. HOV 2 3. Trucks 4. Commercial Vehicles 5. Airport PAX
Assignment 4	Rel. gap= 10^{-3} OR 300 UE	PM	1. HOV 3+
Assignment 5	Rel. gap= 10^{-3} OR 300 UE	Midday	1. SOV 2. HOV 2 3. HOV 3+ 4. Trucks 5. Commercial Vehicles 6. Airport PAX
Assignment 6	Rel. gap= 10^{-3} OR 300 UE	Night Time	1. SOV 2. HOV 2 3. HOV 3+ 4. Trucks 5. Commercial Vehicles 6. Airport PAX

Figure 19 Traffic assignment in the Version 2.3 Travel Model: six traffic assignments, with one, five, or six user classes

8.4 Double run of the travel model to address Northern Virginia HOV/HOT lane policy

The Version 2.2 travel model requires two model runs be performed for each scenario being modeled to address the stated policy of Virginia Department of Transportation (VDOT) that HOT facilities will not degrade the operations of HOV users. The "base run" captures the travel time for unimpeded flow of HOV traffic on HOT lanes, consistent with the stated operational policy. The "conformity run" or "final run" of the travel model substitutes the HOV skims obtained for the HOV skims that would otherwise be

obtained by simply skimming the networks with HOT lanes in operation. Only the HOV skims are taken from the "base run." Skims for all other modes are taken from the "conformity run." Under this framework, the "base run" serves solely as a means for measuring times for HOV traffic on HOT facilities. This procedure, which is also called the "HOV 3+ skim substitution option," is described on page 1-10 of the Version 2.2 documentation.[84]

Cambridge Systematics, Inc. (CS) has proposed eliminating the double run of the travel model to address Northern Virginia HOV/HOT lane policy by combining the two steps into one step. The consultant cites the following benefits: less time needed for model runs and greater consistency in mode choice modeling. [85] TPB staff is currently considering the pros and cons of eliminating the double run procedures, but has not chosen to eliminate it yet. Consequently, the double run of the travel model to address Northern Virginia HOV/HOT lane policy is still a part of the Version 2.3 travel model.

8.5 Convergence in traffic assignment

The convergence of the traffic assignment step for the Version 2.2 travel model is shown in Figure 20. This comes from a recent air quality conformity analysis.[86] The y-axis shows the relative gap, using a logarithmic scale, and the x-axis shows the number of UE iterations.

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[84] Ronald Milone et al., *TPB Travel Forecasting Model, Version 2.2: Specification, Validation, and User's Guide*, 1–10.
[85] Cambridge Systematics, Inc., *Fiscal Year 2010 Task Reports*, 3–20.
[86] Ronald Milone and Meseret Seifu to Files, "Transmittal of Version 2.2 Travel Model files as per the October 21, 2009 Amendment to the 2009 CLRP/FY 2010-2015 TIP Air Quality Conformity Determination," Memorandum, October 29, 2009.
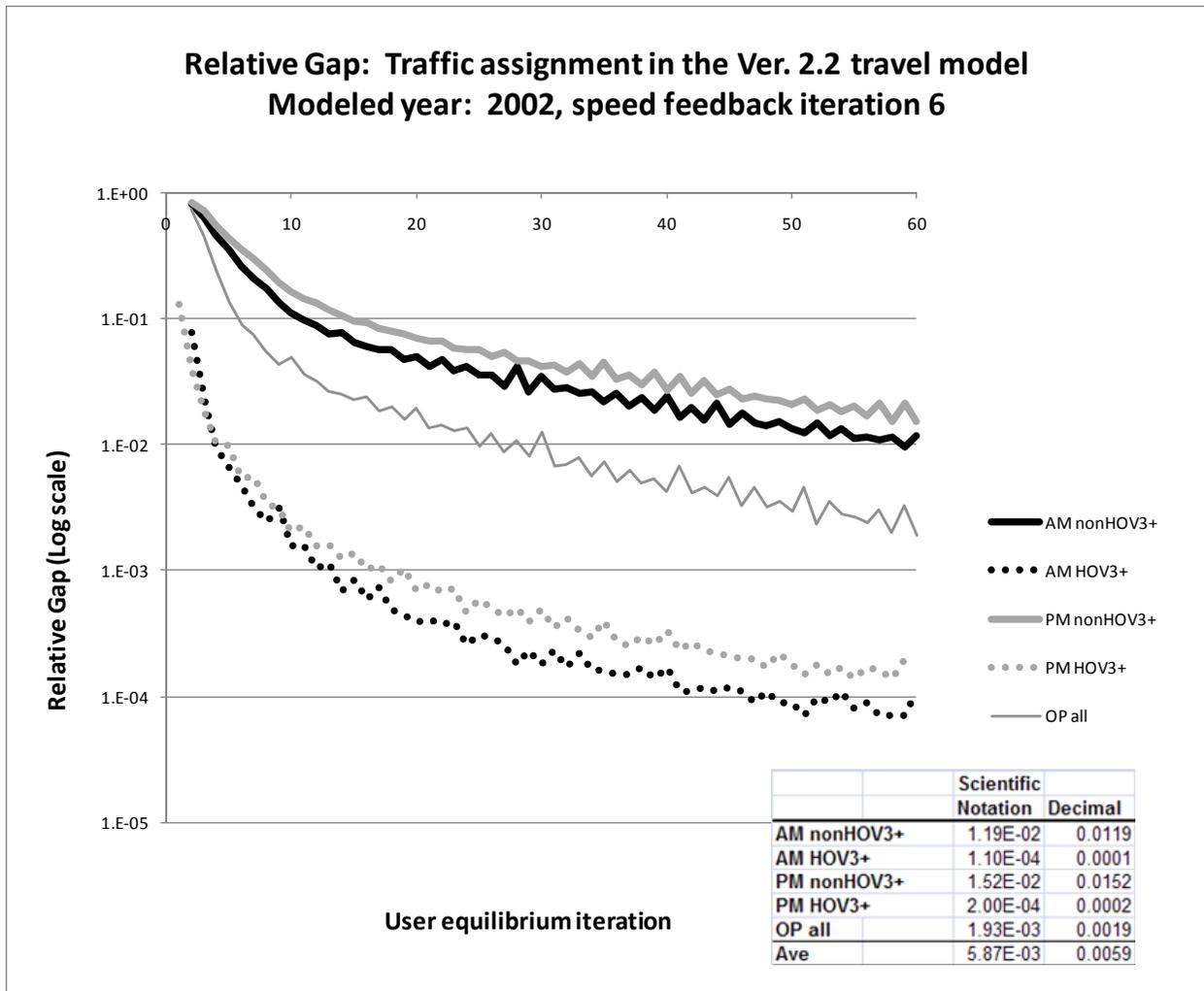
Figure 20 Relative gap by user equilibrium traffic assignment iteration: Version 2.2 Travel Model (final speed feedback iteration, i6)

Source: Transmittal of Version 2.2 Travel Model files as per the October 21, 2009 Amendment to the 2009 CLRP/FY 2010-2015 TIP Air Quality Conformity Determination (O:\model_dev\Version2.2_Jan08_Conformity2010Amended_Xmittal\2002_Conf). Ref: I:\ateam\from_consults\modelScanTaskOrder\2008_cs\2010\trafficAssignRelGapByIterVer2.2_2010_LogScale.pdf.

The current Version 2.2 travel model is reaching the following traffic assignment relative gaps

- about 10^{-2} (ca. 0.01 to 0.02) for the AM and PM non-HOV 3+ assignments
- about 10^{-3} (ca. 0.002) for the off-peak assignment
- about 10^{-4} (ca. 0.0001 to 0.0002) for the AM and PM HOV 3+ assignments
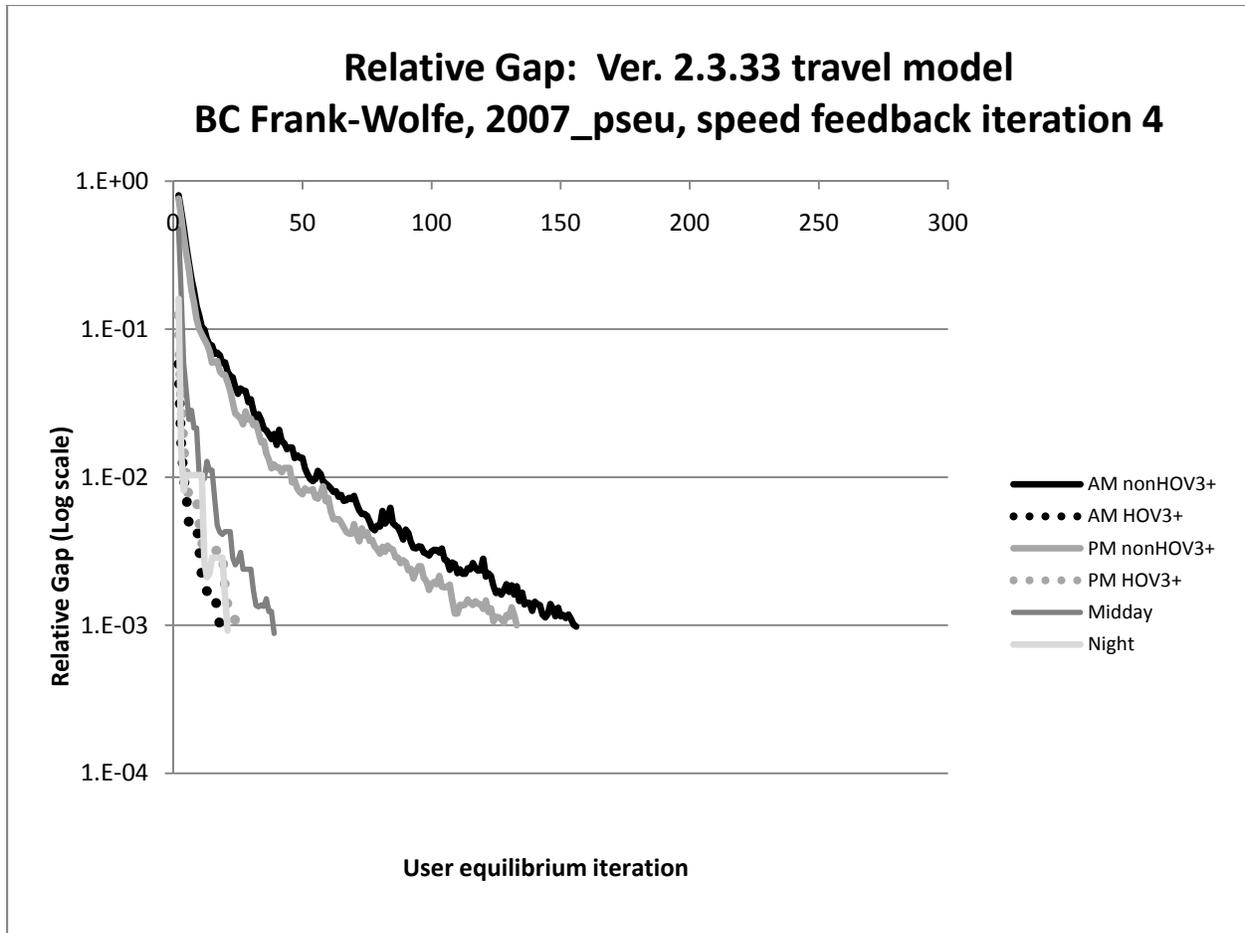
Figure 21 Relative gap by user equilibrium traffic assignment iteration: Version 2.3 Travel Model (final speed feedback iteration, i4)

The Version 2.3 travel model is reaching a similar level of convergence (as seen in Figure 21) for the AM nonHOV3+, PMnonHOV3+ and Night periods. Midday, AM HOV3+, and PM HOV3+ reach a relative gap of 10^{-3}.

8.6 Removal of queuing delay function

The TPB, like most MPOs in the U.S., uses a static traffic assignment (STA), which means that demand is assumed to be constant during the specific assignment period (in TPB's example: AM peak period, PM peak period, midday, and night). In a static traffic assignment model, link speeds are represented by volume-delay functions (VDFs), which capture the fact that as the link becomes more congested, the time to traverse the link goes up. STAs typically do not explicitly account for intersection (node) delay, however the link's VDF can be viewed as implicitly including the sum of the link delay and intersection delay. Another well known limitation of STA models is that some of the loaded links may have assigned volumes that are greater than the physical capacity of the given links, i.e., the volume-to-capacity ratio is

greater than one.[87] One of the model enhancements done by TPB staff to minimize the number of overloaded links, particularly freeways and freeway ramps, was the introduction of a queuing delay function (QDF), such as that shown in Equation 13, which would act in conjunction with the VDF, but would be focused on intersection delay.

Equation 13 Queuing delay function (QDF): Sigmoid

$$t_D = a \frac{1}{1 + e^{-b(x-c)}}$$

where
t_D = delay time (minutes)

x = link demand to capacity ratio $\left(\dfrac{V}{C}\right)$

a = amplitude
b = slope
c = offset

The idea was to represent a phenomena that is not natively part of traditional STA models, namely that of queuing and traffic blockages, which result in reduced link speeds. TPB staff found that the addition of a QDF did, in fact, reduce the number of overloaded links. It also, however, may have resulted in some unintended consequences, such as unrealistically slow modeled speeds on freeways and an unrealistic shifting of volume from freeways to arterials, due to the way that QDFs were applied only to freeways and freeway ramps, but not to arterials and other types of roads.   As noted by Cambridge Systematics, Inc. in a recent report, the queuing delay is not related to the length of the link, so it is possible for a very short link to have a very high level of queuing delay.[88]

Here is a summary of some of the findings/conclusions from CS's recent report:

- The TPB model is the only one that CS encountered which applies queuing delay only to freeway links.
- The No-QDF scenario achieves approximately the same results without the need for a QDF while using a VDF that has been validated for the Washington region.
- The Akçelik function also shows some promise in achieving TPB's goals.
- The QDF may not be the most accurate way to capture the desired network constraints.
- CS recommended TPB staff consider using a newly calibrated set of link-based VDFs that reflect the breakdown in traffic at higher volumes. Using this approach, TPB could
    - Continue use of an expanded and/or re-calibrated conical function
    - Switch to an Akçelik curve
    - Possibly employ different functional forms of VDFs on different facility types (e.g., conical functions for freeway versus Akçelik functions for surface streets).

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[87] Yi-Chang Chiu et al., *A Primer for Dynamic Traffic Assignment* (Transportation Research Board, 2010), http://www.nextrans.org/ADB30/UPLOAD/ssharma/dta_primer.pdf.
[88] Cambridge Systematics, Inc., *Fiscal Year 2010 Task Reports*, 3–7.

From November 2010 to January 2011, TPB staff ran a series of test traffic assignments, some of which used Akçelik functions, such as that shown in Equation 14 and Equation 15. Staff tried implementing these curves as both function and lookup tables in the Cube Voyager scripts. However, it did not seem that the assigned volumes using the Akçelik function were any better at matching the observed volumes and the run times for the Akçelik function were considerably longer. Consequently, TPB staff decided to continue using the conical volume delay function, implemented as a lookup table, and to drop the use of the QDF. Tests conducted by TPB staff indicated that the elimination of the QDF was beneficial for improving the traffic assignment results. Hence, based on these findings and the consultant recommendations, the QDFs were removed.

Equation 14 Akçelik curve

$$t = t_0 + 0.25T \left[(x-1) + \sqrt{(x-1)^2 + \frac{8J_A x}{CT}} \right]$$

where
t = average travel time per unit distance (hours/mile)
t_0 = free-flow travel time per unit distance (hours/mile)
T = flow period, i.e., the time interval in hours, during which an average arrival flow rate V persists
C = capacity
x = the degree of saturation, i.e., V/C, or volume to capacity ratio
J = the delay parameter, a calibration parameter

Equation 15 Akçelik Delay Function (HCM 2000)

$$R = R_0 + D_0 + D_M + 0.25NT\left[(x-1) + \sqrt{(x-1)^2 + \frac{16J * x * L^2}{N^2 T^2}}\right]$$

where

R = link traversal time (hours)

R_0 = link traversal time under free flow conditions (hours)

D_0 = zero-flow control delay at signalized intersection (hours)

D_M = segment delay between signals- equals zero if no signals (hours)

N = number of signals (=1 if no signals)

T = expected duration of demand-Typically 1 hour (hours)

x = link demand to capacity ratio $\left(\dfrac{V}{C}\right)$

J = calibration parameter

L = link length (miles)

8.7 Volume Delay Functions

Volume delay functions (VDFs) are used to develop link speeds at the end of each loading pass. These functions represent the ratio of congested travel time to the free-flow time as a function of the volume-to-capacity (V/C) ratio. The function typically varies by facility type. Like the Version 2.2 travel model, the Version 2.3 travel model uses conical volume delay functions (see Equation 16).[89]

Equation 16 Conical VDF function (Spiess 1990)

$$\frac{t}{t_0} = f(x) = 2 + \sqrt{\alpha^2(1-x)^2 + \beta^2} - \alpha(1-x) - \beta$$

where

t = Congested link travel time

t_0 = Link free-flow travel time

$x = \dfrac{V}{C}$ = link volume to capacity ratio

α = slope of the function at $\dfrac{V}{C}$=1 (slope must be>1.0)

$\beta = \dfrac{2\alpha - 1}{2\alpha - 2}$

Table 74 shows, in tabular form, the conical VDFs used in the Version 2.3 travel model. There is a separate curve for each facility type, although ramps and freeways are assumed to have the same VDF.

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[89] Heinz Spiess, "Conical Volume-Delay Functions," *Transportation Science* 24, no. 2 (May 1, 1990): 153-158, http://transci.journal.informs.org/cgi/content/abstract/24/2/153.

The conical VDFs are shown in graphical form in Figure 22 (for V/C >1) and Figure 23 (for V/C ≤ 1). In reality, no link would ever have a V/C ratio above one. However, in a typical regional travel model, V/C ratios above 1 do occur, so the VDF needs to account for this domain. Figure 22 shows the behavior of the Version 2.3 conical VDFs for large V/C ratios (V/C >1). The curve for freeways is the steepest, followed by expressways, then major arterials, minor arterials, and collectors. A steeper curve means more sensitivity to high V/C ratios, forcing excess traffic off of these facilities. Figure 23 shows the behavior of the Version 2.3 conical VDFs for V/Cs less than or equal to one. In this area of V/C ratio, the freeways show the least sensitivity to V/C ratio, but, as the V/C ratio approaches 1, the freeway VDFs have the steepest slope (a slope of 15).

In Figure 24, the vertical axis now shows congested speed (not ratio of congested to free-flow travel time). One can see that, for freeways, the congested speed drops to about 2 mph at a V/C ratio of 2.00.

Table 74 Conical volume-delay functions used in the Version 2.3 travel model: Tabular format

	Centroid (FT=0)	Freeway (FT=1)	Maj Art (FT=2)	Min Art (FT=3)	Collector (FT=4)	Exprw (FT=5)	Ramps (FT=6)
a		15	7	5.5	3	8	15
b		1.035714	1.083333	1.111111	1.25	1.071429	1.035714
v/c	**t/t0**	**t/t0**	**t/t0**	**t/t0**	**t/t0**	**t/t0**	**t/t0**
0	1.000	1.000	1.000	1.000	1.000	1.000	1.000
0.1	1.000	1.004	1.009	1.012	1.025	1.008	1.004
0.2	1.000	1.009	1.020	1.027	1.056	1.018	1.009
0.3	1.000	1.015	1.035	1.046	1.094	1.030	1.015
0.4	1.000	1.024	1.054	1.071	1.141	1.047	1.024
0.5	1.000	1.035	1.080	1.105	1.203	1.070	1.035
0.6	1.000	1.053	1.119	1.154	1.283	1.103	1.053
0.7	1.000	1.082	1.180	1.228	1.390	1.157	1.082
0.8	1.000	1.138	1.287	1.352	1.537	1.254	1.138
0.9	1.000	1.287	1.506	1.579	1.735	1.466	1.287
1	1.000	2.000	2.000	2.000	2.000	2.000	2.000
1.1	1.000	4.287	2.906	2.679	2.335	3.066	4.287
1.2	1.000	7.138	4.087	3.552	2.737	4.454	7.138
1.3	1.000	10.082	5.380	4.528	3.190	5.957	10.082
1.4	1.000	13.053	6.719	5.554	3.683	7.503	13.053
1.5	1.000	16.035	8.080	6.605	4.203	9.070	16.035
1.6	1.000	19.024	9.454	7.671	4.741	10.647	19.024
1.7	1.000	22.015	10.835	8.746	5.294	12.230	22.015
1.8	1.000	25.009	12.220	9.827	5.856	13.818	25.009
1.9	1.000	28.004	13.609	10.912	6.425	15.408	28.004
2	1.000	31.000	15.000	12.000	7.000	17.000	31.000
2.1	1.000	33.997	16.393	13.090	7.579	18.594	33.997
2.2	1.000	36.994	17.786	14.182	8.161	20.188	36.994
2.3	1.000	39.992	19.181	15.275	8.745	21.784	39.992
2.4	1.000	42.990	20.576	16.369	9.332	23.380	42.990
2.5	1.000	45.988	21.972	17.463	9.920	24.976	45.988
2.6	1.000	48.987	23.369	18.559	10.510	26.573	48.987
2.7	1.000	51.985	24.766	19.655	11.101	28.171	51.985
2.8	1.000	54.984	26.163	20.751	11.693	29.768	54.984
2.9	1.000	57.983	27.561	21.848	12.285	31.366	57.983
3	1.000	60.982	28.959	22.945	12.879	32.964	60.982
999.9	1.000	60.982	28.959	22.945	12.879	32.964	60.982
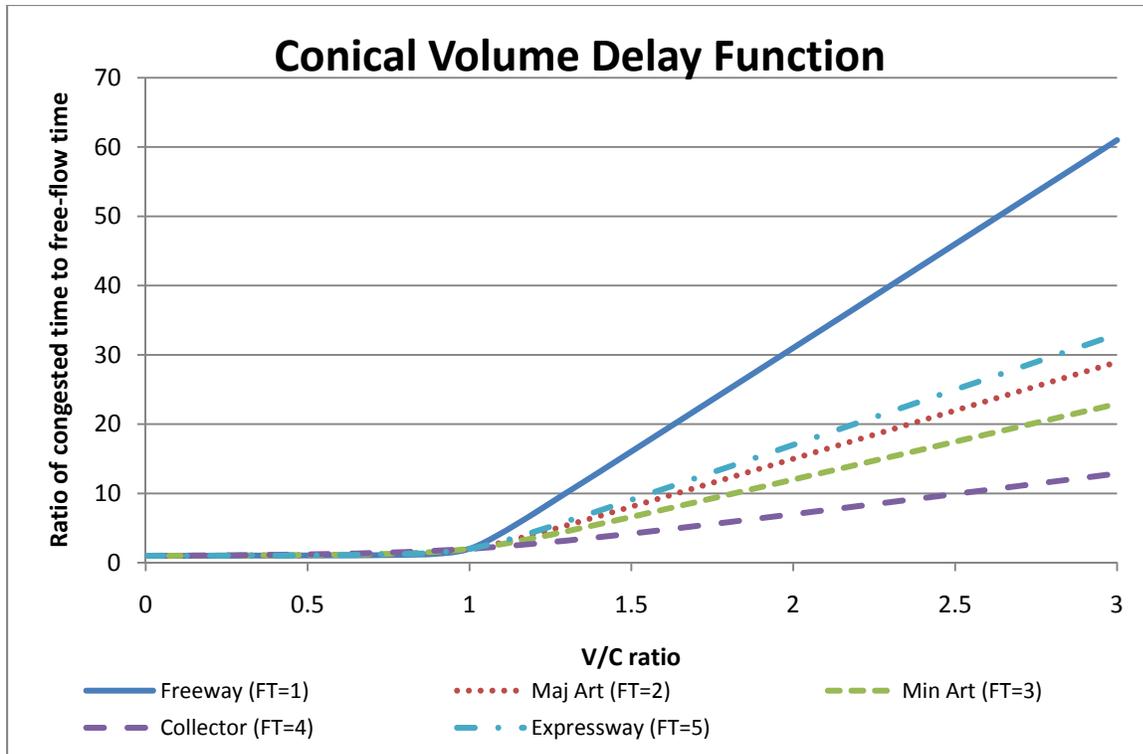
Figure 22 Conical volume-delay functions used in the Version 2.3 travel model: V/C > 1
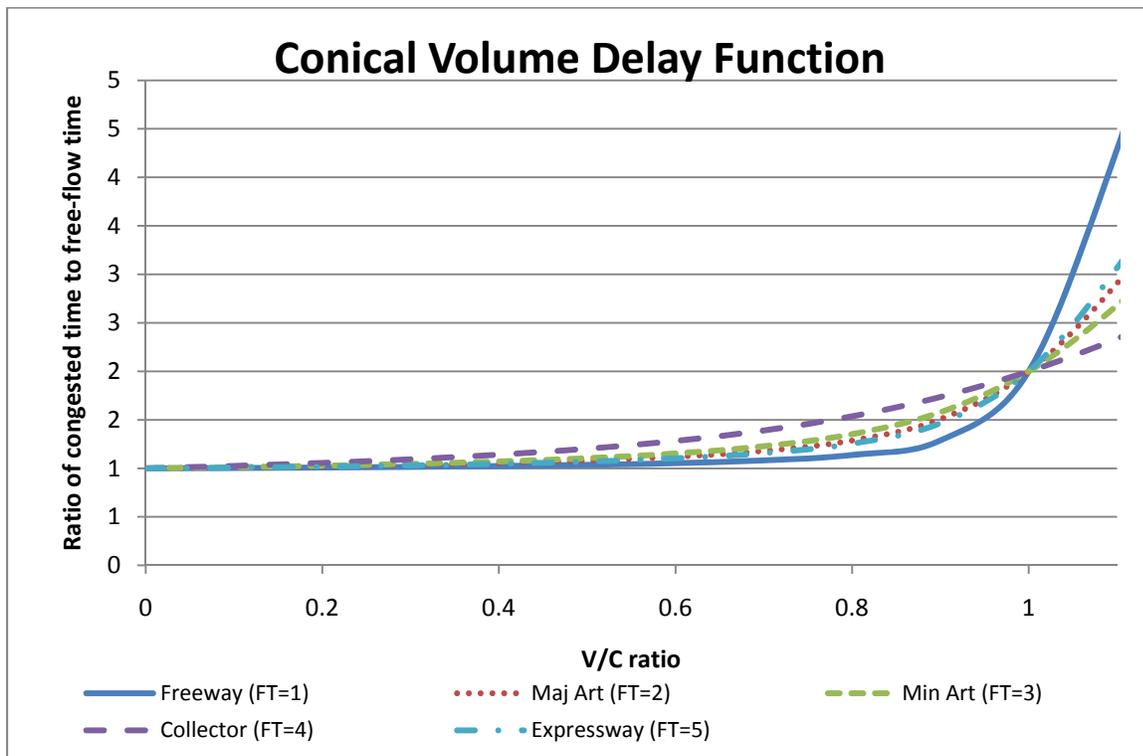
Figure 23 Conical volume-delay functions used in the Version 2.3 travel model: V/C < 1
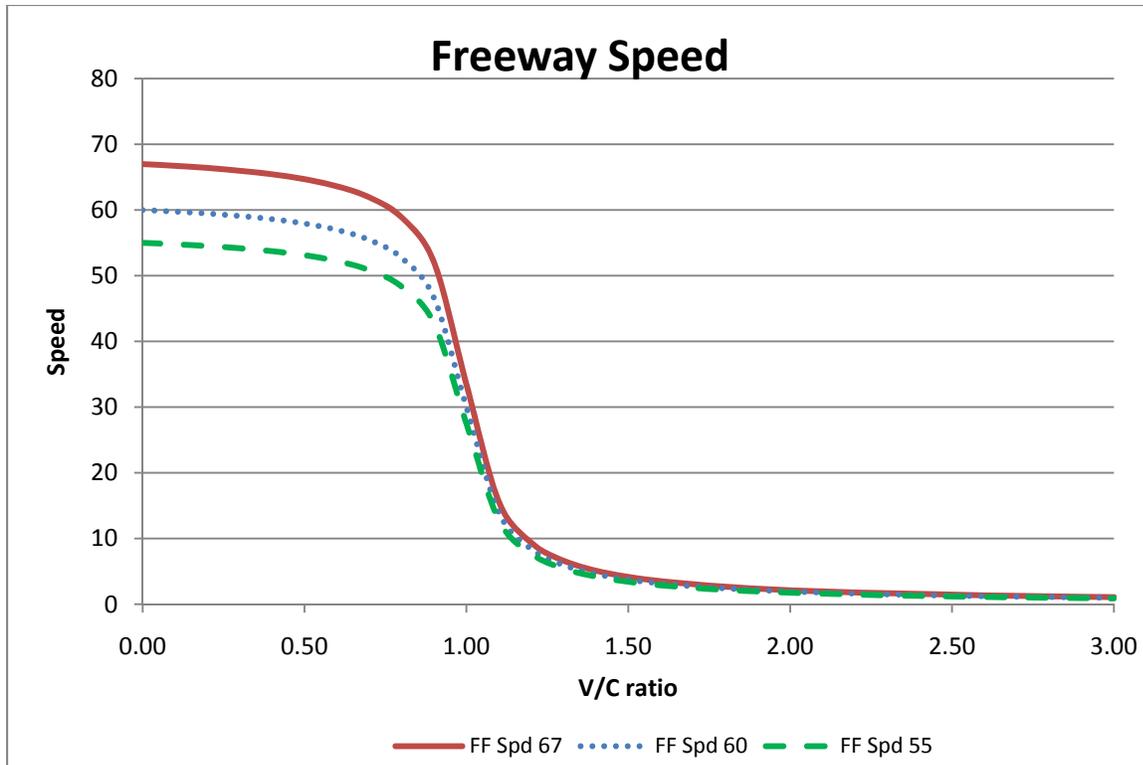
Freeway Speed

Figure 24 Freeway Speed

8.8 Speed and Capacity Tables

Two of the parameters that are necessary as inputs to the VDF are free-flow capacities and speeds. Free-flow capacity is defined as level-of-service (LOS) E capacity. The assumed free-flow speeds and capacities vary by facility type and area type. The Version 2.3 capacities and free flow speeds are defined in Table 75 and Table 76.

Table 75 Free Flow Capacities

	Area type					
	1	**2**	**3**	**4**	**5**	**6**
Freeways	1900	1900	2000	2000	2000	2000
Major Arterials	600	800	960	960	1100	1100
Minor Arterials	500	600	700	840	900	900
Collectors	500	500	600	800	800	800
Expressways	1100	1200	1200	1400	1600	1600

Table 76 Free Flow Speeds

	Area type					
	1	**2**	**3**	**4**	**5**	**6**
Freeways	55	55	60	60	65	65
Major Arterials	35	35	45	45	50	50
Minor Arterials	35	35	40	40	40	45
Collectors	30	30	30	35	35	35
Expressways	45	45	50	50	50	55

8.9 Peaking Factor Assumptions

Another important temporal parameter in the traffic assignment process is the peaking factor, which is the proportion of traffic in a given time period which occurs in the peak hour of the period. Link speeds are a function of the volume-to-capacity (V/C) ratio. The peaking factor is necessary for converting hourly lane capacities into "period lane capacities," from which V/C ratios are computed. The Version 2.3 model requires peaking factors for the AM, midday, PM, and night time periods. To arrive at regionally appropriate peaking factors, an analysis of total auto driver trips from the 2007/2008 HTS was summarized to the modeled time periods. The maximum hourly volume occurring within each time period was then determined. The resulting peaking factors are show in Table 77.

Table 77 Peak- Hour Percentage by Time Period based on Total Auto Driver Trips in Motion Distribution

Period	Percent of Travel	Hours in Period	Peak Hour in Period	Saturation Percent	Peak Hour Percent
AM Peak (6:00 - 9:00)	18.70%	3	8:00 - 9:00	33.3%	41.7%
Midday (9:00 - 15:00)	32.63%	6	12:00 - 13:00	16.7%	17.7%
PM Peak (15:00 - 19:00)	32.89%	4	17:00 - 18:00	25.0%	29.4%
All other hours	15.78%	11	19:00 – 20:00	9.1%	15.0%
Daily	100.00%	24	17:00 - 18:00	4.2%	9.7%

Note: For the AM, midday, and PM periods, the peak-hour percent represents the worst hour of the period. For the "all other hours" period, however, the peak-hour percent represents the average hour during the period.

Chapter 9 Validation

This chapter presents highway and transit performance results of the Version 2.3 model for 2007. The model includes five speed-feedback iterations of the four-step model (pump prime, plus iterations 1 through 4). As mentioned in Chapter 8, there is a dual convergence/stopping criterion for traffic assignment: attain a relative gap of 10^{-3} (0.001) or 200 user equilibrium iterations, whichever comes first. A comparison of global demographic and travel-related statistics between the Version 2.3 model and the existing Version 2.2 model is also presented. The Version 2.3 model also produces transit assignment results. Although transit assignment results for the Metrorail system have been presented at a recent TFS meeting,[90] there was insufficient time to include the updated transit assignment results in this report.

While the model is comprised of the numerous calibrated parameters described earlier in this report, it also includes adjustments that were subsequently deemed necessary during initial validation tests of the model. These include trip generation adjustments and K-factors used in trip distribution. Prior experience has shown that these types of adjustments are sometimes necessary to address some observed travel patterns that are not explained well by the travel model. A detailed accounting of the adjustments is documented in Appendix A.

9.1 Validation summaries

Vehicle miles of travel (VMT) is a standard metric used to assess travel model performance. Simulated VMT is also essential for the estimation of mobile emissions. TPB consulted Highway Performance Monitoring System (HPMS) summaries reported by the local state DOTs to obtain "observed" VMT figures at the jurisdiction level. Care was taken to obtain VMT figures that excluded local facilities, which are not included in the regional highway network.

A summary of estimated and observed VMT for the Washington, D.C. Metropolitan Statistical Area (MSA) is shown in Table 78. The MSA area is comprised of 12 of the central jurisdictions within the larger 22-jurisdiction modeled study area. The table indicates that the model presently matches the VMT in MSA. Virginia and District of Columbia portions of MSA are overestimated by 1% and 8%, respectively, while Maryland MSA VMT is underestimated by 1%.

Estimated and observed VMT for all jurisdictions within the modeled study area is shown in Table 79. The observed VMT figure of 156 million is well aligned with the VMT currently simulated by the Version 2.3 model. The simulated VMT for the region is about 1% lower than the observed figure, an excellent match overall. The table indicates that 10 of the 12 jurisdictions in the MSA match observed VMT figures

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[90] Ronald Milone, "TPB Version 2.3 travel model on the 3,722-TAZ area system: Status report" (presented at the Travel Forecasting Subcommittee of the Technical Committee of the National Capital Region Transportation Planning Board, held at the Metropolitan Washington Council of Governments, Washington, D.C., April 29, 2011), 42.

within 10 percent of observed figures. Loudoun County VMT is overestimated by 12%. While Charles county VMT is underestimated by 12%.

Table 78 2007 Estimated/Observed (HPMS) VMT for the Washington, DC MSA (in thousands)

State	Observed VMT	Estimated VMT	Difference	Pct. Difference
DC	8,271,900	8,929,239	657,339	1.08
MD	56,366,301	55,859,589	-506,712	0.99
VA	50,237,805	50,495,080	257,275	1.01
Total	114,876,006	115,283,908	407,902	1.00

Ref: " E:\modelRuns\fy12\Ver2.3.33\Summary\Jurisdictional_VMT.xlsx"

Note: VMT shown excludes local traffic
Jurisdictions in the MSA are: District of Columbia, Montgomery County, Prince George's County, Arlington County, City of Alexandria, Fairfax County, Loudoun County, Prince William County, Frederick County, Charles County, Calvert County, Stafford County.

Table 79 Year 2007 Estimated and Observed VMT Summary by Jurisdiction (in thousands)

Jurisdiction	Observed VMT	Estimated VMT	Difference (E-O)	Ratio (E/O)
District of Columbia	8,271,900	8,929,239	657,339	1.08
Montgomery County	19,889,589	20,755,761	866,172	1.04
Prince George's County	23,315,753	21,733,273	-1,582,480	0.93
Arlington County	4,391,518	4,314,948	-76,570	0.98
City of Alexandria	1,957,552	2,013,028	55,476	1.03
Fairfax County	26,799,196	25,712,591	-1,086,605	0.96
Loudoun County	5,259,907	5,910,328	650,421	1.12
Prince William County	8,000,267	8,558,940	558,673	1.07
Frederick County	7,841,918	8,630,544	788,626	1.10
Howard County	10,094,384	10,090,905	-3,479	1.00
Anne Arundel County	15,330,000	14,570,489	-759,511	0.95
Charles County	3,348,493	2,951,689	-396,804	0.88
Carrol County	3,394,521	4,227,247	832,726	1.25
Calvert County	1,970,548	1,788,322	-182,226	0.91
St. Mary's County	2,194,932	2,052,550	-142,382	0.94
King George County	789,089	656,299	-132,790	0.83
City of Fredericksburg	948,495	777,383	-171,112	0.82
Stafford County	3,829,366	3,985,245	155,879	1.04
Spotsylvania County	3,299,537	2,013,315	-1,286,222	0.61
Fauquier County	3,149,136	2,932,644	-216,492	0.93
Clarke County	769,608	914,487	144,879	1.19
Jefferson County	1,081,763	1,354,704	272,942	1.25
Total	155,927,469	154,873,932	-1,053,537	0.99

Ref: " E:\modelRuns\fy12\Ver2.3.33\Summary\Jurisdictional_VMT.xlsx"

Estimated and observed daily link volumes on pre-defined "screenlines" in the regional network are also important performance indicators of the regional model. Screenline locations currently analyzed by TPB staff are shown on Figure 25 and Figure 26.
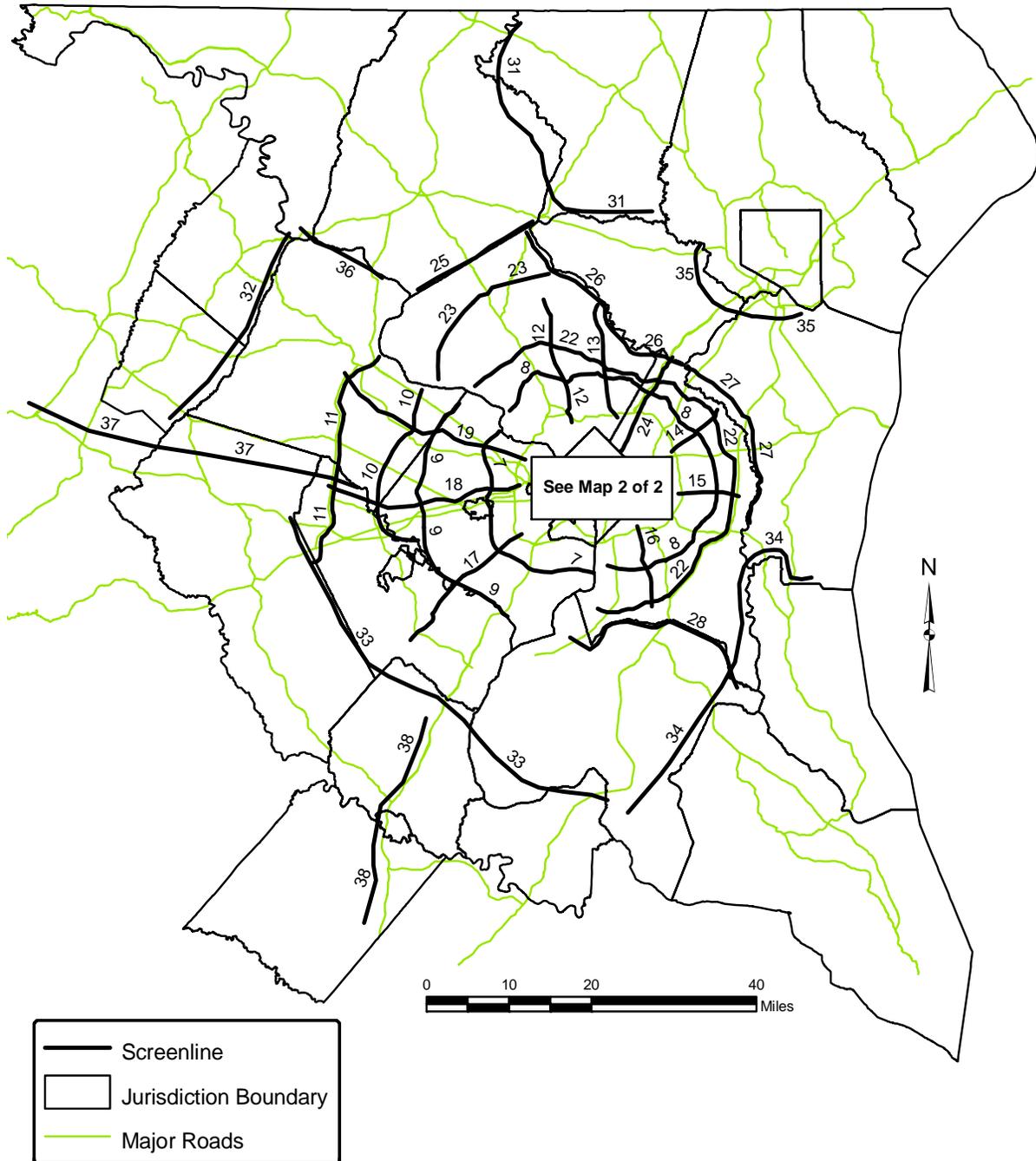
Figure 25 Highway Network Screen lines Map 1 of 2

Ref: I:\ateam\docum\FY11\Ver2.3\modelDoc\Screenline_V23_WO_Bltway.emf
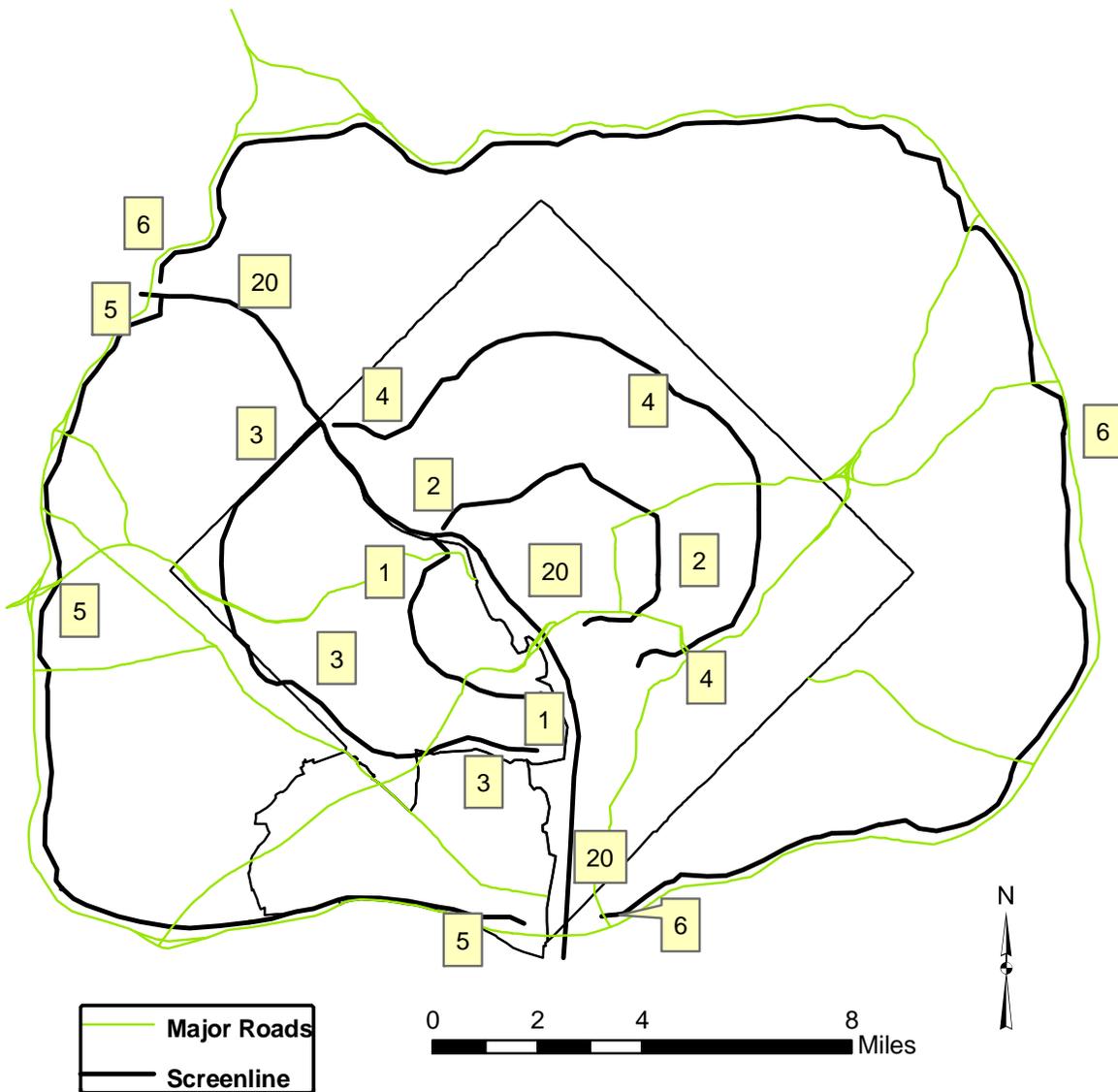
Figure 26 Highway Network Screen lines (Inside the Capital Beltway) Map 2 of 2

Ref: I:\ateam\docum\FY11\Ver2.3\modelDoc\Screenline_V23_BltWay.emf

The screenline performance of the Version 2.3 model is shown in Table 80. The table also indicates the total number of highway links crossing each screenline and the percentage of links with a coded daily ground count. The table indicates that 57% of all links crossing regional screenlines are coded with a ground count, which is an improvement over Version 2.2 Travel Model where 37% of screenline links had a coded ground count.[91]

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[91] Ronald Milone et al., *TPB Travel Forecasting Model, Version 2.2: Specification, Validation, and User's Guide*, 9–5.

Table 80 Year 2007 Estimated and Observed Daily Screenline Crossings

Screenline	Estimated	Observed	Difference	Ratio	Screenline links	Screenline links with counts	Pct. links with counts
1	432,188	541,123	-108,935	0.80	44	24	0.55
2	913,400	770,152	143,248	1.19	74	60	0.81
3	744,547	769,828	-25,281	0.97	58	44	0.76
4	1,048,019	844,084	203,935	1.24	74	68	0.92
5	597,585	535,254	62,331	1.12	60	22	0.37
6	1,526,646	1,517,908	8,738	1.01	118	68	0.58
7	572,945	630,970	-58,025	0.91	74	36	0.49
8	1,401,027	1,278,214	122,813	1.10	108	44	0.41
9	531,776	548,542	-16,766	0.97	55	26	0.47
10	470,090	437,926	32,164	1.07	24	18	0.75
11	255,449	218,070	37,379	1.17	34	20	0.59
12	439,385	470,410	-31,025	0.93	34	16	0.47
13	435,242	367,212	68,030	1.19	20	10	0.50
14	263,130	323,644	-60,514	0.81	12	8	0.67
15	268,910	326,882	-57,972	0.82	16	8	0.50
16	116,667	142,540	-25,873	0.82	16	2	0.13
17	157,650	175,348	-17,698	0.90	42	22	0.52
18	395,804	457,548	-61,744	0.87	50	22	0.44
19	310,789	398,144	-87,355	0.78	50	27	0.54
20	1,130,839	897,896	232,943	1.26	14	14	1.00
22	1,033,219	1,004,460	28,759	1.03	140	47	0.34
23	234,069	237,578	-3,509	0.99	31	18	0.58
24	331,210	364,500	-33,290	0.91	30	12	0.40
25	138,663	109,804	28,859	1.26	12	8	0.67
26	88,827	40,888	47,939	2.17	18	8	0.44
27	200,329	144,130	56,199	1.39	16	6	0.38
28	172,704	231,106	-58,402	0.75	26	24	0.92
31	180,641	78,014	102,627	2.32	30	20	0.67
32	33,943	26,900	7,043	1.26	8	2	0.25
33	337,117	290,636	46,481	1.16	22	16	0.73
34	111,655	96,922	14,733	1.15	18	14	0.78
35	688,805	855,788	-166,983	0.80	36	30	0.83
36	50,040	11,702	38,338	4.28	8	6	0.75
37	40,774	30,784	9,990	1.32	16	16	1.00
38	185,109	266,540	-81,431	0.69	32	26	0.81
Total	15,839,193	15,441,447	397,746	1.03	1,420	812	0.57

In addition to screenline counts, percent Root Mean Square Error (RMSE) for all links with ground counts is calculated to assess model performance. RMSE values by facility type are shown in Table 81.

Table 81 Percent RMSE by Facility Type

Facility Type		% RMSE
FTYPE1	Freeway	24%
FTYPE2	Major Arterial	38%
FTYPE3	Minor Arterial	57%
FTYPE4	Collector	82%
FTYPE5	Expressway	35%
All FTYPEs		43%

Ref: " E:\modelRuns\fy12\Ver2.3.36\Assignment_Summary\Daily_scatterplot_RMSE.xlsx" ("E:\modelRuns\fy12\Ver2.3.36\Assignment_Summary\Summarize_Est_Obs_Volume_Daily.s")

A comparison of year-2007 estimated and observed trips by purpose and mode is shown in Table 82. The table includes estimated and observed on-board transit surveys collected in or around 2007. The Version 2.3 mode choice model was calibrated to targets established by the on-board surveys. Overall estimated regional transit percentage is less than the observed target percentage (6.23% versus 6.50%).

A global comparison of control totals (land use, demographic, and travel) from the Version 2.2 model and Version 2.3 model results is displayed in Table 83. A direct comparison of 2007 results was not possible as the Version 2.2 model has not been executed for that particular year. Instead, the nearest available Version 2.2 simulation years were used for the comparison (2005 and 2011). Staff offers the following observations from the comparison table:

- The 2007 land use used in the Version 2.3 simulation reflects a lower average household size than that reflected in the Version 2.2 land use (about 2.5 versus 2.6). This is because the 2007 "Pseudo Round 8.0" land use was informed by recent ACS data. The Round 8.0 Cooperative land use used in the Version 2.2 model is based on 2000 Census data.
- The 2007 external travel data used in the Version 2.3 model reflects actual 2007 traffic counts. The Version 2.2 external travel is based on earlier traffic count data.
- The proportion of transit trips between the travel models, by purpose, is different as noted above.
- The HBW car occupancies are notably lower in the Version 2.3 model, in comparison with those of Version 2.2. However, the *reverse* is true for the non-work purposes -- The 2007/08 HTS reports notably larger auto occupancies, for non-work purposes, particularly for the HBO purpose. Overall, the Version 2.3 average auto occupancy is higher than that of the Version 2.2 model simulation (1.40 versus 1.26).
- The Version 2.3 motorized trip rate is about 7.39/HH, in contrast to the Version 2.2 model rate of about 10.2. This is a substantial difference and may be due, in part, to the lower average household size assumed in the Version 2.3 land activity inputs.
- Version 2.3 vehicle trip lengths are longer than that those in the Version 2.2 model (66.2 miles/HH versus 64.9 shown for the 2005 Version 2.2 model).
- The VMT appears to track well in the comparison.

Table 82 Comparison of 2007 Estimated and Observed Trips by Purpose and Mode

		Simulated V2.3.36	Observed (2007/08 HTS & Trn On-Board Surveys)		
				Diff	Ratio
		Trips	Trips	(E-O)	(E/O)
HBW	Transit	716,400	755,700	-39,300	0.95
	Auto Person	2,806,600	2,856,600	-50,000	0.98
	Auto Driver	2,576,400	2,609,000	-32,600	0.99
	Motorized Person	3,522,900	3,612,300	-89,400	0.98
	Avg. Auto Occupancy	1.09	1.09	0.00	1.00
	Transit Percentage	20.33	20.90	-0.57	0.97
HBS	Transit	25,600	26,900	-1,300	0.95
	Auto Person	2,845,200	2,957,600	-112,400	0.96
	Auto Driver	1,891,100	1,966,900	-75,800	0.96
	Motorized Person	2,870,800	2,984,500	-113,700	0.96
	Avg. Auto Occupancy	1.51	1.50	0.01	1.00
	Transit Percentage	0.89	0.90	-0.01	0.99
HBO	Transit	184,900	187,900	-3,000	0.98
	Auto Person	6,268,500	6,007,300	261,200	1.04
	Auto Driver	3,998,200	3,827,900	170,300	1.04
	Motorized Person	6,453,500	6,195,200	258,300	1.04
	Avg. Auto Occupancy	1.57	1.57	0.00	1.00
	Transit Percentage	2.87	3.40	-0.53	0.84
NHW	Transit	107,100	108,800	-1,700	0.98
	Auto Person	1,438,800	1,602,800	-164,000	0.90
	Auto Driver	1,214,400	1,353,400	-139,000	0.90
	Motorized Person	1,545,800	1,711,600	-165,800	0.90
	Avg. Auto Occupancy	1.19	1.18	0.01	1.01
	Transit Percentage	6.93	6.40	0.53	1.08
NHO	Transit	43,500	44,800	-1,300	0.97
	Auto Person	2,856,700	2,825,900	30,800	1.01
	Auto Driver	1,936,900	1,919,100	17,800	1.01
	Motorized Person	2,900,200	2,870,700	29,500	1.01
	Avg. Auto Occupancy	1.47	1.47	0.00	1.00
	Transit Percentage	1.50	1.60	-0.10	0.94
Total	Transit	1,077,500	1,124,100	-46,600	0.96
	Auto Person	16,215,700	16,250,100	-34,400	1.00
	Auto Driver	11,617,000	11,676,300	-59,300	0.99
	Motorized Person	17,293,200	17,374,300	-81,100	1.00
	Avg. Auto Occupancy	1.40	1.38	0.02	1.01
	Transit Percentage	6.23	6.50	-0.27	0.96

Source: "X:\modelRuns\fy12\Ver2.3.36\Summary\Compare_Mode_Choice_Adj.tab"; Ref: "I:\ateam\docum\FY11\Ver2.3\modelDoc_v3\01_calib\Compare_Mode_Choice_V2.3.36.xlsx"

Table 83 Summary of Version 2.2 and Version 2.3 travel model output: Years 2005, 2007 and 2011

		Version 2.2 - 2010 CLRP 2005	Version 2.3 (2.3.36) 2007	Version 2.2 - 2010 CLRP 2011	V2.3- V2.2- 2005
1	Households	2,344,561	2,339,832	2,524,150	-4,729
2	Employment	3,700,075	3,801,935	3,982,448	101,860
3	HH Population	6,124,771	5,860,693	6,562,726	-264,078
4	HH & GQ Population	6,262,508	5,980,362	6,706,665	-282,146
5	Extl. Productions/ HBW Auto Person	296,405	294,506	328,893	-1,899
6	Extl. Productions/ HBS Auto Person	75,000	70,670	82,309	-4,330
7	Extl. Productions/ HBO Auto Person	206,939	226,003	230,075	19,064
8	Extl. Productions/ NHB Auto Person	78,096	87,025	85,912	8,929
9	Extl. Productions/ Auto Person Subtotal	656,440	678,204	727,189	21,764
10	Extl. Productions/ Medium Truck	3,965	11,810	4,405	2,021
11	Extl. Productions/ Heavy Truck	25,647	14,325	28,489	-18,408
12	Extl. Productions/ Truck Subtotal	29,612	26,135	32,894	-16,387
13	Extl. Attractions/ HBW Auto Person	182,548	183,126	201,047	578
14	Extl. Attractions/ HBS Auto Person	74,016	68,260	81,571	-5,756
15	Extl. Attractions/ HBO Auto Person	288,889	320,036	320,442	31,147
16	Extl. Attractions/ NHB Auto Person	78,087	87,006	85,902	8,919
17	Extl. Attractions/ Auto Person Subtotal	623,540	658,428	688,962	34,888
18	Extl. Attractions/ Medium Truck	3,965	11,810	4,405	2,021
19	Extl. Attractions/ Heavy Truck	25,647	14,325	28,489	-18,408
20	Extl. Attractions/ Truck Subtotal	29,612	26,135	32,894	-16,387
21	Inc. Grp 1 HHs	546,725	635,804	590,646	89,079
22	Inc. Grp 2 HHs	534,824	726,625	576,826	191,801
23	Inc. Grp 3 HHs	651,606	483,258	702,106	-168,349
24	Inc. Grp 4 HHs	611,405	494,172	654,570	-117,233
25	HHs Subtotal	2,344,560	2,339,858	2,524,149	-4,702
26	1- person HHs	594,601	664,558	645,373	69,956
27	2- person HHs	721,723	723,463	780,010	1,739
28	3- person HHs	411,997	392,844	442,560	-19,153
29	4+ person HHs	616,239	558,994	656,205	-57,245
30	HHs Subtotal	2,344,560	2,339,858	2,524,149	-4,703
31	0 Vehicle HHs	220,862	203,376	242,413	-18,201
32	1 Vehicle HHs	772,416	737,660	837,490	-35,718
33	2 Vehicle HHs	911,858	870,427	977,824	-40,654
34	3+ Vehicle HHs	439,423	528,395	466,423	89,871
35	HHs Subtotal	2,344,560	2,339,858	2,524,149	-4,695

		Version 2.2 - 2010 CLRP 2005	Version 2.3 (2.3.36) 2007	Version 2.2 - 2010 CLRP 2011	V2.3- V2.2- 2005
36	HBW Motorized Person Trips	4,425,947	3,522,945	4,756,097	-899,735
37	HBS Motorized Person Trips	3,404,738	2,870,779	3,650,705	-537,070
38	HBO Motorized Person Trips	10,480,364	6,453,461	11,215,274	-4,026,571
39	NHB Motorized Person Trips	5,795,249	4,446,044	6,216,076	-1,346,881
40	Total Motorized Person Trips	24,106,298	17,293,230	25,838,152	-6,810,257
41	Motorized Person Trips per HH	10.28	7.39	10.24	-2.89
42	Motorized Person Trips per capita	3.85	2.89	3.85	-0.96
43	Non-Motorized HBW Trips	186,955	117,309	207,633	-69,632
44	HBW Auto Driver Trips	3,417,806	2,571,616	3,684,230	-763,461
45	HBS Auto Driver Trips	2,695,175	1,888,395	2,904,137	-747,754
46	HBO Auto Driver Trips	7,684,037	3,997,403	8,239,272	-3,855,984
47	NHB Auto Driver Trips	4,419,748	3,141,645	4,763,290	-1,193,359
48	Total Auto Driver Trips	18,216,766	11,599,060	19,590,929	-6,560,558
49	HBW Auto Passenger Trips	419,737	234,976	461,494	-274,516
50	HBS Auto Passenger Trips	653,783	956,790	685,536	241,215
51	HBO Auto Passenger Trips	2,557,797	2,271,132	2,713,741	-116,004
52	NHB Auto Passenger Trips	1,218,207	1,153,787	1,289,772	-145,459
53	Total Auto Passenger Trips	4,849,524	4,616,683	5,150,543	-294,764
54	HBW Auto Occupancies	1.12	1.09	1.13	-0.07
55	HBS Auto Occupancies	1.24	1.51	1.24	0.22
56	HBO Auto Occupancies	1.33	1.57	1.33	0.31
57	NHB Auto Occupancies	1.28	1.37	1.27	0.05
58	Total Auto Occupancies	1.27	1.40	1.26	0.12
59	HBW Transit Trips	588,404	716,353	610,373	138,242
60	HBS Transit Trips	55,780	25,595	61,032	-30,531
61	HBO Transit Trips	238,530	184,926	262,261	-54,583
62	NHB Transit Trips	157,294	214,130	163,014	-8,063
63	Total Transit Trips	1,040,008	1,077,487	1,096,680	45,065
64	HBW Transit Percentage	13.29	20.33	12.83	7.32
65	HBS Transit Percentage	1.64	0.89	1.67	-0.76
66	HBO Transit Percentage	2.28	2.87	2.34	0.57
67	NHB Transit Percentage	2.71	4.82	2.62	0.64
68	Total Transit Percentage	4.31	6.23	4.24	1.96

		Version 2.2 - 2011 CLRP 2005	Version 2.3 (2.3.36) 2007	Version 2.2 - 2011 CLRP 2011	V2.3- V2.2- 2005
69	Medium Truck	328,595	508,308	356,288	134,284
70	Heavy Truck	168,507	156,879	182,503	-23,533
71	Misc. Auto Driver	636,646	652,238	685,415	15,592
72	Through (X-X) Auto&Comm.Veh	40,761	42,456	45,365	1,695
73	Through (X-X) Trucks	32,621	33,637	36,346	1,016
74	Airport Passenger Auto Drivers	49,386	60,681	56,814	11,295
75	Commercial Vehicles (Int/&Extl)	1,197,239	1,268,086	1,282,625	71,007
76	Total Vehicle Trips	20,670,521	15,261,363	22,236,285	-5,317,784
77	Freeway VMT	58,798,950	63,875,252	61,635,302	4,680,352
78	Major Art VMT	57,217,037	54,872,253	59,734,047	-1,387,312
79	Minor Art VMT	19,990,859	18,319,353	21,750,767	-456,623
80	Collector VMT	8,417,414	9,999,308	8,966,940	2,764,443
81	Express. VMT	6,411,319	6,238,093	6,963,125	-83,230
82	Ramp VMT	1,228,003	1,569,673	1,276,848	363,237
83	Total VMT	152,063,583	154,873,932	160,327,029	5,880,866
84	VMT per Capita	24.28	25.90	23.91	2.13
85	VMT per HH	64.86	66.19	63.52	2.64
86	VMT per Vehicle Trip	7.36	10.15	7.21	2.93

Ref: " X:\modelRuns\fy12\Ver2.3.36\Summary\View_From_Space_V23_2.3.36_2.3.27_2007_pseu.xlsx"

Appendix A   Model adjustment factors

The Version 2.3 travel model incorporates three sets of adjustment factors: one is applied following trip generation and two are applied to the trip distribution process.

1.1 Trip Generation

The first set of factors is applied to productions and attractions as shown in Table 1 and Table 2. Factors that are applied to productions and attractions are often called "p-mods" and "a-mods" since they modify the productions and attractions. In this case, we are using jurisdiction-level p-mods and a-mods.

Table 1 Jurisdictional Production Adjustment Factors ("P-mods")

Jurisdiction	HBW	HBS	HBO	NNW	NHO
District of Columbia	1.00	0.85	1.20	1.00	1.00
Montgomery	0.95	1.00	1.05	1.00	1.00
Prince George's	1.00	0.88	0.97	1.00	1.00
Arlington	1.00	1.11	1.08	1.00	1.00
Alexandria	1.00	1.00	1.00	1.00	1.00
Fairfax	1.02	1.02	1.02	1.00	1.00
Loudoun	1.00	0.95	0.92	1.00	1.00
Prince William	1.04	1.15	0.94	1.00	1.00
Frederick	1.13	1.00	1.04	1.00	1.00
Howard	1.00	1.00	0.94	1.00	1.00
Anne Arundel	1.00	1.12	1.03	1.00	1.00
Charles	1.00	1.00	0.93	1.00	1.00
Carroll	1.00	1.00	0.92	1.00	1.00
Calvert	1.00	1.00	1.12	1.00	1.00
St. Mary's	1.36	1.00	1.00	1.00	1.00
King George's	1.00	1.00	1.00	1.00	1.00
Fredericksburg	1.00	1.00	1.00	1.00	1.00
Stafford	1.00	1.14	0.86	1.00	1.00
Spotsylvania	1.00	1.00	1.00	1.00	1.00
Fauquier	1.00	1.00	0.88	1.00	1.00
Clarke	1.00	1.00	1.00	1.00	1.00
Jefferson	1.00	1.00	1.00	1.00	1.00

Note: Cells < 1.0 are shown in green (dark gray). Cells > 1.0 are shown in red (light gray).

Table 2 Jurisdictional Attraction Adjustment Factors ("A-mods")

Jurisdiction	HBW	HBS	HBO	NNW	NHO
District of Columbia	1.10	0.60	0.90	1.10	0.80
Montgomery	1.02	1.07	1.10	0.90	1.13
Prince George's	1.08	0.78	0.77	1.00	0.77
Arlington	1.22	0.87	0.95	1.00	0.60
Alexandria	0.77	0.85	1.00	1.00	1.14
Fairfax	1.07	1.05	1.00	0.95	0.95
Loudoun	0.89	1.07	0.87	0.85	1.00
Prince William	1.11	1.05	0.96	1.00	1.00
Frederick	1.00	1.00	0.83	0.88	1.14
Howard	0.82	1.18	0.87	0.78	1.00
Anne Arundel	0.86	1.00	0.85	0.89	0.94
Charles	1.00	1.00	1.00	1.00	1.00
Carroll	1.00	1.51	0.94	1.00	1.24
Calvert	1.00	0.78	1.29	1.00	1.00
St. Mary's	1.40	1.00	0.80	1.49	1.00
King George's	1.00	1.00	1.00	1.00	1.00
Fredericksburg	1.00	1.00	1.00	1.00	1.00
Stafford	1.00	1.72	1.00	1.00	1.00
Spotsylvania	1.00	1.00	1.00	1.00	1.00
Fauquier	1.00	1.00	1.00	1.00	1.00
Clarke	1.00	1.00	1.00	1.00	1.00
Jefferson	1.00	1.00	1.00	1.00	1.00

1.2 Trip Distribution

Trip distribution has two sets of adjustment factors. The first set is used to address physical barrier effects on trip patterns, such as the Potomac River as shown in Table 3. The second set of adjustment factors addresses jurisdictional effects (e.g., school trips and shopping trips tend to remain in a given traveler's residence jurisdiction). HBW k-factors are shown in Table 4, while all other purpose k-factors are presented in Table 5. These adjustment factors were developed by comparing estimated trip distribution results with the observed results from 2007/2008 HTS.

Table 3 K-Factors used in Trip Distribution to Calibrate Potomac River Crossings

HBW	DC/SubMD	SubVA	OuterMD	OuterVA
DC/SubMD	1.00	0.80	1.00	1.00
SubVA	0.90	1.00	0.50	1.00
OuterMD	1.00	0.70	1.00	0.50
OuterVA	0.70	1.00	0.30	1.00

HBS	DC/SubMD	SubVA	OuterMD	OuterVA
DC/SubMD	1.00	0.25	1.00	1.00
SubVA	0.25	1.00	0.50	1.00
OuterMD	1.00	1.00	1.00	1.00
OuterVA	1.00	1.00	1.00	1.00

HBO	DC/SubMD	SubVA	OuterMD	OuterVA
DC/SubMD	1.00	0.30	1.00	1.00
SubVA	0.70	1.00	0.30	1.00
OuterMD	1.00	1.00	1.00	1.00
OuterVA	1.00	1.00	1.00	1.00

NHW	DC/SubMD	SubVA	OuterMD	OuterVA
DC/SubMD	1.00	0.60	1.00	1.00
SubVA	0.60	1.00	0.50	1.00
OuterMD	1.00	1.00	1.00	1.00

NHO	DC/SubMD	SubVA	OuterMD	OuterVA
DC/SubMD	1.00	0.30	1.00	1.00
SubVA	0.30	1.00	0.50	1.00
OuterMD	1.00	0.40	1.00	0.50
OuterVA	1.00	1.00	1.00	1.00

Table 4 HBW K-Factors (Overrides to Potomac River Crossing K-Factors)

Interchange	HBW Factor
DC non-core to DC core	2
Mtg to DC core	2
Mtg to Mtg	2.5
PG to PG	1.5
Arl core to DC core	2.5
Arl non-core to DC core	1.7
Alx to DC core	2
Ffx to DC core	1.5
Ffx to Ffx	1.2
PW to Ffx	2

Table 5 Non-HBW Intra-Jurisdictional K-Factors

Interchange	HBS Factor	HBO Factor	NHW Factor	NHO Factor
DC non-core to DC non-core	2.5	2.2	1.5	2.5
Mtg to Mtg	2	2.2	2.2	1.5
PG to PG	2.5	2.5	1.5	1.7
Arl non-core to Arl non-core	2	2.2	1.7	1.7
Alx to Alx	2	2.2	1.7	1.7
Ffx to Ffx	2.5	2.5	2	2.1
Ldn to Ldn	1.5	2.2	1.7	1.5
PW to PW	1.75	2.2	1.5	1.5
Frd to Frd	1.5	2.2	1.5	1.5
Car to Car	1.5	2.2	1.5	1.5
How to How	1.5	2.2	1.7	1.7
Ann to Ann	1.5	2.2	1.5	1.7
Calv to Calv	1.5	1.5	1.5	1.7
StM to StM	1.5	1.5	1.5	1.7
Chs to Chs	1.5	1.5	1.5	1.7
Fau to Fau	1.5	1.5	1.5	1.7
Staf to Staf	1.5	1	1.5	1.7
Clrk to Clrk	1.5	1.5	1.5	1.3
Jef to Jef	1.5	1.5	1.5	1.3
Frbrg to Frbrg	1.5	1	1.5	1.7
Spots to Spots	1.5	1	1.5	1.7
KingG to KingG	1.5	1.5	1.5	1.5

Appendix B Year 2007 mode choice summary (final, i4, iteration)

Note: Global estimated and observed totals can be found in Table 82 on page 9-7.

Appendix B Year 2007 mode choice summary

```
        Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
        Purpose: Internal HBW Trips    MODE: Est Transit

             DESTINATION
      ORIGIN |   1       2       3       4       5       6       7       8      9      10     11    12     13     14     15    16     17     18     19    20    21    22    23 |  TOTAL
      ================================================================================================================================================================================
       1 DC CR| 10811    5319    1900     683    1428    2251     630     983      1      3      0     0      2      2      0     0      0      0      0     0     0     0     0 |  24012
       2 DC NC|109010   36591   17789    7970    5551    9732    2988    4308      3     11      0     0     22     17      0     0      0      0      0     0     0     0     0 | 193991
       3 MTG   | 71960   13757   40953    2917    3925    4660     902    1277      0      3      0     0     22      4      0     0      0      0      0     0     0     0     0 | 140379
       4 PG    | 46648   19177    9438   15265    4834    6093    1470    1324      0      2      0     0     81     55      0     0      1      0      0     0     0     0     0 | 104388
       5 ARLCR |  2896     285     128      23     158     572     118     140      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |   4321
       6 ARNCR | 35374    3845    1591     287    4114    8970    2448    2583      1      5      0     0      0      0      0     0      0      0      0     0     0     0     0 |  59220
       7 ALX   | 18077    1949     718     153    2144    4665    2683    1766      0      7      0     0      0      0      0     0      0      0      0     0     0     0     0 |  32162
       8 FFX   | 50134    6848    3413     454    8968   14740    5766   13368     70     63      0     0      6      7      0     0      0      0      0     0     1     0     0 | 103838
       9 LDN   |  2268     448     248      20     617     724     112     246    459      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |   5141
      10 PW    |  5560    1596     863     208    1470    2091     853    1993     33   1221      0     0     11     13      0     0      0      0      0     0     1     0     0 |  15912
      11 FRD   |  1210     187     480      15      81      81      13      17      0      0   1086     0      0      0      0     0      0      0      0     0     0     0     0 |   3172
      12 CAR   |     0       0       0       0       0       0       0       0      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |      0
      13 HOW   |  4306    1181     920     333     400     424      84      51      0      0      0     0    460     21      0     0      0      0      0     0     0     0     0 |   8179
      14 AAR   |  6292    1394     673     357     533     572     113      61      0      0      0     0     31     68      0     0      0      0      0     0     0     0     0 |  10094
      15 CAL   |   647     282      89      39     107     114      26      10      0      0      0     0      0      1     21     0      0      0      0     0     0     0     0 |   1338
      16 STM   |   331     118      43      13      50      52      12       7      0      0      0     0      0      0      1    89     13      0      0     0     0     0     0 |    728
      17 CHS   |  2777     893     276     122     318     360      90      51      0      0      0     0      0      0      0     3    381      0      0     0     0     0     0 |   5270
      18 FAU   |    67      23       9       1      31      38      16       4      0      4      0     0      0      0      0     0      0      0      0     0     0     0     0 |    193
      19 STA   |   799     213      76       9     278     383     125      38      0     35      0     0      0      0      0     0      0      0      2     0     1     0     0 |   1960
      20 CL/JF |    94      42      56       4      35      35       7      12      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |    284
      21 SP/FB |   615     191      75      11     225     319     146      61      0     65      0     0      0      0      0     0      0      0      2     0    10     0     0 |   1721
      22 KGEO  |    15       6       2       0       7       9       5       2      0      3      0     0      0      0      0     0      0      0      0     0     0     0     0 |     48
      23 EXTL  |     0       0       0       0       0       0       0       0      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |      0
      ================================================================================================================================================================================
      TOTAL   369891          79740           35273           18608         567         1087          635           22            396          0           13          0 |
                      94347           28884           56885           28301       1421            0          187          93            0            0            0 | 716353


        Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
        Purpose: Internal HBW Trips    MODE: Obs Transit

             DESTINATION
      ORIGIN |   1       2       3       4       5       6       7       8      9      10     11    12     13     14     15    16     17     18     19    20    21    22    23 |  TOTAL
      ================================================================================================================================================================================
       1 DC CR| 17296    6707    3631    1280     774    3422    1059    1467     32     64     22     0     34     43      0     0      0     72      0     0     0     0     0 |  35903
       2 DC NC|103373   42192   14393    5918    3034   10116    3969    3048    248    104      0     0     79     70      0     0     17     17      0     0     0     0     0 | 186578
       3 MTG   | 67810   23319   38961    3600    1471    4582    1403     604      0      0     69     0     76     94     32    15      5      0     53     0     0     0     0 | 142094
       4 PG    | 66663   24251    9938   14686    2898   10715    2316    2670    133      0      0     0    156    186      0     0      7      0      0     0     0     0     0 | 134619
       5 ARLCR |  2844     894     161     222      13     627     283     189      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |   5233
       6 ARNCR | 38525    8185    1703     930    1811    7631    1874    1953     39     29      0     0      3      0      0     0      0      0      0     0     0     0     0 |  62683
       7 ALX   | 17922    4329     774     539    1309    4808    4306    1720     36     18      0     0      0      0      0     0      0      0      0     0     0     0     0 |  35761
       8 FFX   | 47265   11473    1424    1063    5032   17147    4359   15275    120     76      0     0     10      9      0     0      0      0      0     0     0     0     0 | 103252
       9 LDN   |  1159     492      13      27     142     638     133      97      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |   2701
      10 PW    |  6246    1899     226     136     695    3022     772     656     70   1466      0     0      4      5      0     0      0      3      4     0     0     0     0 |  15206
      11 FRD   |  2847     537    1787     120      22     252      31       0      0      0    846     0      0      0      0     0      0      0      0     0     0     0     0 |   6442
      12 CAR   |   213      18       0       0       0      64       0       0      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |    295
      13 HOW   |  3854     554     111      80     162     693      34      67      0      0      0     0      0      0      0     0      0      0      0     0    57     0     0 |   5612
      14 AAR   |  5265    1482     210      99     407    1122      59      33      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |   8677
      15 CAL   |   607     304     109       2      82      67      35      26      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |   1232
      16 STM   |    31       0      41       0       4     112      17       0      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |    205
      17 CHS   |  2539     874     120     255     221     990      42      40      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |   5081
      18 FAU   |   174     111       3       0      78     121      19      46      0      2      0     0      0      0      0     0      0      0      0     0     0     0     0 |    554
      19 STA   |   825     269      44       6      83     381     182     208      0     43      0     0      0      0      0     0      0      0      0     0     3     0     0 |   2044
      20 CL/JF |     2      45       0       0       5       3       5       0      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |     61
      21 SP/FB |   222     265      11      46      59     264     184     163      0     59      0     0      0      0      0     0      0      0      9     0     3     0     0 |   1285
      22 KGEO  |    89      16       3       0       7      25       8      13      0      5      0     0      0      0      0     0      0      0      0     0     0     0     0 |    166
      23 EXTL  |     0       0       0       0       0       0       0       0      0      0      0     0      0      0      0     0      0      0      0     0     0     0     0 |      0
      ================================================================================================================================================================================
      TOTAL   385771         73663           18310           21090         678          937          359           32            29           66           63          0 |
                     128216           29009           66802           28275       1867            0          410          15            92            0            0 | 755684
```

Appendix B Year 2007 mode choice summary

```
        Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
        Purpose: Internal HBW Trips   MODE: Difference (Est-Obs) Transit

             DESTINATION
      ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |   TOTAL
 ===============================================================================================================================================================================
   1 DC CR  | -6485  -1388  -1731   -597    654  -1171   -429   -484    -31    -61    -22      0    -32    -41      0      0      0    -72      0      0      0      0      0 |  -11891
   2 DC NC  |  5637  -5601   3396   2052   2517   -384   -981   1260   -245    -93      0      0    -57    -53      0      0    -17    -17      0      0      0      0      0 |    7413
   3 MTG    |  4150  -9562   1992   -683   2454     78   -501    673      0      3    -69      0    -54    -90    -32    -15     -5      0    -53      0      0      0      0 |   -1715
   4 PG     |-20015  -5074   -500    579   1936  -4622   -846  -1347   -133      2      0      0    -75   -131      0      0     -6      0      0      0      0      0      0 |  -30231
   5 ARLCR  |    52   -609    -33   -199    145    -55   -165    -49      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |    -912
   6 ARNCR  | -3151  -4340   -112   -643   2303   1339    574    630    -38    -24      0      0      0     -3      0      0      0      0      0      0      0      0      0 |   -3463
   7 ALX    |   155  -2380    -56   -386    835   -143  -1623     46    -36    -11      0      0      0      0      0      0      0      0      0      0      0      0      0 |   -3599
   8 FFX    |  2869  -4625   1989   -610   3936  -2407   1408  -1906    -50    -13      0      0     -4     -2      0      0      0      0      0      0      1      0      0 |     586
   9 LDN    |  1108    -44    235     -7    476     86    -21    149    459      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |    2441
  10 PW     |  -686   -303    636     71    775   -932     81   1336    -37   -246      0      0      7      8      0      0      0     -3     -4      0      1      0      0 |     706
  11 FRD    | -1637   -350  -1307   -105     59   -171    -18     17      0      0    240      0      0      0      0      0      0      0      0      0      0      0      0 |   -3270
  12 CAR    |  -213    -18      0      0      0    -64      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |    -295
  13 HOW    |   452    627    809    253    238   -269     50    -16      0      0      0      0    460     21      0      0      0      0      0      0    -57      0      0 |    2567
  14 AAR    |  1027    -88    463    258    126   -550     54     28      0      0      0      0     31     68      0      0      0      0      0      0      0      0      0 |    1417
  15 CAL    |    40    -22    -20     37     25     47     -9    -16      0      0      0      0      0      1     21      0      0      0      0      0      0      0      0 |     106
  16 STM    |   300    117      2     13     46    -60     -5      7      0      0      0      0      0      0      1     89     13      0      0      0      0      0      0 |     523
  17 CHS    |   238     19    156   -133     97   -630     48     11      0      0      0      0      0      0      0      3    381      0      0      0      0      0      0 |     189
  18 FAU    |  -107    -89      7      1    -47    -83     -3    -42      0      2      0      0      0      0      0      0      0      0      0      0      0      0      0 |    -361
  19 STA    |   -26    -56     32      4    195      1    -57   -170     -0     -8      0      0      0      0      0      0      0      0      2      0     -2      0      0 |     -84
  20 CL/JF  |    92     -3     56      4     29     32      2     12      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |     224
  21 SP/FB  |   393    -73     64    -35    166     55    -38   -101      0      5      0      0      0      0      0      0      0     -0     -7      0      7      0      0 |     436
  22 KGEO   |   -74    -10     -1      0     -1    -16     -4    -11      0     -2      0      0      0      0      0      0      0      0     -0      0      0      0      0 |    -118
  23 EXTL   |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |       0
 ===============================================================================================================================================================================
    TOTAL  -15880         6077          16963         -2482          -111          150          276           -10          367          -62          -50           0 |
                  -33869         -125          -9918            27          -446            0          -223            78          -92            0            0      -39331
```

```
        Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
        Purpose: Internal HBW Trips   MODE: Ratio (Est/Obs) Transit

             DESTINATION
      ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |   TOTAL
 ===============================================================================================================================================================================
   1 DC CR  |  0.63   0.79   0.52   0.53   1.84   0.66   0.60   0.67   0.03   0.04      0      0   0.06   0.04      0      0      0      0      0      0      0      0      0 |    0.67
   2 DC NC  |  1.05   0.87   1.24   1.35   1.83   0.96   0.75   1.41   0.01   0.11      0      0   0.28   0.24      0      0      0      0      0      0      0      0      0 |    1.04
   3 MTG    |  1.06   0.59   1.05   0.81   2.67   1.02   0.64   2.11   0.13   2.75   0.00      0   0.29   0.04      0      0      0      0      0      0      0      0      0 |    0.99
   4 PG     |  0.70   0.79   0.95   1.04   1.67   0.57   0.63   0.50      0   1.97      0      0   0.52   0.29      0      0   0.21      0      0      0      0      0      0 |    0.78
   5 ARLCR  |  1.02   0.32   0.80   0.10  12.14   0.91   0.42   0.74   0.06   0.31      0      0      0   0.01      0      0      0      0      0      0      0      0      0 |    0.83
   6 ARNCR  |  0.92   0.47   0.93   0.31   2.27   1.18   1.31   1.32   0.02   0.17      0      0   0.03   0.04      0      0      0      0      0      0      0      0      0 |    0.94
   7 ALX    |  1.01   0.45   0.93   0.28   1.64   0.97   0.62   1.03   0.00   0.36      0      0      0      0      0      0      0      0      0      0      0      0      0 |    0.90
   8 FFX    |  1.06   0.60   2.40   0.43   1.78   0.86   1.32   0.88   0.59   0.83   0.03      0   0.57   0.74      0      0      0      0      0      0   0.63      0      0 |    1.01
   9 LDN    |  1.96   0.91  19.06   0.74   4.36   1.13   0.84   2.54 459.26      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |    1.90
  10 PW     |  0.89   0.84   3.81   1.52   2.12   0.69   1.10   3.04   0.47   0.83   0.04      0   3.11   2.41      0      0      0      0      0      0   1.28      0      0 |    1.05
  11 FRD    |  0.43   0.35   0.27   0.13   3.67   0.32   0.43  17.35      0      0   1.28      0      0      0      0      0      0      0      0      0      0      0      0 |    0.49
  12 CAR    |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |       0
  13 HOW    |  1.12   2.13   8.28   4.16   2.47   0.61   2.47   0.76      0   0.04      0      0 460.03  20.70      0      0      0      0      0      0      0      0      0 |    1.46
  14 AAR    |  1.20   0.94   3.21   3.61   1.31   0.51   1.91   1.84      0   0.07      0      0  30.94  68.17      0      0      0      0      0      0      0      0      0 |    1.16
  15 CAL    |  1.07   0.93   0.81  19.70   1.30   1.70   0.76   0.37      0      0      0      0      0   1.33  21.49   0.34      0      0      0      0      0      0      0 |    1.09
  16 STM    | 10.832938.25   1.04  12.95  12.54   0.46   0.70   6.68      0      0      0      0      0      0   0.95  89.24  12.97      0      0      0      0      0      0 |    3.56
  17 CHS    |  1.09   1.02   2.30   0.48   1.44   0.36   2.15   1.27      0      0      0      0   0.04   0.02      0   2.98 381.43      0      0      0      0      0      0 |    1.04
  18 FAU    |  0.39   0.20   3.45   1.11   0.39   0.31   0.84   0.09      0   1.86      0      0      0      0      0      0      0      0      0      0      0      0      0 |    0.35
  19 STA    |  0.97   0.79   1.71   1.68   3.35   1.00   0.69   0.18      0   0.82      0      0      0      0      0      0      0      0   9.33      0   0.35      0      0 |    0.96
  20 CL/JF  | 48.91   0.93  55.89   3.60   6.51  11.31   1.36 240.00      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |    4.69
  21 SP/FB  |  2.76   0.72   6.86   0.24   3.80   1.21   0.79   0.38      0   1.09      0      0   0.05   0.05      0      0      0      0   0.23      0   3.43      0      0 |    1.34
  22 KGEO   |  0.17   0.40   0.75   0.25   0.91   0.35   0.57   0.14      0   0.56      0      0      0      0      0      0      0      0      0      0   0.01      0      0 |    0.29
  23 EXTL   |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |       0
 ===============================================================================================================================================================================
    TOTAL   0.96           1.08           1.93           0.88           0.84           1.16           1.77           0.70          13.65           0.07           0.21           0 |
                   0.74           1.00           0.85           1.00           0.76            0           0.46           6.17            0            0            0       0.95
```

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Est Auto Person

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	3942	546	647	816	121	128	127	1277	75	36	7	0	60	127	3	3	29	2	1	0	0	0	0	7948
2 DC NC	9333	6399	8202	11154	1011	1053	780	7584	460	230	113	3	806	1679	74	45	376	15	5	2	4	1	0	49330
3 MTG	57644	31275	200880	32379	3697	8709	3631	26731	1708	760	5255	485	7714	6893	192	275	559	87	39	218	51	6	0	389188
4 PG	39186	41648	36217	152696	4223	9492	5519	18402	743	579	379	57	7124	15727	1032	890	5329	39	29	15	33	29	0	339388
5 ARLCR	197	130	132	82	540	336	103	555	24	15	1	0	2	5	0	0	1	1	0	0	0	0	0	2123
6 ARNCR	8450	3950	3580	1859	4435	13614	4050	19076	676	497	26	0	57	133	5	12	41	24	16	3	13	1	0	60517
7 ALX	9211	3183	2450	1743	2341	6086	8499	16498	450	623	17	0	44	116	8	16	63	21	28	3	20	1	0	51419
8 FFX	72033	25257	29367	13572	11007	32704	26267	291719	22839	17816	403	21	513	1181	92	265	554	1044	563	210	511	23	0	547960
9 LDN	9582	5171	8616	2508	2041	5116	2526	51594	53826	4631	1708	97	353	461	19	86	101	854	119	1603	142	7	0	151163
10 PW	12124	6304	6879	3623	2595	6783	5219	89902	6292	76721	188	10	153	397	30	115	171	3022	2358	219	1351	58	0	224514
11 FRD	4953	3502	19304	3097	666	1354	512	4774	2263	337	80091	5765	7686	4376	41	83	109	67	5	1160	8	1	0	140152
12 CAR	3099	1935	7786	2019	326	622	237	1645	396	83	8624	44377	4787	2900	32	47	77	14	2	178	3	0	0	79187
13 HOW	7665	6444	16222	11457	681	1491	679	3113	247	125	4079	1319	56037	20348	127	189	277	10	4	105	7	2	0	130625
14 AAR	14112	11474	14119	21017	1356	2867	1404	4862	291	235	1169	357	17730	140153	1458	721	1124	11	8	41	11	7	0	234528
15 CAL	4648	2895	2187	4419	412	834	460	1510	79	84	56	10	380	2680	18354	5904	2206	4	8	1	17	19	0	47166
16 STM	3564	2192	1499	3332	346	668	406	1307	62	94	32	4	219	978	4061	51426	5596	10	30	0	56	93	0	75974
17 CHS	8925	5953	3539	10336	852	1749	1123	3398	144	176	67	9	444	1788	1796	3305	31121	8	22	1	49	97	0	74903
18 FAU	1505	725	1012	364	434	1024	601	7848	2095	5798	53	2	20	40	4	24	22	10465	923	199	704	34	0	33895
19 STA	2524	1301	1309	836	677	1736	1361	8963	949	9253	26	1	31	91	21	121	124	1720	20758	72	10573	374	0	62821
20 CL/JF	706	409	1957	310	188	445	212	4158	3781	940	1502	94	297	179	1	2	4	442	27	16886	28	1	0	32570
21 SP/FB	1404	723	806	514	372	1012	785	5940	678	5313	18	1	17	52	26	127	159	1414	8230	58	31199	458	0	59307
22 KGEO	723	405	277	494	154	308	193	1130	116	917	2	0	13	52	43	155	317	212	1022	9	1404	3968	0	11913
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	275531	161822	366987	278625	38477	98132	64692	571985	98192	125265	103813	52612	104482	200357	27419	63811	48359	19489	34197	20983	46183	5179	0	2806592

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Obs Auto Person

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1740	284	386	130	0	417	0	623	254	0	0	0	0	447	0	0	0	0	0	0	0	0	0	4281
2 DC NC	12791	2168	7347	11193	1111	1595	1341	7886	936	334	0	0	116	3006	116	0	0	0	0	0	0	0	0	49938
3 MTG	48287	34541	243503	26384	2437	9989	1758	27514	2146	725	3187	0	8957	8185	0	0	0	457	821	0	0	0	0	418889
4 PG	51967	39513	45941	156780	1296	8989	3789	23187	1657	442	111	1070	6491	12343	0	0	6620	0	0	0	0	0	0	360195
5 ARLCR	0	341	401	0	186	126	0	1411	0	347	0	0	178	0	0	0	0	0	0	0	0	0	0	2991
6 ARNCR	12858	5173	4633	653	4266	13822	3012	22185	1490	503	0	0	0	279	91	0	0	287	0	0	0	0	0	69252
7 ALX	14251	3229	1847	2528	1711	6062	10762	14035	263	1301	0	0	0	311	0	0	0	0	0	0	0	0	0	56300
8 FFX	67526	20930	17450	5794	20447	35172	27099	324648	21332	19794	0	0	2563	238	424	0	336	816	1052	471	0	132	0	566223
9 LDN	5843	2218	4248	0	607	4034	925	64363	59149	2229	0	0	0	382	0	0	663	0	480	0	0	0	0	145140
10 PW	12985	9392	4274	3686	5520	6920	7527	86697	5418	80339	0	0	0	0	0	761	295	2909	2916	0	636	0	0	230273
11 FRD	951	2246	27495	2619	107	227	201	1986	2572	296	87417	3891	3895	1204	0	0	0	0	0	465	0	0	0	135572
12 CAR	553	87	9459	2962	0	0	164	164	0	0	2251	41478	10836	6026	0	0	0	0	0	0	0	0	0	73981
13 HOW	5535	2561	15538	22679	165	285	526	3048	274	0	420	961	56055	22019	0	0	137	0	0	323	0	0	0	130528
14 AAR	13029	6734	7861	26984	950	1569	1792	5109	0	202	0	797	20126	140038	607	80	0	0	0	143	0	0	0	226021
15 CAL	2995	1771	722	5190	152	888	0	3022	0	360	0	0	1072	7577	15580	7407	485	0	0	0	0	0	0	47220
16 STM	1678	2910	457	3385	0	0	0	388	0	0	0	0	0	569	5367	55394	6675	0	0	0	0	0	0	76821
17 CHS	5534	4066	1872	14769	674	1931	1549	5934	0	0	0	0	0	2226	1809	1701	29661	0	0	0	0	288	0	72013
18 FAU	524	0	567	0	0	766	374	8831	1816	6562	0	0	0	0	0	0	0	10640	0	0	214	0	0	30295
19 STA	1561	1843	858	279	0	2573	1186	9510	0	13392	0	0	0	0	0	0	0	0	18220	536	10419	893	0	61271
20 CL/JF	509	0	533	0	0	0	0	3934	6540	0	3619	0	157	0	0	0	0	314	0	13645	0	297	0	29549
21 SP/FB	1865	2718	788	1011	520	544	0	617	0	2460	0	0	0	0	0	0	0	258	5811	2235	32937	4830	0	56592
22 KGEO	273	0	0	0	0	0	0	329	0	804	0	0	0	367	0	244	1001	244	839	0	1018	8183	0	13302
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	263256	142721	396179	287025	40148	95909	62005	615422	103848	130089	97005	48196	110445	205217	23994	65587	45209	15845	29580	19120	45225	14624	0	2856648

Appendix B Year 2007 mode choice summary

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Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Difference (Est-Obs) Auto Person

         DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
=======================================================================================================================================================================================
 1 DC CR|  2202    262    261    685    121   -289    127    654   -179     36      7      0     60   -319      3      3     29      2      1      0      0      0      0 |   3667
 2 DC NC| -3458   4232    855    -39    -99   -542   -561   -302   -476   -104    113      3    690  -1327    -41     45    376     15      5      2      4      1      0 |   -608
 3 MTG  |  9357  -3266 -42623   5994   1260  -1279   1873   -782   -437     35   2068    485  -1243  -1293    192    275    559     87   -418   -603     51      6      0 | -29702
 4 PG   |-12781   2136  -9724  -4085   2927    504   1730  -4786   -914    137    268  -1013    633   3384   1032    890  -1291     39     29     15     33     29      0 | -20807
 5 ARLCR|   197   -211   -269     82    354    210    103   -856     24   -332      1      0   -176      5      0      0      1      1      0      0      0      0      0 |   -867
 6 ARNCR| -4408  -1222  -1054   1206    169   -208   1038  -3109   -814     -6     26      0     57   -146    -86     12     41     24   -270      3     13      1      0 |  -8735
 7 ALX  | -5040    -47    603   -785    629     24  -2263   2463    187   -677     17      0     44   -196      8     16     63     21     28      3     20      1      0 |  -4881
 8 FFX  |  4507   4327  11917   7779  -9440  -2468   -832 -32929   1507  -1977    403     21  -2051    943   -332    265    218    229   -489   -261    511   -109      0 | -18263
 9 LDN  |  3739   2954   4369   2508   1435   1082   1601 -12769  -5323   2403   1708     97    353     79     19     86    101    192    119   1123    142      7      0 |   6022
10 PW   |  -861  -3088   2605    -63  -2924   -137  -2307   3205    873  -3618    188     10    153    397     30   -645   -124    113   -558    219    715     58      0 |  -5759
11 FRD  |  4002   1256  -8191    479    558   1127    311   2788   -310     41  -7325   1875   3791   3172     41     83    109     67      5    695      8      1      0 |   4580
12 CAR  |  2546   1848  -1673   -943    326    622     72   1481    396     83   6373   2899  -6050  -3127     32     47     77     14      2    178      3      0      0 |   5206
13 HOW  |  2130   3883    684 -11222    515   1207    152     65    -27    125   3658    358    -18  -1671    127    189    140     10      4   -219      7      2      0 |     98
14 AAR  |  1083   4740   6259  -5967    405   1299   -388   -247    291     33   1169   -440  -2396    115    851    641   1124     11      8   -102     11      7      0 |   8508
15 CAL  |  1653   1124   1465   -771    260    -54    460  -1513     79   -275     56     10   -692  -4897   2774  -1503   1721      4      8      1     17     19      0 |    -54
16 STM  |  1886   -718   1043    -53    346    668    406    918     62     94     32      4    219    409  -1306  -3968  -1079     10     30      0     56     93      0 |   -847
17 CHS  |  3391   1888   1667  -4433    179   -182   -426  -2536    144    176     67      9    444   -437    -13   1604   1460      8     22      1     49   -190      0 |   2890
18 FAU  |   982    725    445    364    434    258    227   -984    278   -764     53      2     20     40      4     24     22   -175    923    199    490     34      0 |   3600
19 STA  |   963   -542    452    556    677   -838    175   -547    949  -4139     26      1     31     91     21    121    124   1720   2538   -464    154   -519      0 |   1550
20 CL/JF|   197    409   1423    310    188    445    212    224  -2759    940  -2117     94    139    179      1      2      4    128     27   3241     28   -296      0 |   3021
21 SP/FB|  -460  -1994     18   -497   -147    468    785   5323    678   2854     18      1     17     52     26    127    159   1156   2419  -2176  -1739  -4372      0 |   2715
22 KGEO |   450    405    277    494    154    308    193    802    116    113      2      0     13   -315     43    -90   -684    -33    184      9    386  -4216      0 |  -1389
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
=======================================================================================================================================================================================
 TOTAL | 12276       -29192      -1672       2687      -5656        6808      -5963        3426        3150        4617         958          0 |
              19100       -8400        2223     -43437      -4824        4416      -4860      -1776        3644        1863       -9444           -50057
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Ratio (Est/Obs) Auto Person

         DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
=======================================================================================================================================================================================
 1 DC CR|  2.27   1.92   1.68   6.26 120.54   0.31 126.58   2.05   0.30  36.46   7.15   0.01  59.92   0.29   3.43   3.06  29.20   2.10   0.63   0.01   0.21   0.02      0 |   1.86
 2 DC NC|  0.73   2.95   1.12   1.00   0.91   0.66   0.58   0.96   0.49   0.69 113.35   3.03   6.97   0.56   0.64  44.97 375.65  15.06   5.36   2.35   4.06   0.77      0 |   0.99
 3 MTG  |  1.19   0.91   0.82   1.23   1.52   0.87   2.07   0.97   0.80   1.05   1.65 484.97   0.86   0.84 192.41 274.83 559.27  87.03   0.09   0.27  50.93   5.89      0 |   0.93
 4 PG   |  0.75   1.05   0.79   0.97   3.26   1.06   1.46   0.79   0.45   1.31   3.42   0.05   1.10   1.271032.30 889.60   0.80  39.31  28.93  14.70  33.19  29.12      0 |   0.94
 5 ARLCR|196.69   0.38   0.33  81.78   2.90   2.67 102.81   0.39  23.73   0.04   0.59      0   0.01   5.33   0.15   0.23   1.49   0.63   0.36   0.02   0.14      0      0 |   0.71
 6 ARNCR|  0.66   0.76   0.77   2.85   1.04   0.98   1.34   0.86   0.45   0.99  25.53   0.25  56.72   0.48   0.06  12.13  40.89  24.26   0.06   3.04  12.55   0.60      0 |   0.87
 7 ALX  |  0.65   0.99   1.33   0.69   1.37   1.00   0.79   1.18   1.71   0.48  16.83   0.23  43.75   0.37   7.89  15.79  63.30  21.18  27.89   2.59  19.59   0.99      0 |   0.91
 8 FFX  |  1.07   1.21   1.68   2.34   0.54   0.93   0.97   0.90   1.07   0.90 402.81  20.86   0.20   4.96   0.22 264.51   1.65   1.28   0.54   0.45 510.59   0.17      0 |   0.97
 9 LDN  |  1.64   2.33   2.032507.88   3.37   1.27   2.73   0.80   0.91   2.081707.92  96.52 352.55   1.21  18.89  86.49 100.56   1.29 118.66   3.34 142.33   6.94      0 |   1.04
10 PW   |  0.93   0.67   1.61   0.98   0.47   0.98   0.69   1.04   1.16   0.95 187.76   9.86 152.53 397.09  29.57   0.15   0.58   1.04   0.81 218.80   2.12  57.83      0 |   0.97
11 FRD  |  5.21   1.56   0.70   1.18   6.20   5.96   2.55   2.40   0.88   1.14   0.92   1.48   1.97   3.63  40.62  82.52 108.86  66.80   5.31   2.49   7.52   0.54      0 |   1.03
12 CAR  |  5.60  22.22   0.82   0.68 326.35 622.29   1.44  10.00 396.40  82.56   3.83   1.07   0.44  31.64  47.14  76.78  14.36   1.66 177.77   2.84   0.41      0 |   1.07
13 HOW  |  1.38   2.52   1.04   0.51   4.12   5.24   1.29   1.02   0.90 124.89   9.70   1.37   1.00   0.92 126.59 189.43   2.02   9.97   4.05   0.32   6.81   1.82      0 |   1.00
14 AAR  |  1.08   1.70   1.80   0.78   1.43   1.83   0.78   0.95 290.54   1.161168.62   0.45   0.88   1.00   2.40   9.011123.97  11.24   8.35   0.29  11.49   6.71      0 |   1.04
15 CAL  |  1.55   1.63   3.03   0.85   2.71   0.94 459.52   0.50  79.09   0.23  55.67   9.98   0.35   0.35   1.18   0.80   4.55   4.17   7.78   1.35  16.86  18.93      0 |   1.00
16 STM  |  2.12   0.75   3.28   0.98 346.22 667.73 406.08   3.37  61.76  93.75  31.80   3.70 218.55   1.72   0.76   0.93   0.84   9.99  29.65   0.48  56.23  93.37      0 |   0.99
17 CHS  |  1.61   1.46   1.89   0.70   1.27   0.91   0.72   0.57 143.55 175.87  66.81   8.89 444.04   0.80   0.99   1.94   1.05   8.44  21.87   1.18  49.10   0.34      0 |   1.04
18 FAU  |  2.87 725.11   1.79 363.94 433.62   1.34   1.61   0.89   1.15   0.88  52.55   2.47  19.56  40.34   3.59  23.56  21.57   0.98 923.23 199.24   3.29  34.26      0 |   1.12
19 STA  |  1.62   0.71   1.53   2.99 677.38   0.67   1.15   0.94 948.79   0.69  26.24   1.40  30.80  90.62  21.48 120.64 123.551720.12   1.14   0.13   1.01   0.42      0 |   1.03
20 CL/JF|  1.39 409.14   3.67 310.09 187.82 444.63 211.81   1.06   0.58 940.28   0.42  93.80   1.89 179.35   0.86   2.08   4.34   1.41  27.16   1.24  28.41   0.00      0 |   1.10
21 SP/FB|  0.75   0.27   1.02   0.51   0.72   1.86 785.44   9.62 677.76   2.16  17.56   0.61  17.33  52.24  26.19 126.72 158.97   5.48   1.42   0.03   0.95   0.09      0 |   1.05
22 KGEO |  2.65 404.98 276.72 494.04 154.36 307.50 193.04   3.44 115.97   1.14   2.27   0.08  12.98   0.14  42.91   0.63   0.32   0.87   1.22   8.80   1.38   0.48      0 |   0.90
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
=======================================================================================================================================================================================
 TOTAL |  1.05         0.93         0.96         1.04         0.95         1.07         0.95         1.14         1.07         1.16         1.02          0 |
               1.13         0.97         1.02         0.93         0.96         1.09         0.98         0.97         1.23         1.10         0.35          0.98
```

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Est Auto Driver

ORIGIN	DESTINATION 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	3229	471	588	749	107	117	114	1148	67	34	7	0	54	115	3	3	27	2	1	0	0	0	0	6836
2 DC NC	7820	5578	7360	10137	887	944	697	6767	410	213	103	3	720	1491	70	41	343	14	5	2	4	1	0	43610
3 MTG	49256	28522	186588	30114	3251	7873	3303	24532	1578	715	4894	460	7173	6387	183	257	525	81	38	205	50	6	0	355990
4 PG	33194	37982	33207	142698	3691	8558	5022	16887	689	548	355	56	6615	14597	971	833	4988	37	28	15	33	28	0	311031
5 ARLCR	169	119	120	77	476	304	94	508	22	14	1	0	2	5	0	0	1	1	0	0	0	0	0	1912
6 ARNCR	7448	3627	3293	1739	3961	12432	3720	17595	620	464	24	0	54	124	5	12	39	22	16	3	12	1	0	55211
7 ALX	8058	2950	2256	1639	2093	5626	7909	15394	417	588	16	0	41	109	8	15	61	20	27	3	19	1	0	47249
8 FFX	61462	23578	27506	12792	9727	30354	24826	275371	21609	16907	385	21	487	1111	90	252	532	990	540	201	489	22	0	509252
9 LDN	7764	4714	8002	2326	1710	4561	2318	48110	51072	4386	1618	94	332	428	18	80	96	808	114	1518	136	7	0	140212
10 PW	8065	5308	5874	3145	1862	5666	4713	82260	5912	72843	174	10	131	339	28	106	161	2857	2239	208	1279	56	0	203235
11 FRD	4042	3118	17520	2829	563	1189	454	4260	2063	309	74756	5349	6968	3948	38	75	101	61	5	1073	7	1	0	128730
12 CAR	2544	1728	7038	1853	277	545	210	1467	355	76	7931	41696	4393	2643	30	43	71	13	2	162	3	0	0	73080
13 HOW	6478	5847	14928	10650	595	1341	615	2846	228	118	3766	1232	52510	18965	118	175	257	9	4	97	7	2	0	120784
14 AAR	11748	10322	12820	19460	1171	2551	1261	4409	266	219	1065	331	16419	131075	1353	663	1038	10	8	38	11	6	0	216247
15 CAL	3823	2588	1964	4069	352	736	411	1360	72	78	51	10	344	2454	17228	5493	2026	4	7	1	16	17	0	43103
16 STM	2837	1923	1317	3027	287	577	357	1158	56	85	29	4	195	873	3753	48180	5144	9	28	0	52	86	0	69974
17 CHS	7389	5356	3183	9581	732	1553	1014	3088	131	164	62	9	404	1630	1667	3071	29175	8	21	1	46	91	0	68376
18 FAU	1036	608	886	316	318	839	530	7062	1949	5451	50	2	18	35	3	22	20	9920	872	187	662	32	0	30819
19 STA	1367	977	963	660	401	1296	1156	7691	858	8698	22	1	23	69	20	113	115	1606	19744	67	10013	354	0	56214
20 CL/JF	540	366	1761	281	145	372	184	3678	3468	854	1392	86	264	160	1	2	4	406	25	16052	27	1	0	30070
21 SP/FB	720	522	569	396	208	729	646	4940	598	4932	15	1	12	38	25	118	148	1303	7786	54	29620	431	0	53812
22 KGEO	498	352	223	451	100	230	161	920	100	842	2	0	12	48	40	144	294	192	960	8	1317	3776	0	10669
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	229487	337967		32913		59713		92539		96717		97170		25653		45168		32469		43803		0		
		146554	258989		88395		531451		118538		49363		186642		59700		18370		19896		4918		2576417

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Obs Auto Driver

ORIGIN	DESTINATION 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1292	226	386	130	0	417	0	623	254	0	0	0	0	447	0	0	0	0	0	0	0	0	0	3776
2 DC NC	10790	1951	6887	9414	1111	1595	929	7178	936	334	0	0	116	2505	116	0	0	0	0	0	0	0	0	43862
3 MTG	40219	30719	224648	25685	2065	9137	1758	25990	2146	725	3187	0	8957	7306	0	0	0	457	821	0	0	0	0	383818
4 PG	44339	35248	41549	142691	1296	7982	3491	20967	1657	221	111	1070	6491	11763	0	0	5112	0	0	0	0	0	0	323986
5 ARLCR	0	341	401	0	186	126	0	1411	0	347	0	0	178	0	0	0	0	0	0	0	0	0	0	2991
6 ARNCR	11171	4821	4236	653	3930	12314	2844	20212	1490	503	0	0	0	279	91	0	0	287	0	0	0	0	0	62832
7 ALX	10303	3229	1665	1913	1711	5450	9330	12987	263	1301	0	0	0	311	0	0	0	0	0	0	0	0	0	48463
8 FFX	55303	18116	16790	5794	16414	32518	25817	303262	18639	19204	0	0	2563	238	424	0	336	816	1052	471	0	132	0	517887
9 LDN	4587	2218	4248	0	607	2609	925	61288	54268	2229	0	0	0	382	0	0	0	663	0	480	0	0	0	134503
10 PW	6825	7319	2701	2113	3842	5940	6405	80112	5418	77918	0	0	0	0	0	393	295	2909	2916	0	636	0	0	205743
11 FRD	951	2246	25532	2619	107	227	201	1986	2572	296	80588	3891	3895	1204	0	0	0	0	0	465	0	0	0	126781
12 CAR	553	87	8280	2678	0	0	164	164	0	0	2137	38595	10381	5623	0	0	0	0	0	0	0	0	0	68663
13 HOW	4595	2426	15199	20938	165	285	526	2273	274	0	420	961	51185	21307	0	0	137	0	0	323	0	0	0	121016
14 AAR	9872	6734	6360	26285	950	1569	1792	4567	0	202	0	797	19351	133857	607	80	0	0	0	143	0	0	0	213166
15 CAL	2995	1537	722	5190	152	444	0	3022	0	360	0	0	1072	6156	13696	7407	485	0	0	0	0	0	0	43237
16 STM	1678	2459	457	3385	0	0	0	388	0	0	0	0	0	569	4252	51198	5483	0	0	0	0	0	0	69868
17 CHS	4959	3924	1238	13642	674	1931	1549	5149	0	0	0	0	2055	1608	1303	27526	0	0	0	0	288	0	65846
18 FAU	524	0	567	0	0	766	374	8831	1816	6062	0	0	0	0	0	0	0	9273	0	0	214	0	0	28428
19 STA	1561	1843	858	140	0	901	1186	7725	0	11574	0	0	0	0	0	0	0	0	15822	536	9107	893	0	52145
20 CL/JF	509	0	533	0	0	0	0	3239	5658	0	3619	0	157	0	0	0	0	314	0	12335	0	297	0	26663
21 SP/FB	1865	1100	788	1011	520	544	0	617	0	2460	0	0	0	0	0	0	0	258	5811	1658	31341	4830	0	52803
22 KGEO	273	0	0	0	0	0	0	329	0	804	0	0	0	367	0	244	1001	244	839	0	842	7623	0	12565
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	215164	364044		33730		57292		95393		90062		104345		20794		40374		27182		42141		0		
		126545	264279		84754		572320		124540		45314		194369		60626		14478		17233		14063		2609040

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Difference (Est-Obs) Auto Driver

          DESTINATION
ORIGIN |   1     2      3      4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 |  TOTAL
==========================================================================================================================================================
 1 DC CR| 1937   245    201   619   107  -300   114   525  -187    34     7     0    54  -332     3     3    27     2     1     0     0     0     0 |   3060
 2 DC NC|-2970  3626    474   723  -223  -652  -233  -411  -526  -122   103     3   604 -1014   -46    41   343    14     5     2     4     1     0 |   -252
 3 MTG   | 9037 -2197 -38060  4430  1186 -1264  1545 -1458  -568   -10  1707   460 -1784  -918   183   257   525    81  -419  -616    50     6     0 | -27828
 4 PG    |-11145 2734  -8342     8  2395   577  1531 -4080  -968   327   244 -1014   125  2833   971   833  -124    37    28    15    33    28     0 | -12955
 5 ARLCR |  169  -222   -281    77   290   178    94  -903    22  -333     1     0  -176     5     0     0     1     1     0     0     0     0     0 |  -1078
 6 ARNCR |-3723 -1193   -943  1086    30   118   875 -2617  -870   -39    24     0    54  -155   -86    12    39    22  -271     3    12     1     0 |  -7621
 7 ALX   |-2245  -280    591  -274   382   177 -1421  2408   154  -713    16     0    41  -203     8    15    61    20    27     3    19     1     0 |  -1214
 8 FFX   | 6160  5462  10716  6999 -6687 -2164  -990 -27890  2970 -2297   385    21 -2077   873  -334   252   197   174  -512  -270   489  -110     0 |  -8635
 9 LDN   | 3177  2497   3754  2326  1104  1953  1393 -13178 -3197  2157  1618    94   332    45    18    80    96   145   114  1038   136     7     0 |   5709
10 PW    | 1241 -2012   3173  1032 -1980  -274 -1693  2149   494 -5075   174    10   131   339    28  -287  -134   -52  -677   208   642    56     0 |  -2507
11 FRD   | 3091   873  -8012   211   455   961   253  2274  -509    13 -5832  1458  3073  2744    38    75   101    61     5   608     7     1     0 |   1950
12 CAR   | 1990  1640  -1242  -825   277   545    46  1303   355    76  5794  3101 -5988 -2979    30    43    71    13     2   162     3     0     0 |   4417
13 HOW   | 1883  3421   -271 -10289   430  1056    89   573   -46   118  3345   270  1325 -2343   118   175   120     9     4  -227     7     2     0 |   -232
14 AAR   | 1875  3588   6461 -6825   220   983  -531  -158   266    17  1065  -465 -2932 -2782   747   583  1038    10     8  -105    11     6     0 |   3081
15 CAL   |  828  1051   1242 -1121   200   292   411 -1662    72  -281    51    10  -728 -3702  3532 -1914  1541     4     7     1    16    17     0 |   -134
16 STM   | 1159  -537    860  -358   287   577   357   769    56    85    29     4   195   304  -499 -3018  -340     9    28     0    52    86     0 |    106
17 CHS   | 2430  1432   1945 -4061    59  -378  -536 -2061   131   164    62     9   404  -426    59  1768  1649     8    21     1    46  -197     0 |   2531
18 FAU   |  512   608    320   316   318    73   157 -1769   133  -612    50     2    18    35     3    22    20   646   872   187   448    32     0 |   2391
19 STA   | -194  -866    106   520   401   396   -30   -33   858 -2875    22     1    23    69    20   113   115  1606  3922  -469   906  -539     0 |   4069
20 CL/JF |   31   366   1228   281   145   372   184   439 -2190   854 -2227    86   107   160     1     2     4    91    25  3717    27  -296     0 |   3407
21 SP/FB |-1144  -578   -218  -615  -312   185   646  4323   598  2472    15     1    12    38    25   118   148  1045  1975 -1604 -1721 -4399     0 |   1009
22 KGEO  |  225   352    223   451   100   230   161   591   100    38     2     0    12  -319    40  -100  -707   -52   121     8   475 -3847     0 |  -1896
23 EXTL  |    0     0      0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |      0
==========================================================================================================================================================
 TOTAL  14323      -26076    -817       2421      -2854       6655      -7175       4860       4794       5286       1662        0 |
             20009      -5290      3641     -40869      -6002       4049      -7727       -926       3893       2662      -9145    -32623
```

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Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Ratio (Est/Obs) Auto Driver

          DESTINATION
ORIGIN |   1     2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 | TOTAL
==========================================================================================================================================================
 1 DC CR| 2.50  2.08   1.52   5.75 106.51   0.28 114.15   1.84   0.26  34.02   6.70   0.01  54.35   0.26   3.36   2.83  27.28   1.91   0.63   0.01   0.21   0.02    0 | 1.81
 2 DC NC| 0.72  2.86   1.07   1.08   0.80   0.59   0.75   0.94   0.44   0.64 103.42   3.03   6.23   0.60   0.61  41.42 342.56  13.52   5.26   2.35   4.02   0.77    0 | 0.99
 3 MTG  | 1.22  0.93   0.83   1.17   1.57   0.86   1.88   0.94   0.74   0.99   1.54 459.56   0.80   0.87 183.33 256.60 524.90  80.86   0.08   0.25  49.80   5.77    0 | 0.93
 4 PG   | 0.75  1.08   0.80   1.00   2.85   1.07   1.44   0.81   0.42   2.48   3.20   0.05   1.02   1.24 970.67 833.36   0.98  36.91  28.37  14.59  32.57  27.65    0 | 0.96
 5 ARLCR|169.01 0.35   0.30  76.67   2.56   2.41  93.72   0.36  21.51   0.04   0.58      0   0.01   4.95   0.15   0.22   1.44   0.57   0.36   0.02   0.14      0    0 | 0.64
 6 ARNCR| 0.67  0.75   0.78   2.66   1.01   1.01   1.31   0.87   0.42   0.92  24.45   0.25  53.60   0.45   0.06  11.50  39.16  22.49   0.05   3.01  12.23   0.60    0 | 0.88
 7 ALX  | 0.78  0.91   1.35   0.86   1.22   1.03   0.85   1.19   1.58   0.45  16.13   0.23  41.42   0.35   7.78  15.04  60.70  19.81  26.74   2.56  18.96   0.97    0 | 0.97
 8 FFX  | 1.11  1.30   1.64   2.21   0.59   0.93   0.96   0.91   1.16   0.88 384.50  20.73   0.19   4.67   0.21 251.84   1.59   1.21   0.51   0.43 488.68   0.17    0 | 0.98
 9 LDN  | 1.69  2.13   1.88 2326.35  2.82   1.75   2.51   0.78   0.94   1.97 1617.72 93.56 331.82   1.22  18.18  80.48  95.64   1.22 114.01   3.16 136.31   6.80    0 | 1.04
10 PW   | 1.18  0.73   2.17   1.49   0.48   0.95   0.74   1.03   1.09   0.93 174.22   9.67 130.60 339.35  28.08   0.27   0.54   0.98   0.77 207.98   2.01  55.59    0 | 0.99
11 FRD  | 4.25  1.39   0.69   1.08   5.24   5.23   2.26   2.15   0.80   1.04   0.93   1.37   1.79   3.28  38.43  75.49 101.08  61.01   5.12   2.31   7.32   0.53    0 | 1.02
12 CAR  | 4.60 19.85   0.85   0.69 276.52 545.45   1.28   8.92 355.15  76.04   3.71   1.08   0.42   0.47  29.76  43.23  71.18  13.02   1.63 161.84   2.81   0.40    0 | 1.06
13 HOW  | 1.41  2.41   0.98   0.51   3.60   4.71   1.17   1.25   0.83 117.52   8.96   1.28   1.03   0.89 118.41 174.91   1.88   9.17   3.98   0.30   6.70   1.77    0 | 1.00
14 AAR  | 1.19  1.53   2.02   0.74   1.23   1.63   0.70   0.97 265.85   1.08 1064.85  0.42   0.85   0.98   2.23   8.27 1038.38 10.34   8.10   0.27  11.18   6.31    0 | 1.01
15 CAL  | 1.28  1.68   2.72   0.70   1.09   2.31   1.66 410.60   0.45  72.07   0.22  51.24   9.63   0.32   0.40   1.26   0.74   4.18   3.81   7.32   1.34  15.84 17.48 | 1.00
16 STM  | 1.69  0.78   2.88   0.89 287.05 577.31 356.54   2.98  55.60  85.00  29.17   3.60 195.34   1.53   0.88   0.94   0.94   8.97  27.77   0.48  51.97  86.16    0 | 1.00
17 CHS  | 1.49  1.37   2.57   0.70   1.09   0.80   0.65   0.60 131.21 164.01  61.80   8.70 404.31   1.04   2.36   1.06   7.78  20.91   1.18  46.41   0.32      0    0 | 1.04
18 FAU  | 1.98 608.25  1.56 315.77 317.78   1.10   1.42   0.40   1.07   0.90  49.74   2.45  17.54  34.70   3.46  21.99  20.38   1.07 871.60 187.21   3.09  32.38    0 | 1.08
19 STA  | 0.88  0.53   1.12   4.72 400.93   1.44   0.97   1.00 857.66   0.75  21.86   1.29  22.60  68.83  20.16 113.25 115.46 1605.79  1.25   0.13   1.10   0.40    0 | 1.08
20 CL/JF| 1.06 365.62  3.30 281.01 145.42 372.17 183.82   1.14   0.61 853.65   0.38  86.47   1.68 160.33   0.85   1.95   4.05   1.29  25.35   1.30  26.59   0.00    0 | 1.13
21 SP/FB| 0.39  0.47   0.72   0.39   0.40   1.34 646.00   8.00 597.76   2.01  14.94   0.52  12.17  38.06  24.74 118.30 148.30   5.05   1.34   0.03   0.95   0.09    0 | 1.02
22 KGEO | 1.83 351.55 222.74 451.30 100.10 229.92 160.63   2.80  99.99   1.05   1.96   0.08  11.77   0.13  39.83   0.59   0.29   0.79   1.14   8.23   1.56   0.50    0 | 0.85
23 EXTL |    0     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0    0 |    0
==========================================================================================================================================================
 TOTAL   1.07       0.93       0.98       1.04       0.97       1.07       0.93       1.23       1.12       1.19       1.04        0 |
               1.16       0.98       1.04       0.93       0.95       1.09       0.96       0.98       1.27       1.15       0.35      0.99
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips    MODE: Est Motr Psn

        DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
=======================================================================================================================================================================================
 1 DC CR| 14753   5865   2547   1499   1548   2379    757   2260     76     39      7      0     62    129      3      3     29      2      1      0      0      0      0 |  31960
 2 DC NC|118343  42990  25991  19124   6562  10785   3768  11892    462    241    113      3    827   1696     74     45    376     15      5      2      4      1      0 | 243322
 3 MTG  |129604  45032 241833  35295   7622  13369   4533  28008   1709    763   5255    485   7736   6897    192    275    559     87     39    218     51      6      0 | 529567
 4 PG   | 85835  60825  45655 167961   9057  15586   6989  19725    743    581    379     57   7205  15781   1032    890   5331     39     29     15     33     29      0 | 443776
 5 ARLCR|  3092    415    260    105    697    908    221    695     24     15      1      0      2      5      0      0      1      1      0      0      0      0      0 |   6445
 6 ARNCR| 43824   7796   5171   2146   8550  22584   6498  21660    677    502     26      0     57    133      5     12     41     24     16      3     13      1      0 | 119737
 7 ALX  | 27287   5132   3168   1895   4485  10751  11182  18264    450    630     17      0     44    116      8     16     63     21     28      3     20      1      0 |  83581
 8 FFX  |122166  32106  32780  14026  19976  47444  32033 305087  22909  17880    403     21    518   1188     92    265    554   1044    563    210    511     23      0 | 651798
 9 LDN  | 11850   5619   8864   2528   2659   5840   2637  51840  54286   4631   1708     97    353    461     19     86    101    854    119   1603    142      7      0 | 156304
10 PW   | 17685   7900   7742   3831   4065   8873   6072  91895   6325  77942    188     10    163    410     30    115    171   3022   2358    219   1352     58      0 | 240426
11 FRD  |  6164   3689  19784   3113    747   1436    525   4791   2263    337  81178   5765   7686   4376     41     83    109     67      5   1160      8      1      0 | 143325
12 CAR  |  3099   1935   7786   2019    326    622    237   1645    396     83   8624  44377   4787   2900     32     47     77     14      2    178      3      0      0 |  79187
13 HOW  | 11971   7625  17142  11790   1080   1915    763   3163    247    125   4079   1319  56497  20369    127    189    277     10      4    105      7      2      0 | 138804
14 AAR  | 20403  12868  14793  21375   1888   3440   1517   4923    291    235   1169    357  17761 140221   1458    721   1124     11      8     41     11      7      0 | 244623
15 CAL  |  5296   3177   2275   4458    519    948    486   1519     79     84     56     10    380   2681  18375   5905   2206      4      8      1     17     19      0 |  48504
16 STM  |  3895   2310   1542   3345    396    719    418   1313     62     94     32      4    219    978   4062  51515   5609     10     30      0     56     93      0 |  76702
17 CHS  | 11702   6846   3815  10457   1170   2109   1214   3449    144    176     67      9    444   1788   1796   3308  31502      8     22      1     49     97      0 |  80173
18 FAU  |  1573    748   1021    365    464   1062    617   7852   2095   5802     53      2     20     40      4     24     22  10465    923    199    704     34      0 |  34088
19 STA  |  3323   1514   1385    845    956   2118   1486   9001    949   9288     26      1     31     91     21    121    124   1720  20761     72  10574    374      0 |  64780
20 CL/JF|   800    451   2013    314    222    480    219   4170   3781    940   1502     94    297    179      1      2      4    442     27  16886     28      1      0 |  32854
21 SP/FB|  2019    914    881    525    598   1332    931   6002    678   5378     18      1     17     52     26    127    159   1414   8232     58  31209    458      0 |  61029
22 KGEO |   738    411    279    494    161    316    198   1132    116    920      2      0     13     52     43    155    317    212   1022      9   1404   3968      0 |  11961
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
=======================================================================================================================================================================================
 TOTAL  645422        446727          73750          83300          98759        104899        105117        27441          48755          34201          46197          0 |
             256169         307508         155016        600286        126686         52612        200544         63904          19489         20983          5179       3522945


Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips    MODE: Obs Motr Psn

        DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
=======================================================================================================================================================================================
 1 DC CR| 19036   6991   4017   1410    774   3839   1059   2090    286     64     22      0     34    490      0      0      0     72      0      0      0      0      0 |  40184
 2 DC NC|116164  44360  21740  17111   4145  11711   5310  10934   1184    438      0      0    195   3076    116      0     17     17      0      0      0      0      0 | 236517
 3 MTG  |116097  57860 282464  29984   3908  14571   3161  28118   2146    725   3256      0   9033   8279     32     15      5      0    510    821      0      0      0 | 560893
 4 PG   |118630  63764  55879 171466   4194  19704   6105  25857   1790    442    111   1070   6647  12529      0      0   6627      0      0      0      0      0      0 | 494814
 5 ARLCR|  2844   1235    562    222    199    753    283   1600      0    347      0      0    178      0      0      0      0      0      0      0      0      0      0 |   8224
 6 ARNCR| 51383  13358   6336   1583   6077  21453   4886  24138   1529    532      0      0      0    282     91      0      0    287      0      0      0      0      0 | 131935
 7 ALX  | 32173   7559   2621   3067   3020  10870  15068  15755    299   1319      0      0      0    311      0      0      0      0      0      0      0      0      0 |  92061
 8 FFX  |114791  32403  18873   6857  25479  52319  31458 339922  21452  19870      0      0   2573    247    424      0    336    816   1052    471      0    132      0 | 669476
 9 LDN  |  7002   2710   4261     29    748   4672   1058  64460  59149   2229      0      0      0    382      0      0      0    663      0    480      0      0      0 | 147841
10 PW   | 19232  11290   4501   3822   6215   9942   8299  87353   5488  81805      0      0      4      5      0    761    295   2912   2919      0    636      0      0 | 245479
11 FRD  |  3798   2783  29282   2739    129    479    232   1986   2572    296  88263   3891   3895   1204      0      0      0      0      0    465      0      0      0 | 142014
12 CAR  |   766    105   9459   2962      0     64    164    164      0      0   2251  41478  10836   6026      0      0      0      0      0      0      0      0      0 |  74276
13 HOW  |  9389   3115  15649  22759    327    978    560   3115    274      0    420    961  56055  22019      0      0    137      0      0    323     57      0      0 | 136140
14 AAR  | 18294   8216   8071  27083   1357   2691   1851   5142      0    202      0    797  20126 140038    607     80      0      0      0    143      0      0      0 | 234698
15 CAL  |  3602   2075    831   5192    234    955     35   3048      0    360      0      0   1072   7577  15580   7407    485      0      0      0      0      0      0 |  48452
16 STM  |  1708   2910    498   3385      4    112     17    388      0      0      0      0      0    569   5367  55394   6675      0      0      0      0      0      0 |  77026
17 CHS  |  8073   4940   1992  15024    895   2921   1591   5974      0      0      0      0      0   2226   1809   1701  29661      0      0      0      0    288      0 |  77094
18 FAU  |   698    111    569      0     78    887    393   8878   1816   6565      0      0      0      0      0      0      0  10640      0      0    214      0      0 |  30849
19 STA  |  2386   2112    902    285     83   2955   1368   9718      0  13435      0      0      0      0      0      0      0      0  18220    536  10422    893      0 |  63315
20 CL/JF|   511     45    533      0      5      3      5   3934   6540      0   3619      0    157      0      0      0      0    314      0  13645      0    297      0 |  29609
21 SP/FB|  2087   2982    799   1057    579    808    184    780      0   2519      0      0      0      0      0      0      0    258   5820   2235  32940   4830      0 |  57878
22 KGEO |   362     16      3      0      7     25      8    342      0    809      0      0      0    367      0    244   1001    244    839      0   1018   8183      0 |  13468
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
=======================================================================================================================================================================================
 TOTAL  649027        469842          58458          83095        104526         97942        110804          24026          45238          29646          45288          0 |
             270938         316034         162711        643697        131956         48196        205627         65602          15937         19120         14624       3612333
```

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Difference (Est-Obs) Motorized Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	-4283	-1126	-1470	88	774	-1460	-302	170	-210	-25	-15	0	28	-361	3	3	29	-70	1	0	0	0	0	-8224
2 DC NC	2179	-1370	4251	2013	2417	-926	-1541	958	-721	-197	113	3	633	-1380	-41	45	359	-2	5	2	4	1	0	6805
3 MTG	13507	-12828	-40631	5311	3714	-1201	1372	-437	38	1999	485	-1297	-1383	160	260	554	87	-471	-603	51	6	0	0	-31416
4 PG	-32796	-2939	-10224	-3506	4863	-4118	884	-6132	-1047	139	268	-1013	558	3253	1032	890	-1296	39	29	15	33	29	0	-51038
5 ARLCR	248	-820	-302	-117	498	155	-62	-905	24	-332	1	0	-176	5	0	0	1	1	0	0	0	0	0	-1779
6 ARNCR	-7559	-5562	-1165	563	2473	1131	1612	-2479	-852	-30	26	0	57	-149	-86	12	41	24	-270	3	13	1	0	-12198
7 ALX	-4885	-2427	547	-1171	1465	-119	-3886	2509	151	-689	17	0	44	-196	8	16	63	21	28	3	20	1	0	-8480
8 FFX	7375	-297	13906	7169	-5504	-4875	576	-34835	1457	-1990	403	21	-2055	941	-332	265	218	229	-489	-261	511	-109	0	-17678
9 LDN	4848	2910	4603	2501	1911	1168	1579	-12620	-4864	2403	1708	97	353	79	19	86	101	192	119	1123	142	7	0	8463
10 PW	-1547	-3390	3242	8	-2149	-1069	-2227	4541	836	-3863	188	10	160	405	30	-645	-124	110	-562	219	716	58	0	-5053
11 FRD	2365	907	-9498	374	617	956	293	2805	-310	41	-7085	1875	3791	3172	41	83	109	67	5	695	8	1	0	1311
12 CAR	2333	1830	-1673	-943	326	558	72	1481	396	83	6373	2899	-6050	-3127	32	47	77	14	2	178	3	0	0	4911
13 HOW	2582	4510	1492	-10969	753	937	202	49	-27	125	3658	358	442	-1650	127	189	140	10	4	-219	-50	2	0	2665
14 AAR	2110	4652	6722	-5708	531	749	-334	-219	291	33	1169	-440	-2365	184	851	641	1124	11	8	-102	11	7	0	9925
15 CAL	1693	1102	1444	-734	285	-7	451	-1529	79	-275	56	10	-692	-4895	2795	-1502	1721	4	8	1	17	19	0	52
16 STM	2187	-600	1044	-40	392	607	401	925	62	94	32	4	219	409	-1305	-3878	-1066	10	30	0	56	93	0	-324
17 CHS	3629	1907	1823	-4567	275	-812	-378	-2525	144	176	67	9	444	-437	-13	1607	1841	8	22	1	49	-190	0	3079
18 FAU	875	636	452	365	386	175	224	-1025	278	-762	53	2	20	40	4	24	22	-175	923	199	490	34	0	3239
19 STA	937	-598	483	560	873	-836	118	-717	949	-4147	26	1	31	91	21	121	124	1720	2540	-464	152	-519	0	1465
20 CL/JF	289	406	1479	314	217	477	214	236	-2759	940	-2117	94	139	179	1	2	4	128	27	3241	28	-296	0	3245
21 SP/FB	-68	-2068	82	-532	19	523	747	5222	678	2859	18	1	17	52	26	127	159	1156	2412	-2176	-1731	-4372	0	3151
22 KGEO	376	395	276	494	154	292	189	790	116	111	2	0	13	-315	43	-90	-684	-33	184	9	386	-4216	0	-1507
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL: -3604   -23115   15292   205   -5767   6958   -5687   3416   3517   4555   909   0 |
-14769   -8526   -7695   -43410   -5270   4416   -5083   -1698   3552   1863   -9444   -89387

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Ratio (Est/Obs) Motorized Person

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0.78	0.84	0.63	1.06	2.00	0.62	0.71	1.08	0.26	0.61	0.33	0.01	1.82	0.26	3.43	3.06	29.20	0.03	0.63	0.01	0.21	0.02	0	0.80
2 DC NC	1.02	0.97	1.20	1.12	1.58	0.92	0.71	1.09	0.39	0.55	113.35	3.03	4.25	0.55	0.64	44.97	22.10	0.89	5.36	2.35	4.06	0.77	0	1.03
3 MTG	1.12	0.78	0.86	1.18	1.95	0.92	1.43	1.00	0.80	1.05	1.61	484.97	0.86	0.83	6.01	18.32	111.85	87.03	0.08	0.27	50.93	5.89	0	0.94
4 PG	0.72	0.95	0.82	0.98	2.16	0.79	1.14	0.76	0.42	1.32	3.42	0.05	1.08	1.26	1032.30	889.60	0.80	39.31	28.93	14.70	33.19	29.12	0	0.90
5 ARLCR	1.09	0.34	0.46	0.47	3.50	1.21	0.78	0.43	23.79	0.04	0.59	0	0.01	5.34	0.15	0.23	1.49	0.63	0.36	0.02	0.14	0	0	0.78
6 ARNCR	0.85	0.58	0.82	1.36	1.41	1.05	1.33	0.90	0.44	0.94	25.53	0.25	56.75	0.47	0.06	12.13	40.89	24.26	0.06	3.04	12.55	0.60	0	0.91
7 ALX	0.85	0.68	1.21	0.62	1.49	0.99	0.74	1.16	1.51	0.48	16.83	0.23	43.75	0.37	7.89	15.79	63.30	21.18	27.89	2.59	19.59	0.99	0	0.91
8 FFX	1.06	0.99	1.74	2.05	0.78	0.91	1.02	0.90	1.07	0.90	402.84	20.86	0.20	4.81	0.22	264.51	1.65	1.28	0.54	0.45	511.22	0.17	0	0.97
9 LDN	1.69	2.07	2.08	93.63	3.55	1.25	2.49	0.80	0.92	2.08	1707.92	96.52	352.55	1.21	18.89	86.49	100.56	1.29	118.66	3.34	142.33	6.94	0	1.06
10 PW	0.92	0.70	1.72	1.00	0.65	0.89	0.73	1.05	1.15	0.95	187.80	9.86	46.69	75.94	29.57	0.15	0.58	1.04	0.81	218.80	2.13	57.83	0	0.98
11 FRD	1.62	1.33	0.68	1.14	5.77	3.00	2.26	2.41	0.88	1.14	0.92	1.48	1.97	3.63	40.62	82.52	108.86	66.80	5.31	2.49	7.52	0.54	0	1.01
12 CAR	4.04	18.42	0.82	0.68	326.35	9.72	1.44	10.00	396.40	82.56	3.83	1.07	0.44	0.48	31.64	47.14	76.78	14.36	1.66	177.77	2.84	0.41	0	1.07
13 HOW	1.28	2.45	1.10	0.52	3.30	1.96	1.36	1.02	0.90	124.93	9.70	1.37	1.01	0.93	126.59	189.43	2.02	9.97	4.05	0.32	0.12	1.82	0	1.02
14 AAR	1.12	1.57	1.83	0.79	1.39	1.28	0.82	0.96	290.54	1.16	1168.62	0.45	0.88	1.00	2.40	9.01	1123.97	11.24	8.35	0.29	11.49	6.71	0	1.04
15 CAL	1.47	1.53	2.74	0.86	2.22	0.99	13.89	0.50	79.09	0.23	55.67	9.98	0.35	1.18	0.80	4.55	4.17	7.78	1.35	16.86	18.93		0	1.00
16 STM	2.28	0.79	3.10	0.99	99.10	6.42	24.59	3.38	61.76	93.75	31.80	3.70	218.55	1.72	0.76	0.93	0.84	9.99	29.65	0.48	56.23	93.37	0	1.00
17 CHS	1.45	1.39	1.91	0.70	1.30	0.72	0.76	0.58	143.55	175.87	66.81	8.89	444.00	0.80	0.99	1.94	1.06	8.44	21.87	1.18	49.10	0.34	0	1.04
18 FAU	2.25	6.71	1.79	365.05	5.95	1.20	1.57	0.88	1.15	0.88	52.55	2.47	19.56	40.34	3.59	23.56	21.57	0.98	923.23	199.24	3.29	34.26	0	1.10
19 STA	1.39	0.72	1.54	2.97	11.52	0.72	1.09	0.93	94879.0	0.69	26.24	1.40	30.80	90.62	21.48	120.64	123.55	172012	1.14	0.13	1.01	0.42	0	1.02
20 CL/JF	1.57	10.00	3.77	313.69	41.81	154.27	42.98	1.06	0.58	940.28	0.42	93.80	1.89	179.35	0.86	2.08	4.34	1.41	27.16	1.24	28.41	0.00	0	1.11
21 SP/FB	0.97	0.31	1.10	0.50	1.03	1.65	5.06	7.69	677.76	2.13	17.56	0.61	17.38	52.29	26.19	126.72	158.97	5.48	1.41	0.03	0.95	0.09	0	1.05
22 KGEO	2.04	25.84	101.74	494.29	22.44	12.89	24.00	3.31	115.97	1.14	2.27	0.08	12.98	0.14	42.91	0.63	0.32	0.87	1.22	8.80	1.38	0.48	0	0.89
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL: 0.99   0.95   1.26   1.00   0.94   1.07   0.95   1.14   1.08   1.15   1.02   0 |
0.95   0.97   0.95   0.93   0.96   1.09   0.98   0.97   1.22   1.10   0.35   0.98

Appendix B Year 2007 mode choice summary

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1.22	1.16	1.10	1.09	1.13	1.09	1.11	1.11	1.11	1.07	1.07	1.00	1.10	1.11	1.02	1.08	1.07	1.10	1.00	1.00	1.00	1.00	0	1.16
2 DC NC	1.19	1.15	1.11	1.10	1.14	1.12	1.12	1.12	1.12	1.08	1.10	1.00	1.12	1.13	1.06	1.09	1.10	1.11	1.02	1.00	1.01	1.00	0	1.13
3 MTG	1.17	1.10	1.08	1.08	1.14	1.11	1.10	1.09	1.08	1.06	1.07	1.06	1.08	1.08	1.05	1.07	1.07	1.08	1.03	1.06	1.02	1.02	0	1.09
4 PG	1.18	1.10	1.09	1.07	1.14	1.11	1.10	1.09	1.08	1.06	1.07	1.03	1.08	1.08	1.06	1.07	1.07	1.07	1.02	1.01	1.02	1.05	0	1.09
5 ARLCR	1.16	1.09	1.09	1.07	1.13	1.11	1.10	1.09	1.10	1.07	1.02	0	1.06	1.08	1.00	1.05	1.03	1.11	1.00	1.00	1.00	0	0	1.11
6 ARNCR	1.13	1.09	1.09	1.07	1.12	1.10	1.09	1.08	1.09	1.07	1.04	1.00	1.06	1.07	1.01	1.05	1.04	1.08	1.04	1.01	1.03	1.00	0	1.10
7 ALX	1.14	1.08	1.09	1.06	1.12	1.08	1.07	1.07	1.08	1.06	1.04	1.00	1.06	1.07	1.01	1.05	1.04	1.07	1.04	1.01	1.03	1.02	0	1.09
8 FFX	1.17	1.07	1.07	1.06	1.13	1.08	1.06	1.06	1.06	1.05	1.05	1.01	1.05	1.06	1.02	1.05	1.04	1.06	1.04	1.05	1.04	1.03	0	1.08
9 LDN	1.23	1.10	1.08	1.08	1.19	1.12	1.09	1.07	1.05	1.06	1.06	1.03	1.06	1.08	1.04	1.07	1.05	1.06	1.04	1.06	1.04	1.02	0	1.08
10 PW	1.50	1.19	1.17	1.15	1.39	1.20	1.11	1.09	1.06	1.05	1.08	1.02	1.17	1.17	1.05	1.09	1.07	1.06	1.05	1.05	1.06	1.04	0	1.10
11 FRD	1.23	1.12	1.10	1.09	1.18	1.14	1.13	1.12	1.10	1.09	1.07	1.08	1.10	1.11	1.06	1.09	1.08	1.09	1.04	1.08	1.03	1.02	0	1.09
12 CAR	1.22	1.12	1.11	1.09	1.18	1.14	1.12	1.12	1.11	1.09	1.09	1.06	1.09	1.10	1.06	1.09	1.08	1.10	1.02	1.10	1.01	1.02	0	1.08
13 HOW	1.18	1.10	1.09	1.08	1.14	1.11	1.10	1.09	1.08	1.06	1.08	1.07	1.07	1.07	1.07	1.08	1.08	1.09	1.02	1.08	1.02	1.03	0	1.08
14 AAR	1.20	1.11	1.10	1.08	1.16	1.12	1.11	1.10	1.09	1.07	1.10	1.08	1.08	1.07	1.08	1.09	1.08	1.09	1.03	1.08	1.03	1.06	0	1.08
15 CAL	1.22	1.12	1.11	1.09	1.17	1.13	1.12	1.11	1.11	1.08	1.09	1.04	1.10	1.09	1.07	1.07	1.09	1.09	1.06	1.01	1.06	1.08	0	1.09
16 STM	1.26	1.14	1.14	1.10	1.21	1.16	1.14	1.13	1.11	1.10	1.09	1.03	1.12	1.12	1.08	1.07	1.09	1.11	1.07	1.00	1.08	1.08	0	1.09
17 CHS	1.21	1.11	1.11	1.08	1.16	1.13	1.11	1.10	1.09	1.07	1.08	1.02	1.10	1.10	1.08	1.08	1.07	1.08	1.05	1.00	1.06	1.07	0	1.10
18 FAU	1.45	1.19	1.14	1.15	1.36	1.22	1.13	1.11	1.07	1.06	1.06	1.01	1.12	1.16	1.04	1.07	1.06	1.06	1.06	1.06	1.06	1.06	0	1.10
19 STA	1.85	1.33	1.36	1.27	1.69	1.34	1.18	1.17	1.11	1.06	1.20	1.09	1.36	1.32	1.07	1.07	1.07	1.07	1.05	1.07	1.06	1.06	0	1.12
20 CL/JF	1.31	1.12	1.11	1.10	1.29	1.19	1.15	1.13	1.09	1.10	1.08	1.08	1.12	1.12	1.01	1.07	1.07	1.09	1.07	1.05	1.07	1.05	0	1.08
21 SP/FB	1.95	1.39	1.42	1.30	1.79	1.39	1.22	1.20	1.13	1.08	1.18	1.17	1.42	1.37	1.06	1.07	1.07	1.09	1.06	1.08	1.05	1.06	0	1.10
22 KGEO	1.45	1.15	1.24	1.09	1.54	1.34	1.20	1.23	1.16	1.09	1.16	1.00	1.10	1.09	1.08	1.07	1.08	1.10	1.07	1.07	1.07	1.05	0	1.12
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1.20	1.10	1.09	1.08	1.17	1.11	1.08	1.08	1.06	1.06	1.07	1.07	1.08	1.07	1.07	1.07	1.07	1.06	1.05	1.05	1.05	1.05	0	1.09

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1.35	1.25	1.00	1.00	0	1.00	0	1.00	1.00	0	0	0	0	1.00	0	0	0	0	0	0	0	0	0	1.13
2 DC NC	1.19	1.11	1.07	1.19	1.00	1.00	1.44	1.10	1.00	1.00	0	0	1.00	1.20	1.00	0	0	0	0	0	0	0	0	1.14
3 MTG	1.20	1.12	1.08	1.03	1.18	1.09	1.00	1.06	1.00	1.00	1.00	0	1.00	1.12	0	0	0	1.00	1.00	0	0	0	0	1.09
4 PG	1.17	1.12	1.11	1.10	1.00	1.13	1.09	1.11	1.00	2.00	1.00	1.00	1.00	1.05	0	0	1.30	0	0	0	0	0	0	1.11
5 ARLCR	0	1.00	1.00	0	1.00	1.00	0	1.00	0	1.00	0	0	1.00	0	0	0	0	0	0	0	0	0	0	1.00
6 ARNCR	1.15	1.07	1.09	1.00	1.09	1.12	1.06	1.10	1.00	1.00	0	0	0	1.00	1.00	0	0	0	1.00	0	0	0	0	1.10
7 ALX	1.38	1.00	1.11	1.32	1.00	1.11	1.15	1.08	1.00	1.00	0	0	0	1.00	0	0	0	0	0	0	0	0	0	1.16
8 FFX	1.22	1.16	1.04	1.00	1.25	1.08	1.05	1.07	1.14	1.03	0	0	1.00	1.00	1.00	0	1.00	1.00	1.00	1.00	0	1.00	0	1.09
9 LDN	1.27	1.00	1.00	0	1.00	1.55	1.00	1.05	1.09	1.00	0	0	0	1.00	0	0	1.00	0	1.00	0	0	0	0	1.08
10 PW	1.90	1.28	1.58	1.74	1.44	1.16	1.18	1.08	1.00	1.03	0	0	0	0	0	1.93	1.00	1.00	1.00	0	1.00	0	0	1.12
11 FRD	1.00	1.00	1.08	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.08	1.00	1.00	1.00	0	0	0	0	0	1.00	0	0	0	1.07
12 CAR	1.00	1.00	1.14	1.11	0	0	1.00	1.00	0	0	1.05	1.07	1.04	1.07	0	0	0	0	0	0	0	0	0	1.08
13 HOW	1.20	1.06	1.02	1.08	1.00	1.00	1.00	1.34	1.00	0	1.00	1.00	1.10	1.03	0	0	1.00	0	0	1.00	0	0	0	1.08
14 AAR	1.32	1.00	1.24	1.03	1.00	1.00	1.00	1.12	0	1.00	0	1.00	1.04	1.05	1.00	1.00	0	0	1.00	0	0	0	0	1.06
15 CAL	1.00	1.15	1.00	1.00	1.00	2.00	0	1.00	0	1.00	0	0	1.00	1.23	1.14	1.00	1.00	0	0	0	0	0	0	1.09
16 STM	1.00	1.18	1.00	1.00	0	0	0	1.00	0	0	0	0	0	1.00	1.26	1.08	1.22	0	0	0	0	0	0	1.10
17 CHS	1.12	1.04	1.51	1.08	1.00	1.00	1.00	1.15	0	0	0	0	0	1.08	1.12	1.31	1.08	0	0	0	0	1.00	0	1.09
18 FAU	1.00	0	1.00	0	1.00	1.00	1.00	1.00	1.00	1.08	0	0	0	0	0	0	0	1.15	0	0	1.00	0	0	1.07
19 STA	1.00	1.00	1.00	2.00	0	2.86	1.00	1.23	0	1.16	0	0	0	0	0	0	0	0	1.15	1.00	1.14	1.00	0	1.18
20 CL/JF	1.00	0	1.00	0	0	0	0	1.21	1.16	0	1.00	0	1.00	0	0	0	0	0	1.00	0	1.11	0	0	1.11
21 SP/FB	1.00	2.47	1.00	1.00	1.00	1.00	0	1.00	0	1.00	0	0	0	0	0	0	0	1.00	1.00	1.35	1.05	1.00	0	1.07
22 KGEO	1.00	0	0	0	0	0	0	1.00	0	1.00	0	0	0	1.00	0	1.00	1.00	1.00	1.00	0	1.21	1.07	0	1.06
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1.22	1.13	1.09	1.09	1.19	1.13	1.08	1.08	1.09	1.04	1.08	1.06	1.06	1.06	1.15	1.08	1.12	1.09	1.09	1.11	1.07	1.04	0	1.09

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Est Pct. Tran

ORIGIN	DESTINATION 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	73.3	90.7	74.6	45.6	92.2	94.6	83.3	43.5	1.1	7.0	0	0	3.3	1.3	0	0	0	0	0	0	0	0	0	75.1
2 DC NC	92.1	85.1	68.4	41.7	84.6	90.2	79.3	36.2	0.6	4.5	0	0	2.7	1.0	0	0	0	0	0	0	0	0	0	79.7
3 MTG	55.5	30.5	16.9	8.3	51.5	34.9	19.9	4.6	0.0	0.4	0.0	0	0.3	0.1	0	0	0	0	0	0	0	0	0	26.5
4 PG	54.3	31.5	20.7	9.1	53.4	39.1	21.0	6.7	0	0.3	0	0	1.1	0.3	0	0	0.0	0	0	0	0	0	0	23.5
5 ARLCR	93.6	68.7	49.4	22.1	22.6	63.0	53.5	20.2	0.3	2.0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	67.1
6 ARNCR	80.7	49.3	30.8	13.4	48.1	39.7	37.7	11.9	0.1	1.0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	49.5
7 ALX	66.2	38.0	22.7	8.1	47.8	43.4	24.0	9.7	0.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	38.5
8 FFX	41.0	21.3	10.4	3.2	44.9	31.1	18.0	4.4	0.3	0.4	0.0	0	1.1	0.6	0	0	0	0	0	0	0.1	0	0	15.9
9 LDN	19.1	8.0	2.8	0.8	23.2	12.4	4.2	0.5	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.3
10 PW	31.4	20.2	11.1	5.4	36.2	23.6	14.0	2.2	0.5	1.6	0.0	0	6.7	3.2	0	0	0	0	0	0	0.1	0	0	6.6
11 FRD	19.6	5.1	2.4	0.5	10.8	5.7	2.6	0.4	0	0	1.3	0	0	0	0	0	0	0	0	0	0	0	0	2.2
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	36.0	15.5	5.4	2.8	37.0	22.1	11.0	1.6	0	0.0	0	0	0.8	0.1	0	0	0	0	0	0	0	0	0	5.9
14 AAR	30.8	10.8	4.6	1.7	28.2	16.6	7.4	1.2	0	0.0	0	0	0.2	0.0	0	0	0	0	0	0	0	0	0	4.1
15 CAL	12.2	8.9	3.9	0.9	20.6	12.0	5.4	0.6	0	0	0	0	0	0.0	0.1	0.0	0	0	0	0	0	0	0	2.8
16 STM	8.5	5.1	2.8	0.4	12.7	7.2	2.9	0.5	0	0	0	0	0	0	0.0	0.2	0.2	0	0	0	0	0	0	0.9
17 CHS	23.7	13.0	7.2	1.2	27.1	17.1	7.4	1.5	0	0	0	0	0.0	0.0	0	0.1	1.2	0	0	0	0	0	0	6.6
18 FAU	4.3	3.0	0.9	0.3	6.6	3.6	2.6	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6
19 STA	24.0	14.1	5.5	1.1	29.1	18.1	8.4	0.4	0	0.4	0	0	0	0	0	0	0	0	0.0	0	0.0	0	0	3.0
20 CL/JF	11.7	9.3	2.8	1.1	15.6	7.3	3.2	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9
21 SP/FB	30.5	20.9	8.5	2.1	37.7	24.0	15.7	1.0	0	1.2	0	0	0.3	0.1	0	0	0	0	0.0	0	0.0	0	0	2.8
22 KGEO	2.0	1.5	0.7	0.1	4.1	2.7	2.4	0.2	0	0.3	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.4
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	57.3		17.8		47.8		22.3		0.6		1.0		0.6		0.1		0.8		0.0		0.0		0	
		36.8		9.4		36.7		4.7		1.1		0		0.1		0.1		0		0		0	20.3

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBW Trips   MODE: Obs Pct. Tran

ORIGIN	DESTINATION 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	90.9	95.9	90.4	90.8	100.0	89.1	100.0	70.2	11.2	100.0	100.0	0	100.0	8.8	0	0	0	100.0	0	0	0	0	0	89.3
2 DC NC	89.0	95.1	66.2	34.6	73.2	86.4	74.8	27.9	20.9	23.7	0	0	40.6	2.3	0	0	100.0	100.0	0	0	0	0	0	78.9
3 MTG	58.4	40.3	13.8	12.0	37.6	31.4	44.4	2.1	0	0	2.1	0	0.8	1.1	100.0	100.0	100.0	0	10.4	0	0	0	0	25.3
4 PG	56.2	38.0	17.8	8.6	69.1	54.4	37.9	10.3	7.4	0	0	0	2.3	1.5	0	0	0.1	0	0	0	0	0	0	27.2
5 ARLCR	100.0	72.4	28.7	100.0	6.5	83.3	100.0	11.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63.6
6 ARNCR	75.0	61.3	26.9	58.8	29.8	35.6	38.4	8.1	2.6	5.5	0	0	0	1.1	0	0	0	0	0	0	0	0	0	47.5
7 ALX	55.7	57.3	29.5	17.6	43.3	44.2	28.6	10.9	12.0	1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	38.8
8 FFX	41.2	35.4	7.5	15.5	19.7	32.8	13.9	4.5	0.6	0.4	0	0	0.4	3.6	0	0	0	0	0	0	0	0	0	15.4
9 LDN	16.6	18.2	0.3	100.0	18.9	13.7	12.6	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.8
10 PW	32.5	16.8	5.0	3.6	11.2	30.4	9.3	0.8	1.3	1.8	0	0	100.0	100.0	0	0	0	0	0.1	0.1	0	0	0	6.2
11 FRD	75.0	19.3	6.1	4.4	17.0	52.6	13.4	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	4.5
12 CAR	27.8	17.1	0	0	0	100.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4
13 HOW	41.0	17.8	0.7	0.4	49.5	70.9	6.1	2.2	0	0	0	0	0	0	0	0	0	0	0	0	100.0	0	0	4.1
14 AAR	28.8	18.0	2.6	0.4	30.0	41.7	3.2	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.7
15 CAL	16.9	14.7	13.1	0.0	35.0	7.0	100.0	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.5
16 STM	1.8	0.0	8.2	0	100.0	100.0	100.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
17 CHS	31.5	17.7	6.0	1.7	24.7	33.9	2.6	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.6
18 FAU	24.9	100.0	0.5	0	13.6	13.6	4.8	0.5	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.8
19 STA	34.6	12.7	4.9	2.0	100.0	12.9	13.3	2.1	100.0	0.3	0	0	0	0	0	0	0	100.0	0.0	0	0.0	0	0	3.2
20 CL/JF	0.4	100.0	0	0	100.0	100.0	100.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
21 SP/FB	10.7	8.9	1.4	4.3	10.2	32.7	100.0	20.9	0	2.4	0	0	0	0	0	0	0	0.1	0.2	0	0.0	0	0	2.2
22 KGEO	24.5	100.0	100.0	0	100.0	100.0	100.0	3.8	0	0.6	0	0	0	0	0	0	0	0	0.0	0	0	0	0	1.2
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	59.4		15.7		31.3		25.4		0.6		1.0		0.3		0.1		0.1		0.2		0.1		0	
		47.3		9.2		41.1		4.4		1.4		0		0.2		0.0		0.6		0		0	20.9

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Est Transit

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	433	326	164	17	23	196	42	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1237
2 DC NC	2050	4458	1278	443	43	528	161	104	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	9066
3 MTG	193	149	4804	87	31	28	1	1	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	5298
4 PG	255	307	445	1820	43	90	20	5	0	2	0	0	8	6	0	0	1	0	0	0	0	0	0	3002
5 ARLCR	34	3	1	0	4	109	12	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	179
6 ARNCR	164	8	2	0	66	1144	139	261	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1786
7 ALX	43	1	0	0	9	161	378	181	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	774
8 FFX	78	12	25	21	4	118	102	1679	11	72	5	0	10	9	1	33	23	0	0	0	2	0	0	2205
9 LDN	1	0	0	0	0	0	0	11	97	23	0	0	0	0	0	0	0	0	0	0	0	0	0	132
10 PW	18	29	66	49	12	85	63	573	50	442	11	0	26	25	2	64	51	0	0	0	3	0	0	1568
11 FRD	0	0	0	0	0	0	0	0	0	1	125	0	0	0	0	0	0	0	0	0	0	0	0	126
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0	4	0	0	0	1	0	4	0	0	34	2	0	0	0	0	0	0	0	0	0	46
14 AAR	2	0	0	4	0	0	0	6	0	6	0	0	1	6	0	0	0	0	0	0	0	0	0	26
15 CAL	0	0	0	0	0	0	0	0	0	1	0	0	0	0	5	0	0	0	0	0	0	0	0	6
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0	9
17 CHS	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	108	0	0	0	0	0	0	109
18 FAU	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
19 STA	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	2	1	0	1	1	14	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	20
22 KGEO	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3273	5292	6787	2445	235	2461	919	2893	159	559	141	0	82	48	7	105	184	0	0	0	5	0	0	25595

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Obs Transit

ORIGIN \ DESTINATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	269	716	84	0	0	517	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	1607
2 DC NC	2244	4135	894	811	0	1015	0	107	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9206
3 MTG	186	217	4946	77	0	59	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5503
4 PG	405	588	608	1915	0	91	0	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3664
5 ARLCR	44	72	0	0	0	186	0	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	353
6 ARNCR	167	0	0	0	22	893	0	328	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1410
7 ALX	0	31	32	0	0	408	390	199	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1060
8 FFX	132	38	0	0	21	242	171	3272	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3876
9 LDN	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
10 PW	59	0	0	0	0	20	0	0	0	81	0	0	0	0	0	0	0	0	0	0	0	0	0	160
11 FRD	0	0	0	0	0	0	0	0	0	0	91	0	0	0	0	0	0	0	0	0	0	0	0	91
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
14 AAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3506	5797	6568	2803	43	3431	579	4024	0	81	91	0	0	21	0	0	0	0	0	0	0	0	0	26944

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Difference (Est-Obs) Transit

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	164	-390	80	17	23	-321	42	35	0	0	0	0	0	-21	0	0	0	0	0	0	0	0	0	-370
2 DC NC	-194	323	384	-368	43	-487	161	-3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-140
3 MTG	7	-68	-142	10	31	-31	-17	1	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	-205
4 PG	-150	-281	-163	-95	43	-1	20	-52	0	2	0	0	8	6	0	0	1	0	0	0	0	0	0	-662
5 ARLCR	-10	-69	1	0	4	-77	12	-36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-174
6 ARNCR	-3	8	2	0	44	251	139	-67	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	376
7 ALX	43	-30	-32	0	9	-247	-12	-18	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	-286
8 FFX	-54	-26	25	21	-17	-124	-69	-1593	11	72	5	0	10	9	1	33	23	0	0	0	2	0	0	-1671
9 LDN	1	0	0	0	0	0	0	1	97	23	0	0	0	0	0	0	0	0	0	0	0	0	0	122
10 PW	-41	29	66	49	12	65	63	573	50	361	11	0	26	25	2	64	51	0	0	0	3	0	0	1408
11 FRD	0	0	0	0	0	0	0	0	0	1	34	0	0	0	0	0	0	0	0	0	0	0	0	35
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	-4	4	0	0	0	1	0	4	0	0	34	2	0	0	0	0	0	0	0	0	0	42
14 AAR	2	0	0	4	0	0	0	6	0	6	0	0	1	6	0	0	0	0	0	0	0	0	0	26
15 CAL	0	0	0	0	0	0	0	0	0	1	0	0	0	0	5	0	0	0	0	0	0	0	0	6
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0	9
17 CHS	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	108	0	0	0	0	0	0	109
18 FAU	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
19 STA	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	2	1	0	1	1	14	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	20
22 KGEO	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	-233	-505	219	-358	192	-970	340	-1131	0	478	50	0	0	27	0	0	0	0	0	0	0	0	0	-1349

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Ratio (Est/Obs) Transit

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1.61	0.46	1.95	16.85	23.14	0.38	42.22	35.09	0	0.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0.77
2 DC NC	0.91	1.08	1.43	0.55	43.09	0.52	161.15	0.97	0	0.76	0	0	0.42	0.04	0	0	0.23	0	0	0	0	0	0	0.98
3 MTG	1.04	0.69	0.97	1.13	31.12	0.48	0.04	0.60	0	2.21	0	0	2.57	0.10	0	0	0	0	0	0	0	0	0	0.96
4 PG	0.63	0.52	0.73	0.95	43.46	0.99	20.23	0.08	0	1.68	0	0	7.65	5.68	0	0	1.13	0	0	0	0	0	0	0.82
5 ARLCR	0.78	0.04	0.96	0	3.73	0.59	12.10	0.30	0	0.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0.51
6 ARNCR	0.98	7.96	2.02	0	2.99	1.28	138.62	0.80	0	2.44	0	0	0	0	0	0	0	0	0	0	0	0	0	1.27
7 ALX	42.64	0.02	0.00	0	8.78	0.39	0.97	0.91	0	1.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0.73
8 FFX	0.59	0.32	24.56	20.66	0.20	0.49	0.60	0.51	11.42	71.99	4.80	0	10.11	8.52	0.72	32.51	23.22	0	0.01	0	1.52	0	0	0.57
9 LDN	0.89	0	0	0	0	0	0	1.10	96.88	23.00	0	0	0	0	0	0	0	0	0	0	0	0	0	13.18
10 PW	0.30	28.89	66.20	49.14	11.53	4.24	63.17	573.18	50.27	5.45	10.89	0	25.93	24.90	1.51	64.32	50.63	0	0.02	0	3.21	0	0	9.80
11 FRD	0.02	0	0	0	0	0	0	0.16	0	0.50	1.38	0	0	0	0	0	0	0	0	0	0	0	0	1.39
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0.18	0	0.12	3.61	0	0	0	1.39	0	3.79	0	0	34.06	2.25	0	0	0	0	0	0	0	0	0	11.44
14 AAR	2.06	0.04	0.07	3.63	0	0.04	0.01	6.24	0	6.16	0	0	1.40	6.43	0	0	0	0	0	0	0	0	0	26.08
15 CAL	0.19	0.02	0	0	0	0.01	0	0.31	0	0.95	0	0	0	0	4.76	0.14	0	0	0	0	0	0	0	6.38
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.04	7.82	0.98	0	0	0	0	0	0	8.84
17 CHS	0	0	0	0.03	0	0	0	0.33	0	0.98	0	0	0	0	0	0	107.51	0	0	0	0	0	0	108.85
18 FAU	0	0	0	0	0	0	0	2.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.38
19 STA	0	0	0	0	0	0	0	2.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.31
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0.39	0.14	2.34	0.67	0.12	0.72	0.66	13.83	0	0.83	0	0	0	0	0	0	0	0	0	0	0.02	0	0	19.72
22 KGEO	0	0	0	0	0	0	0	1.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.76
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.93	0.91	1.03	0.87	5.46	0.72	1.59	0.72	0	6.90	1.55	0	0	2.28	0	0	0	0	0	0	0	0	0	0.95

Appendix B Year 2007 mode choice summary

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      Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
      Purpose: Internal HBS Trips    MODE: Est Auto Person

            DESTINATION
  ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
 ================================================================================================================================================================================
  1 DC CR|  4160   2248   1454    818    202    952    380   1739     63     22      0      0     29     39      0      0     12      1      0      0      0      0      0 |  12120
  2 DC NC| 12850  61893  17395  15486    871   4666   2405  10848    373    179      3      0    564    741      0      0    273     11      0      0      0      0      0 | 128557
  3 MTG   |  4638  12056 387938  19556     97    646    161   2540    105     11   1735    257   3691   2223      0      0     96      1      0      0      1      0      0 | 435753
  4 PG    |  5420  13666  19147 258671    318   2155   2415   7920    159    130      1      1   4709   7173     17     56   7046      7      0      0      0      0      0 | 329011
  5 ARLCR |   151    127     42     41    588   1207    327   1129     21     17      0      0      0      3      0      0      3      0      0      0      0      0      0 |   3656
  6 ARNCR |  2147   1991    584    764   2287  50703   5914  19475    235    230      6      0      6     50      0      0     65      1      0      0      3      0      0 |  84463
  7 ALX   |   715    768    118    552    659   5946  28689  14893    107    289      0      0      2     23      0      2    107      1      1      0      4      0      0 |  52875
  8 FFX   |  4190   5467   2848   4358   1925  17425  16535 448037   6794   7367    126      1     92    415      0      8   1037     81     94      2    325      0      0 | 517127
  9 LDN   |   505    672    694    586    171   1232    579  16149  97123   1353   4404    127     56    145      0      0    166    181     10   1436     47      0      0 | 125634
 10 PW    |   317    352    110    311    165   1292   1491  21999   1379 198636     45      0      6     42      0      0    169   1544    765      6   1150      0      0 | 229779
 11 FRD   |    13     20   6865     38      8     47      5    795   2239     10  90113   4243   1086    117      0      0      0      1      0     30      0      0      0 | 105630
 12 CAR   |     0      0    797     14      0      2      0     44     80      0   1349  74824   1400    113      0      0      0      0      0      0      0      0      0 |  78624
 13 HOW   |    95    293   3823   5453      7     34     14    148     10      1    719   1537 111109  12371      0      0     14      0      0      0      0      0      0 | 135629
 14 AAR   |   485   1118   1850  10467     80    455    422   1422     39     39      4     22  12111 241040    217     59    529      0      0      0      0      0      0 | 270360
 15 CAL   |   191    444    272   3031     43    259    345   1083     21     35      0      0     66   1405  26197   4732   1793      0      0      0      0      0      0 |  39915
 16 STM   |     8      4      5    196      5     32     75    266      0      4      0      0      1     12    302  40954   4469      0      0      0      0      0      0 |  46333
 17 CHS   |    85    124     37   1366     29    182    379   1218     26     35      0      0      4     18    171    737  63058      0      0      0      0      0      0 |  67470
 18 FAU   |    49     39     41     40      7     45     25   1988    460   3067      6      0      0      1      0      0      7  20013    444     15    402      0      0 |  26649
 19 STA   |    43     26     26     32     15    116    180   2400     55   7725      0      0      0      1      0      0      8    231  46795      0   7131     10      0 |  64793
 20 CL/JF |     3      1    716      0      1     11      2   1199   5918    241   1942     55     82      3      0      0      0    183     10  16014      0      0      0 |  26371
 21 SP/FB |     3      0     13      1      7     65     93   1862     76   3134      0      0      0      0      0      0      0    149   4499      0  45097      3      0 |  55004
 22 KGEO  |     2      1      1     41      2     19     38    523      3    896      0      0      0      0      3    113   1555     54   1297      0   1404   3480      0 |   9432
 23 EXTL  |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
 ================================================================================================================================================================================
  TOTAL   | 36070        444776         7488         60473       115284       100454       135016        26906        80408        53905        55565          0 |
              101310        321824       87491        557679       223423        81067       265934        46659        22458        17502         3493        2845185
```

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      Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
      Purpose: Internal HBS Trips    MODE: Obs Auto Person

            DESTINATION
  ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
 ================================================================================================================================================================================
  1 DC CR|  6088   1617    350      0      0   1768    210    640      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |  10674
  2 DC NC| 16016  66001  28122  15345    115   6873    946   5368    373      0      0      0    110    907      0      0    979      0      0      0      0      0      0 | 141153
  3 MTG   |  4485  10227 397179   7751   1390    844    206   4624    124   2175   1503      0   2168   2378      0      0    875      0    141      0      0      0      0 | 436071
  4 PG    |  4612   6497  16408 272971      0   1103    110   2486    182    182    272      0   3629  15982    390    286  16365      0      0      0      0    198      0 | 341673
  5 ARLCR |     0    106      0      0    723   1622      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |   2451
  6 ARNCR |  3520   1289    652    102   2154  59521   8235  17407    225      0     93      0      0    712      0      0      0      0      0      0      0      0      0 |  93909
  7 ALX   |  1295    730    352    951    147   3701  36500  12319      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |  55994
  8 FFX   |  1007    126   1922    773    978  11191  10543 473052  14737  14484      0      0      0      0      0      0    132      0    552      0      0      0      0 | 529497
  9 LDN   |   452      0    394      0      0   1029      0  22404 102019   1994      0      0      0      0      0      0      0      0    288    382      0      0      0 | 128962
 10 PW    |     0      0      0      0      0    439   2081  27325    211 209393      0      0      0      0      0      0      0   3066    309      0   2655    197      0 | 245675
 11 FRD   |     0      0   5106    261      0      0    231      0   1136      0 103235   4892    181    260      0      0      0      0      0      0      0      0      0 | 115301
 12 CAR   |     0      0    669    418    767      0      0      0      0      0    858  75762   2248    381      0      0      0      0      0      0      0      0      0 |  81103
 13 HOW   |   437    339   3462   3993      0      0    163      0      0      0      0      0   1644 123286   8510      0      0      0      0      0      0      0      0 | 141835
 14 AAR   |     0    282      0  19966      0     72      0    228      0    204      0   2169  13014 250504    803      0    402      0      0      0      0      0      0 | 287644
 15 CAL   |     0      0   1316   5478      0      0    255   2796      0      0      0      0      0   3856  25964   1603   2784      0      0      0      0      0      0 |  44051
 16 STM   |     0      0      0      0      0    391      0    391      0      0      0      0      0      0    791  38086   5040      0      0      0      0      0      0 |  44700
 17 CHS   |  1216      0    842   6383      0      0   1271      0      0      0      0      0    833    222   3210  59964      0      0      0      0      0      0      0 |  73940
 18 FAU   |     0      0      0      0      0      0      0   1038   2948   4497      0      0      0      0      0      0      0  17421    939      0      0      0      0 |  26843
 19 STA   |     0      0      0      0      0    564      0    689      0   1741      0      0      0      0      0      0      0      0  49660      0  13824      0      0 |  66478
 20 CL/JF |     0      0      0      0      0      0      0    148   1204      0    830      0      0      0      0      0      0     78      0  17736      0      0      0 |  19996
 21 SP/FB |     0      0      0      0      0      0      0      0      0   2118      0      0      0      0      0      0      0      0   4096      0  58236      0      0 |  64450
 22 KGEO  |     0      0      0      0      0      0      0      0    179      0      0      0    122      0      0      0      0      0    980      0   1533   2347      0 |   5160
 23 EXTL  |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
 ================================================================================================================================================================================
  TOTAL   | 39129        456524         5506         60751       123157       106791       144635        28171        86540        56965        76247          0 |
               87883        334740       89118        570917       236967        84466       284444        43185        20565        18118         2741        2957561
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Difference (Est-Obs) Auto Person

        DESTINATION
ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
=====================================================================================================================================================================================
 1 DC CR| -1928    631   1104    818    202   -816    169   1099     63     22      0      0     29     39      0      0     12      1      0      0      0      0      0 |   1445
 2 DC NC| -3166  -4107 -10727    141    756  -2207   1459   5480     -0    179      3      0    455   -166      0      0   -706     11      0      0      0      0      0 | -12596
 3 MTG  |   153   1829  -9241  11805  -1293   -197    -45  -2085    -20  -2164    232    257   1523   -155      0      0     11   -141      0      1      0      0      0 |   -318
 4 PG   |   808   7169   2739 -14300    318   1051   2305   5434    -23    -52   -271      1   1080  -8809   -374   -230  -9319      7      0      0      0   -198      0 | -12662
 5 ARLCR|   151     21     42     41   -135   -415    327   1129     21     17      0      0      0      3      0      0      3      0      0      0      0      0      0 |   1205
 6 ARNCR| -1373    702    -68    663    133  -8818   2068     11    230    -87      0      0      6   -662      0      0     65      1      0      0      3      0      0 |  -9446
 7 ALX  |  -580     38   -233   -398    512   2245  -7811   2573    107    289      0      0      2     23      0      2    107      1      1      0      4      0      0 |  -3119
 8 FFX  |  3183   5341    926   3585    948   6234   5992 -25015  -7943  -7117    126      1     92    415      0      8    906     81   -459      2    325      0      0 | -12370
 9 LDN  |    53    672    300    586    171    203    579  -6255  -4896   -642   4404    127     56    145      0      0    166    181   -277   1054     47      0      0 |  -3328
10 PW   |   317    352    110    311    165    853   -591  -5326   1168 -10757     45      0      6     42      0      0    169  -1522    457      6  -1505   -197      0 | -15896
11 FRD  |    13     20   1758   -223      8     47   -225    795   1103     10 -13122   -649    906   -144      0      0      0      1      0     30      0      0      0 |  -9671
12 CAR  |     0   -668    379   -753      0      2    -45      0     44     80     80    491   -938   -847   -268      0      0   -778      1      0      0      0      0      0 |  -2478
13 HOW  |  -342    -47    361   1460      7     34   -149    148     10      1    719   -106 -12177   3861      0      0     14      0      0      0      0      0      0 |  -6206
14 AAR  |   485    836   1850  -9498     80    383    422   1193     39   -164      4  -2147   -903  -9463   -586     59    127      0      0      0      0      0      0 | -17284
15 CAL  |   191    444  -1044  -2447     43    259     89  -1713     21     35      0      0     66  -2451    233   3129   -991      0      0      0      0      0      0 |  -4136
16 STM  |     8      4      5    196      5   -359     75   -125      0      4      0      0      1     12   -490   2868   -571      0      0      0      0      0      0 |   1633
17 CHS  | -1131    124   -805  -5017     29    182   -892   1218     26     35      0      0      4   -814    -51  -2473   3094      0      0      0      0      0      0 |  -6470
18 FAU  |    49     39     41     40      7     45     25    950  -2488  -1430      6      0      0      1      0      0      7   2592   -495     15    402      0      0 |   -194
19 STA  |    43     26     26     32     15   -449    180   1710     55   5984      0      0      0      1      0      0      8    231  -2865      0  -6692     10      0 |  -1685
20 CL/JF|     3      1    716      0      1     11      2   1051   4714    241   1112     55     82      3      0      0      0    104      0  -1722      0      0      0 |   6375
21 SP/FB|     3      0     13      1      7     65     93   1862     76   1016      0      0      0      0      0      0      0    149    403      0 -13138      3      0 |  -9446
22 KGEO |     2      1      1     41      2     19     38    523      3    718      0      0      0   -122      3    113   1555     54    317      0   -129   1133      0 |   4272
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
=====================================================================================================================================================================================
 TOTAL | -3059        -11748          1982          -278         -7874         -6337         -9620         -1265          -6132         -3060        -20682            0 |
            13427         -12916         -1627        -13239        -13544         -3399        -18511          3475          1893          -616           753              -112377
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Ratio (Est/Obs) Auto Person

        DESTINATION
ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
=====================================================================================================================================================================================
 1 DC CR|  0.68   1.39   4.15 818.23 202.10   0.54   1.81   2.72  62.80  22.18   0.03      0  28.50  38.66      0      0  12.43   1.39      0      0      0      0      0 |   1.14
 2 DC NC|  0.80   0.94   0.62   1.01   7.58   0.68   2.54   2.02   1.00 178.57   2.95      0   5.15   0.82      0      0   0.28  10.60   0.16      0      0      0      0 |   0.91
 3 MTG  |  1.03   1.18   0.98   2.52   0.07   0.77   0.78   0.55   0.84   0.01   1.15 257.27   1.70   0.93      0      0   0.11   1.38   0.00   0.36   0.97      0      0 |   1.00
 4 PG   |  1.18   2.10   1.17   0.95 317.61   1.95  21.95   3.19   0.87   0.72   0.00   0.98   1.30   0.45   0.04   0.20   0.43   6.86   0.13      0      0      0      0 |   0.96
 5 ARLCR|150.51   1.20  42.41  41.01   0.81   0.74 327.421128.67  20.53  17.31   0.09      0   0.31   2.50      0      0   2.62   0.13   0.01      0   0.07      0      0 |   1.49
 6 ARNCR|  0.61   1.54   0.90   7.52   0.86   0.85   0.72   1.12   1.05 230.16   0.06      0   6.44   0.07      0   0.15  64.96   0.98   0.36      0   3.36      0      0 |   0.90
 7 ALX  |  0.55   1.05   0.34   0.58   4.48   1.61   0.79   1.21 106.95 289.37   0.31      0   1.92  22.67      0   1.81 106.55   0.71   0.71      0   3.70      0      0 |   0.94
 8 FFX  |  4.16  43.24   1.48   5.64   1.97   1.56   1.57   0.95   0.46   0.51 125.67   1.02  91.91 414.82   0.09   7.71   7.88  80.95   0.17   1.53 325.03      0      0 |   0.98
 9 LDN  |  1.12 671.88   1.76 585.50 170.73   1.20 578.57   0.72   0.95   0.68440 4.11 126.72  55.59 145.07      0   0.03 166.38 180.67   0.04   3.76  46.63      0      0 |   0.97
10 PW   |316.95 351.56 109.91 311.14 165.23   2.94   0.72   0.81   6.55   0.95  44.77      0   6.32  42.15      0      0 169.31   0.50   2.48   6.11   0.43      0      0 |   0.94
11 FRD  | 13.42  19.79   1.34   0.15   8.43  46.88   0.02 794.78   1.97  10.01   0.87   0.87   6.01   0.45      0      0   0.15   0.81      0  29.68      0      0      0 |   0.92
12 CAR  |  0.11   0.00   1.91   0.02   0.42   1.81   0.03  44.29  79.99   0.05   1.57   0.99   0.62   0.30      0      0      0      0      0      0      0      0      0 |   0.97
13 HOW  |  0.22   0.86   1.10   1.37   7.48  33.53   0.08 148.30  10.38   0.93 719.37   0.94   0.90   1.45      0      0  14.18   0.01      0   0.12      0      0      0 |   0.96
14 AAR  |485.12   3.961849.98   0.52  80.21   6.30 421.96   6.23  38.50   0.19   4.23   0.01   0.93   0.96   0.27  58.81   1.32   0.11   0.01      0      0      0      0 |   0.94
15 CAL  |190.51 443.83   0.21   0.55  42.97 259.06   1.35   0.39  20.90  34.63      0      0  66.47   0.36   1.01   2.95   0.64   0.02      0      0      0      0      0 |   0.91
16 STM  |  7.55   4.21   4.84 195.88   4.96   0.08  75.41   0.68   0.07   4.44      0      0   0.93  11.78   0.38   1.08   0.89      0      0      0   0.06   0.18      0 |   1.04
17 CHS  |  0.07 123.70   0.21   0.55  28.92 182.15   0.301218.28  25.76  35.17      0      0   4.37   0.02   0.77   0.23   1.05   0.14   0.01      0   0.03   0.43      0 |   0.91
18 FAU  | 49.43  39.12  40.69  40.36   6.76  45.05  24.99   1.92   0.16   0.68   6.20      0   0.37   0.78      0      0   6.78   1.15   0.47  14.50 401.95   0.09      0 |   0.99
19 STA  | 43.13  25.84  26.22  31.97  14.84   0.20 179.79   3.48  55.03   4.44      0      0      0   0.71      0      0   7.88 231.12   0.94      0   0.52   9.96      0 |   0.97
20 CL/JF|  2.72   1.24 715.91   0.28   1.27  10.59   1.72   8.09   4.92 240.87   2.34  55.07  82.02   3.35      0      0      0   2.33   0.21   0.90   0.25      0      0 |   1.32
21 SP/FB|  2.96   0.04  13.40   0.60   6.78  65.46  92.821862.43  76.35   1.48      0      0      0      0      0      0   0.24 148.77   1.10      0   0.77   3.06      0 |   0.85
22 KGEO |  1.86   1.38   0.59  41.36   2.26  19.32  38.07 523.39   2.51   5.02      0      0      0   0.00   2.93 112.511555.09  53.70   1.32      0   0.92   1.48      0 |   1.83
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
=====================================================================================================================================================================================
 TOTAL |  0.92          0.97          1.36          1.00          0.94          0.94          0.93          0.96          0.93          0.95          0.73            0 |
            1.15          0.96          0.98          0.98          0.94          0.96          0.93          1.08          1.09          0.97          1.27              0.96
```

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Est Auto Driver

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	3056	1743	967	559	139	697	267	1074	36	13	0	0	17	23	0	0	8	1	0	0	0	0	0	8599
2 DC NC	9374	47958	11812	10499	595	3379	1678	6628	209	101	2	0	334	440	0	0	166	5	0	0	0	0	0	93179
3 MTG	4080	8076	263388	13223	49	414	106	1639	64	7	1143	168	2430	1465	0	0	62	1	0	0	1	0	0	296316
4 PG	4656	8910	12571	175371	157	1284	1503	4883	87	75	0	1	3042	4658	11	36	4672	3	0	0	0	0	0	221921
5 ARLCR	109	95	32	33	377	870	242	857	15	13	0	0	0	2	0	0	2	0	0	0	0	0	0	2647
6 ARNCR	1521	1490	425	581	1465	36695	4405	14489	165	168	4	0	5	37	0	0	49	1	0	0	3	0	0	61503
7 ALX	503	576	85	412	416	4257	20016	9988	65	186	0	0	1	17	0	2	77	0	0	0	3	0	0	36605
8 FFX	2800	4187	1862	2780	1208	12605	11268	284008	4255	4615	75	1	55	247	0	5	630	49	57	1	195	0	0	330900
9 LDN	328	516	445	370	104	883	389	10039	61866	837	2708	75	33	85	0	0	98	111	6	896	27	0	0	79816
10 PW	203	287	71	193	99	918	978	13356	823	126486	27	0	4	25	0	0	100	965	472	4	700	0	0	145711
11 FRD	11	12	4280	24	4	25	3	427	1334	5	60856	2810	663	72	0	0	0	0	0	19	0	0	0	70544
12 CAR	0	0	485	9	0	1	0	20	38	0	866	50892	886	70	0	0	0	0	0	0	0	0	0	53269
13 HOW	81	183	2500	3640	4	19	8	86	6	0	470	1026	75487	8281	0	0	9	0	0	0	0	0	0	91799
14 AAR	403	692	1136	6857	39	256	248	801	18	20	2	13	7832	163072	144	37	338	0	0	0	0	0	0	181907
15 CAL	158	273	157	1945	20	141	198	596	9	18	0	0	38	891	17757	3119	1114	0	0	0	0	0	0	26435
16 STM	7	3	2	119	2	15	38	131	0	2	0	0	0	5	192	27724	2785	0	0	0	0	0	0	31025
17 CHS	72	76	21	895	14	102	227	709	12	19	0	0	2	10	114	490	42727	0	0	0	0	0	0	45488
18 FAU	31	29	25	25	4	31	16	1130	264	1842	4	0	0	0	0	0	4	12695	275	9	246	0	0	16629
19 STA	27	19	15	19	8	77	110	1312	25	4676	0	0	0	0	0	0	5	133	29971	0	4502	6	0	40906
20 CL/JF	2	1	367	0	1	6	1	602	3278	126	1128	30	39	2	0	0	0	102	0	10244	0	0	0	15929
21 SP/FB	2	0	5	0	3	40	52	906	31	1725	0	0	0	0	0	0	75	2775	0	0	28786	2	0	34402
22 KGEO	1	1	0	23	1	11	20	239	1	455	0	0	0	0	2	65	881	24	778	0	849	2232	0	5584
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	27424	75125	300650	217576	4708	62726	41772	353920	72601	141389	67286	55015	90869	179403	18219	31478	53727	14166	34334	11173	35313	2241	0	1891114

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Obs Auto Driver

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	4752	1295	350	0	0	1768	105	543	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8813
2 DC NC	11400	52974	15371	12799	115	4795	753	3441	275	0	0	0	110	551	0	0	356	0	0	0	0	0	0	102939
3 MTG	4179	7492	281699	5332	695	597	206	2990	124	622	984	0	1200	951	0	0	437	0	141	0	0	0	0	307649
4 PG	4231	4725	11316	187410	0	445	110	2071	182	182	272	0	1871	10350	390	286	9460	0	0	0	0	198	0	233499
5 ARLCR	0	106	0	0	474	1401	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1982
6 ARNCR	2629	1077	652	102	1083	41801	5724	12321	112	0	93	0	0	203	0	0	0	0	0	0	0	0	0	65796
7 ALX	859	459	352	532	147	2754	29146	8795	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43044
8 FFX	448	126	1669	773	978	7714	7493	309078	9119	7301	0	0	0	0	0	0	132	0	552	0	0	0	0	345382
9 LDN	452	0	394	0	0	826	0	14504	64817	997	0	0	0	0	0	0	0	0	144	382	0	0	0	82515
10 PW	0	0	0	0	0	439	1348	13326	211	125132	0	0	0	0	0	0	0	1170	309	0	759	98	0	142791
11 FRD	0	0	3080	130	0	0	231	0	813	0	69328	3615	181	130	0	0	0	0	0	0	0	0	0	77507
12 CAR	0	191	209	290	0	0	0	0	0	0	659	49486	1583	381	0	0	0	0	0	0	0	0	0	52799
13 HOW	437	339	2238	3195	0	0	163	0	0	0	0	1204	82146	4079	0	0	0	0	0	0	0	0	0	93803
14 AAR	0	282	0	12729	0	72	0	228	0	204	0	1085	5087	165660	803	0	402	0	0	0	0	0	0	186551
15 CAL	0	0	376	3462	0	0	255	982	0	0	0	0	0	2421	17068	1005	1708	0	0	0	0	0	0	27276
16 STM	0	0	0	0	0	391	0	391	0	0	0	0	0	0	528	26250	2060	0	0	0	0	0	0	29620
17 CHS	608	0	494	4918	0	0	793	0	0	0	0	0	610	222	1934	0	39923	0	0	0	0	0	0	49502
18 FAU	0	0	0	0	0	0	0	1038	1157	3627	0	0	0	0	0	0	0	11833	577	0	0	0	0	18231
19 STA	0	0	0	0	0	282	0	362	0	1741	0	0	0	0	0	0	0	0	27234	0	8360	0	0	37979
20 CL/JF	0	0	0	0	0	0	0	148	543	0	616	0	0	0	0	0	0	78	0	13419	0	0	0	14804
21 SP/FB	0	0	0	0	0	0	0	0	0	1332	0	0	0	0	0	0	0	0	3484	0	35779	0	0	40594
22 KGEO	0	0	0	0	0	0	0	0	179	0	0	0	0	122	0	0	0	0	572	0	1001	1945	0	3819
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	29994	69067	318198	231673	3492	63286	46325	370219	77353	141315	71952	55390	92177	185457	19011	29475	54476	13081	33012	13801	45898	2241	0	1966896

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Difference (Est-Obs) Auto Driver
```

ORIGIN	DESTINATION 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	-1695	448	617	559	139	-1071	162	531	36	13	0	0	17	23	0	0	8	1	0	0	0	0	0	-214
2 DC NC	-2026	-5016	-3559	-2300	480	-1416	925	3187	-66	101	2	0	225	-111	0	0	-190	5	0	0	0	0	0	-9760
3 MTG	-98	584	-18310	7891	-646	-182	-100	-1352	-61	-615	159	168	1230	514	0	0	-375	1	-141	0	1	0	0	-11333
4 PG	425	4186	1256	-12039	157	839	1393	2812	-95	-107	-271	1	1171	-5691	-380	-250	-4788	3	0	0	0	-198	0	-11577
5 ARLCR	109	-12	32	33	-97	-531	242	857	15	13	0	0	0	2	0	0	2	0	0	0	0	0	0	665
6 ARNCR	-1108	413	-227	479	382	-5106	-1319	2168	53	168	-89	0	5	-166	0	0	49	1	0	0	3	0	0	-4294
7 ALX	-356	117	-267	-120	269	1503	-9129	1193	65	186	0	0	1	17	0	2	77	0	0	0	3	0	0	-6439
8 FFX	2352	4060	193	2007	230	4890	3775	-25070	-4864	-2686	75	1	55	247	0	5	498	49	-496	1	195	0	0	-14482
9 LDN	-124	516	50	370	104	57	389	-4464	-2951	-160	2708	75	33	85	0	0	98	111	-138	514	27	0	0	-2700
10 PW	203	287	71	193	99	479	-370	30	612	1354	27	0	4	25	0	0	100	-205	164	4	-58	-98	0	2920
11 FRD	11	12	1200	-107	4	25	-228	427	521	5	-8472	-805	482	-58	0	0	0	0	0	19	0	0	0	-6963
12 CAR	0	-191	276	-282	0	1	0	20	38	0	207	1407	-696	-311	0	0	0	0	0	0	0	0	0	470
13 HOW	-356	-157	262	445	4	19	-155	86	6	0	470	-179	-6659	4203	0	0	9	0	0	0	0	0	0	-2003
14 AAR	403	410	1136	-5872	39	184	248	573	18	-184	2	-1071	2745	-2588	-659	37	-64	0	0	0	0	0	0	-4644
15 CAL	158	273	-219	-1517	20	141	-58	-386	9	18	0	0	38	-1529	690	2114	-594	0	0	0	0	0	0	-842
16 STM	7	3	2	119	2	-377	38	-261	0	2	0	0	0	5	-336	1475	725	0	0	0	0	0	0	1405
17 CHS	-536	76	-473	-4024	14	102	-566	709	12	19	0	0	2	-600	-108	-1444	2804	0	0	0	0	0	0	-4014
18 FAU	31	29	25	25	4	31	16	92	-893	-1785	4	0	0	0	0	0	4	862	-302	9	246	0	0	-1602
19 STA	27	19	15	19	8	-205	110	950	25	2936	0	0	0	0	0	0	5	133	2737	0	-3858	6	0	2928
20 CL/JF	2	1	367	0	1	6	1	454	2735	126	512	30	39	2	0	0	0	24	0	-3175	0	0	0	1124
21 SP/FB	2	0	5	0	3	40	52	906	31	393	0	0	0	0	0	0	0	75	-708	0	-6993	2	0	-6192
22 KGEO	1	1	0	23	1	11	20	239	1	277	0	0	0	-122	2	65	881	24	206	0	-152	287	0	1766
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	-2571		-17548		1216		-4553		-4752		-4666		-1308		-792		-750		1322		-10585		0	
		6058		-14097		-559		-16299		73		-375		-6055		2004		1084		-2628		-1		-75781

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Ratio (Est/Obs) Auto Driver
```

ORIGIN	DESTINATION 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0.64	1.35	2.76	558.65	139.33	0.39	2.54	1.98	36.05	12.82	0.02	0	16.84	22.92	0	0	7.59	0.68	0	0	0	0	0	0.98
2 DC NC	0.82	0.91	0.77	0.82	5.18	0.70	2.23	1.93	0.76	101.34	1.68	0	3.05	0.80	0	0	0.47	5.18	0.08	0	0	0	0	0.91
3 MTG	0.98	1.08	0.93	2.48	0.07	0.69	0.52	0.55	0.51	0.01	1.16	168.15	2.02	1.54	0	0	0.14	0.63	0.00	0.23	0.58	0	0	0.96
4 PG	1.10	1.89	1.11	0.94	156.92	2.88	13.66	2.36	0.48	0.41	0.00	0.58	1.63	0.45	0.03	0.13	0.49	2.80	0.07	0	0	0	0	0.95
5 ARLCR	108.68	0.89	32.26	32.86	0.79	0.62	242.24	856.69	14.60	12.67	0.08	0	0.26	1.99	0	0	2.11	0.09	0.01	0	0.07	0	0	1.34
6 ARNCR	0.58	1.38	0.65	5.71	1.35	0.88	0.77	1.18	1.47	168.40	0.05	0	4.93	0.18	0	0.15	48.85	0.65	0.33	0	2.94	0	0	0.93
7 ALX	0.59	1.25	0.24	0.77	2.83	1.55	0.69	1.14	64.78	185.60	0.28	0	1.49	16.70	0	1.53	77.29	0.33	0.49	0	2.81	0	0	0.85
8 FFX	6.25	33.11	1.12	3.60	1.24	1.63	1.50	0.92	0.47	0.63	74.99	0.61	54.94	247.02	0.05	4.57	4.78	49.31	0.10	0.91	195.07	0	0	0.96
9 LDN	0.72	515.87	1.13	369.88	104.37	1.07	388.62	0.69	0.95	0.842	708.23	75.03	32.90	85.20	0	0.02	98.35	110.66	0.04	2.35	27.48	0	0	0.97
10 PW	202.83	287.37	70.73	193.37	98.95	2.09	0.73	1.00	3.91	1.01	26.67	0	3.74	24.82	0	0	100.39	0.83	1.53	3.65	0.92	0	0	1.02
11 FRD	11.29	11.93	1.39	0.18	3.84	25.32	0.01	426.72	1.64	4.70	0.88	0.78	3.67	0.55	0	0	0.09	0.36	0	19.30	0	0	0	0.91
12 CAR	0.10	0.00	2.32	0.03	0.18	0.75	0.01	20.44	38.47	0.01	1.31	1.03	0.56	0.18	0	0	0	0	0	0	0	0	0	1.01
13 HOW	0.18	0.54	1.12	1.14	3.51	19.06	0.05	86.03	5.56	0.40	469.97	0.85	0.92	2.03	0	0	8.84	0	0	0.07	0	0	0	0.98
14 AAR	403.18	2.45	1135.50	0.54	38.50	3.54	247.50	3.51	18.32	0.10	2.45	0.01	1.54	0.98	0.18	37.31	0.84	0.04	0	0	0	0	0	0.98
15 CAL	157.69	273.09	0.42	0.56	20.33	141.42	0.77	0.61	9.48	17.72	0	0	37.94	0.37	1.04	3.10	0.65	0.01	0	0	0	0	0	0.97
16 STM	6.74	2.52	2.11	118.95	2.11	0.04	38.19	0.33	0.02	1.94	0	0	0.35	5.39	0.36	1.06	1.35	0	0	0	0.04	0.11	0	1.05
17 CHS	0.12	75.61	0.04	0.29	13.74	102.03	0.29	709.11	11.84	18.75	0	0	2.14	0.02	0.51	0.25	1.07	0.05	0	0	0.02	0.27	0	0.92
18 FAU	31.12	28.62	25.01	24.58	3.99	31.14	15.66	1.09	0.23	0.51	3.67	0	0.22	0.46	0	0	3.95	1.07	0.48	8.86	246.35	0.05	0	0.91
19 STA	26.91	19.11	15.10	19.21	8.26	0.27	110.11	3.62	24.69	2.69	0	0	0	0.42	0	0	4.64	132.90	1.10	0	0.54	6.27	0	1.08
20 CL/JF	1.67	0.92	367.19	0.16	0.58	6.11	0.93	4.06	125.66	1.83	29.55	39.47	1.54	0	0	0	1.30	0.13	0.76	0.15	0	0	1.08
21 SP/FB	1.69	0.03	5.20	0.35	3.12	39.67	51.64	906.29	31.27	1.29	0	0	0	0	0	0.08	75.18	0.80	0	0.80	1.86	0	0.85
22 KGEO	1.03	1.00	0.21	22.57	1.02	10.96	20.44	238.72	1.02	2.55	0	0	0	0.00	1.62	65.38	881.49	24.49	1.36	0	0.85	1.15	0	1.46
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.91		0.94		1.35		0.90		0.94		0.94		0.99		0.96		0.99		1.04		0.77		0	
		1.09		0.94		0.99		0.96		1.00		0.99		0.97		1.07		1.08		0.81		1.00		0.96

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Est Motr Psn

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	4593	2574	1618	835	225	1148	422	1775	63	22	0	0	29	39	0	0	12	1	0	0	0	0	0	13356
2 DC NC	14900	66351	18673	15928	914	5194	2566	10952	373	179	3	0	565	741	0	0	273	11	0	0	0	0	0	137623
3 MTG	4831	12205	392742	19643	128	674	162	2540	105	14	1735	257	3694	2223	0	0	96	1	0	0	1	0	0	441051
4 PG	5675	13972	19592	260492	361	2245	2435	7925	159	132	1	1	4717	7179	17	56	7047	7	0	0	0	0	0	332014
5 ARLCR	185	130	43	41	592	1317	340	1144	21	17	0	0	0	3	0	0	3	0	0	0	0	0	0	3835
6 ARNCR	2312	1999	586	764	2353	51847	6053	19736	235	233	6	0	6	50	0	0	65	1	0	0	3	0	0	86248
7 ALX	758	768	118	552	668	6107	29067	15074	107	291	0	0	2	23	0	2	107	1	1	0	4	0	0	53649
8 FFX	4269	5479	2872	4379	1930	17544	16637	449717	6806	7439	130	1	102	423	1	40	1060	81	94	2	327	0	0	519332
9 LDN	506	672	694	586	171	1232	579	16160	97220	1376	4404	127	56	145	0	0	166	181	10	1436	47	0	0	125766
10 PW	335	380	176	360	177	1377	1554	22572	1429	199077	56	0	32	67	2	64	220	1544	765	6	1153	0	0	231347
11 FRD	13	20	6865	38	8	47	5	795	2239	11	90239	4243	1086	117	0	0	0	1	0	30	0	0	0	105757
12 CAR	0	0	797	14	0	2	0	44	80	0	1349	74824	1400	113	0	0	0	0	0	0	0	0	0	78624
13 HOW	95	293	3824	5457	7	34	14	150	10	5	719	1537	111143	12373	0	0	14	0	0	0	0	0	0	135674
14 AAR	487	1118	1850	10471	80	456	422	1428	39	46	4	22	12112	241047	217	59	529	0	0	0	0	0	0	270386
15 CAL	191	444	272	3031	43	259	345	1084	21	36	0	0	66	1405	26202	4732	1793	0	0	0	0	0	0	39922
16 STM	8	4	5	196	5	32	75	266	0	4	0	0	1	12	302	40961	4470	0	0	0	0	0	0	46342
17 CHS	85	124	37	1366	29	182	379	1219	26	36	0	0	4	18	171	737	63165	0	0	0	0	0	0	67579
18 FAU	49	39	41	40	7	45	25	1991	460	3067	6	0	0	1	0	0	7	20013	444	15	402	0	0	26652
19 STA	43	26	26	32	15	116	180	2402	55	7725	0	0	0	1	0	0	8	231	46795	0	7131	10	0	64795
20 CL/JF	3	1	716	0	1	11	2	1199	5918	241	1942	55	82	3	0	0	0	183	0	16014	0	0	0	26371
21 SP/FB	3	0	16	1	7	66	93	1876	76	3135	0	0	0	0	0	0	0	149	4499	0	45097	3	0	55023
22 KGEO	2	1	1	41	2	19	38	525	3	896	0	0	0	0	3	113	1555	54	1297	0	1404	3480	0	9434
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	39343	106603	451563	324269	7723	89952	61392	560572	115442	223982	100595	81067	135098	265982	26913	46764	80592	22458	53905	17502	55570	3493	0	2870779

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Obs Motr Psn

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	6357	2333	434	0	0	2285	210	640	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	12281
2 DC NC	18260	70136	29016	16156	115	7888	946	5475	373	0	0	0	110	907	0	0	979	0	0	0	0	0	0	150359
3 MTG	4671	10444	402125	7828	1390	903	224	4624	124	2175	1503	0	2168	2378	0	0	875	0	141	0	0	0	0	441574
4 PG	5017	7085	17016	274886	0	1194	110	2543	182	182	272	0	3629	15982	390	286	16365	0	0	0	0	198	0	345337
5 ARLCR	44	178	0	0	723	1808	0	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2804
6 ARNCR	3687	1289	652	102	2176	60414	8235	17735	225	0	93	0	0	712	0	0	0	0	0	0	0	0	0	95319
7 ALX	1295	761	384	951	147	4109	36890	12518	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57054
8 FFX	1139	164	1922	773	999	11433	10714	476324	14737	14484	0	0	0	0	0	0	132	0	552	0	0	0	0	533373
9 LDN	452	0	394	0	0	1029	0	22414	102019	1994	0	0	0	0	0	0	0	0	288	382	0	0	0	128972
10 PW	59	0	0	0	0	459	2081	27325	211	209474	0	0	0	0	0	0	0	3066	309	0	2655	197	0	245835
11 FRD	0	0	5106	261	0	0	231	0	1136	0	103326	4892	181	260	0	0	0	0	0	0	0	0	0	115392
12 CAR	0	669	418	767	0	0	0	0	0	0	858	75762	2248	381	0	0	0	0	0	0	0	0	0	81103
13 HOW	437	339	3466	3993	0	0	163	0	0	0	0	1644	123286	8510	0	0	0	0	0	0	0	0	0	141839
14 AAR	0	282	0	19966	0	72	0	228	0	204	0	2169	13014	250504	803	0	402	0	0	0	0	0	0	287644
15 CAL	0	0	1316	5478	0	0	255	2796	0	0	0	0	0	3856	25964	1603	2784	0	0	0	0	0	0	44051
16 STM	0	0	0	0	0	391	0	391	0	0	0	0	0	0	791	38086	5040	0	0	0	0	0	0	44700
17 CHS	1216	0	842	6383	0	0	1271	0	0	0	0	0	0	833	222	3210	59964	0	0	0	0	0	0	73940
18 FAU	0	0	0	0	0	0	0	1038	2948	4497	0	0	0	0	0	0	0	17421	939	0	0	0	0	26843
19 STA	0	0	0	0	0	564	0	689	0	1741	0	0	0	0	0	0	0	0	49660	0	13824	0	0	66478
20 CL/JF	0	0	0	0	0	0	148	1204	0	830	0	0	0	0	0	0	0	78	0	17736	0	0	0	19996
21 SP/FB	0	0	0	0	0	0	0	0	0	2118	0	0	0	0	0	0	0	0	4096	0	58236	0	0	64450
22 KGEO	0	0	0	0	0	0	0	0	179	0	0	0	122	0	0	0	0	0	980	0	1533	2347	0	5160
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	42635	93680	463092	337543	5549	92549	61330	574941	123157	237048	106882	84466	144635	284465	28171	43185	86540	20565	56965	18118	76247	2741	0	2984505

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Difference (Est-Obs) Motorized Person

```
         DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
================================================================================================================================================================================
 1 DC CR | -1764    241   1184    835    225  -1137    212   1134     63     22      0      0     29     18      0      0     12      1      0      0      0      0      0 |   1075
 2 DC NC | -3360  -3784 -10343   -228    799  -2694   1621   5477     -0    179      3      0    455   -166      0      0   -706     11      0      0      0      0      0 | -12736
 3 MTG   |   160   1761  -9383  11815  -1262   -228    -62  -2084    -20  -2162    232    257   1526   -155      0      0   -778      1   -141      0      1      0      0 |   -523
 4 PG    |   659   6888   2576 -14394    361   1051   2325   5382    -23    -50   -271      1   1087  -8803   -374   -230  -9318      7      0      0      0   -198      0 | -13324
 5 ARLCR |   141    -48     43     41   -131   -491    340   1093     21     17      0      0      0      3      0      0      3      0      0      0      0      0      0 |   1031
 6 ARNCR | -1376    710    -66    663    177  -8567  -2182   2001     11    233    -87      0      6   -662      0     15     65      1      0      0      3      0      0 |  -9071
 7 ALX   |  -537      8   -265   -398    521   1998  -7823   2556    107    291      0      0      2     23      0      2    107      1      1      0      4      0      0 |  -3406
 8 FFX   |  3129   5315    950   3606    931   6111   5923 -26607  -7931  -7045    130      1    102    423      1     40    929     81   -459      2    327      0      0 | -14041
 9 LDN   |    54    672    300    586    171    203    579  -6254  -4799   -618   4404    127     56    145      0      0    166    181   -277   1054     47      0      0 |  -3206
10 PW    |   276    380    176    360    177    918   -528  -4753   1219 -10397     56      0     32     67      2     64    220  -1522    457      6  -1502   -197      0 | -14488
11 FRD   |    13     20   1758   -223      8     47   -225    795   1103     11 -13087   -649    906   -144      0      0      0      1      0     30      0      0      0 |  -9635
12 CAR   |     0   -668    379   -753      0      2     -0     44     80      0    491   -938   -847   -268      0      0      0      0      0      0      0      0      0 |  -2478
13 HOW   |  -342    -47    357   1464      7     34   -149    150     10      5    719   -106 -12143   3863      0      0     14      0      0      0      0      0      0 |  -6165
14 AAR   |   487    836   1850  -9495     80    383    422   1200     39   -158      4  -2147   -902  -9457   -586     59    127      0      0      0      0      0      0 | -17258
15 CAL   |   191    444  -1044  -2447     43    259     89  -1713     21     36      0      0     66  -2451    238   3129   -991      0      0      0      0      0      0 |  -4130
16 STM   |     8      4      5    196      5   -359     75   -125      0      4      0      0      1     12   -490   2876   -570      0      0      0      0      0      0 |   1642
17 CHS   | -1131    124   -805  -5017     29    182   -892   1219     26     36      0      0      4   -814    -51  -2473   3202      0      0      0      0      0      0 |  -6361
18 FAU   |    49     39     41     40      7     45     25    953  -2488  -1430      6      0      0      1      0      0      7   2592   -495     15    402      0      0 |   -191
19 STA   |    43     26     26     32     15   -449    180   1713     55   5984      0      0      0      1      0      0      8    231  -2865      0  -6692     10      0 |  -1683
20 CL/JF |     3      1    716      0      1     11      2   1051   4714    241   1112     55     82      3      0      0      0    104      0  -1722      0      0      0 |   6375
21 SP/FB |     3      0     16      1      7     66     93   1876     76   1017      0      0      0      0      0      0      0    149    403      0 -13138      3      0 |  -9427
22 KGEO  |     2      1      1     41      2     19     38    525      3    718      0      0      0   -122      3    113   1555     54    317      0   -129   1133      0 |   4274
23 EXTL  |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
================================================================================================================================================================================
 TOTAL  | -3292       -11529        2174         62        -7715       -6287       -9537       -1258        -5948       -3060       -20677        0 |
              12922        -13274      -2597      -14369      -13067      -3399      -18484       3580        1893        -616         753         -113726
```

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Ratio (Est/Obs) Motorized Person

```
         DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
================================================================================================================================================================================
 1 DC CR |  0.72   1.10   3.73 835.08 225.24   0.50   2.01   2.77  62.80  22.24   0.03      0  28.50   1.84      0      0  12.43   1.39      0      0      0      0      0 |   1.09
 2 DC NC |  0.82   0.95   0.64   0.99   7.96   0.66   2.71   2.00   1.00 179.33   2.95      0   5.15   0.82      0      0   0.28  10.60   0.16      0      0      0      0 |   0.92
 3 MTG   |  1.03   1.17   0.98   2.51   0.09   0.75   0.72   0.55   0.84   0.01   1.15 257.27   1.70   0.93      0      0   0.11   1.38   0.00   0.36   0.97      0      0 |   1.00
 4 PG    |  1.13   1.97   1.15   0.95 361.07   1.88  22.14   3.12   0.87   0.73   0.00   0.98   1.30   0.45   0.04   0.20   0.43   6.86   0.13      0      0      0      0 |   0.96
 5 ARLCR |  4.20   0.73  43.37  41.01   0.82   0.73 339.52  22.43  20.53  17.44   0.09      0   0.31   2.50      0      0   2.62   0.13   0.01      0   0.07      0      0 |   1.37
 6 ARNCR |  0.63   1.55   0.90   7.52   1.08   0.86   0.74   1.11   1.05 232.60   0.06      0   6.44   0.07      0   0.15  64.96   0.98   0.36      0   3.36      0      0 |   0.90
 7 ALX   |  0.59   1.01   0.31   0.58   4.54   1.49   0.79   1.20 106.95 291.04   0.31      0   1.92  22.67      0   1.81 106.55   0.71   0.71      0   3.70      0      0 |   0.94
 8 FFX   |  3.75  33.32   1.49   5.67   1.93   1.53   1.55   0.94   0.46   0.51 130.47   1.02 102.02 423.34   0.81  40.22   8.06  80.95   0.17   1.53 326.55      0      0 |   0.97
 9 LDN   |  1.12 671.88   1.76 585.50 170.73   1.20 578.57   0.72   0.95   0.69 4404.11 126.72  55.59 145.07      0   0.03 166.38 180.67   0.04   3.76  46.63      0      0 |   0.98
10 PW    |  5.67 380.45 176.11 360.28 176.76   3.00   0.75   0.83   6.79   0.95  55.66      0  32.25  67.05   1.51  64.32 219.94   0.50   2.48   6.11   0.43      0      0 |   0.94
11 FRD   | 13.44  19.79   1.34   0.15   8.43  46.88   0.02 794.94   1.97  10.51   0.87   0.87   6.01   0.45      0      0   0.15   0.81      0  29.68      0      0      0 |   0.92
12 CAR   |  0.11   0.00   1.91   0.02   0.42   1.81   0.03  44.29  79.99   0.05   1.57   0.99   0.62   0.30      0      0      0      0      0      0      0      0      0 |   0.97
13 HOW   |  0.22   0.86   1.10   1.37   7.48  33.53   0.08 149.69  10.38   4.72 719.37   0.94   0.90   1.45      0      0  14.18   0.01      0   0.12      0      0      0 |   0.96
14 AAR   | 487.18   3.96 1850.05  0.52  80.21   6.30 421.97   6.26  38.50   0.22   4.23   0.01   0.93   0.96   0.27  58.81   1.32   0.11   0.01      0      0      0      0 |   0.94
15 CAL   | 190.70 443.85   0.21   0.55  42.97 259.07   1.35   0.39  20.90  35.58      0      0  66.47   0.36   1.01   2.95   0.64   0.02      0      0      0      0      0 |   0.91
16 STM   |  7.55   4.21   4.84 195.88   4.96   0.08  75.41   0.68   0.07   4.44      0      0   0.93  11.78   0.38   1.08   0.89      0      0      0   0.06   0.18      0 |   1.04
17 CHS   |  0.07 123.70   0.21  0.10  28.92 182.15   1.72   8.09   4.92 240.87   2.34  55.07  82.02   3.35      0      0      0   2.33   0.21   0.90   0.25      0      0 |   0.91
18 FAU   | 49.43  39.12  40.69  40.36   6.76  45.05  24.99   1.92   0.16   0.68   6.20      0   0.37   0.78      0      0   6.78   1.15   0.47  14.50 401.95   0.09      0 |   0.99
19 STA   | 43.13  25.84  26.22  31.97  14.84   0.20 179.79   3.48  55.03   4.44      0      0      0   0.71      0      0   7.88 231.12   0.94      0   0.52   9.96      0 |   0.97
20 CL/JF |  2.72   1.24 715.74   0.28   1.27  10.59   1.72   8.09   4.92 240.87   2.34  55.07  82.02   3.35      0      0      0      0   0.24 148.77   1.10      0   0.77 |   1.32
21 SP/FB |  3.35   0.18  15.74   1.27   6.90  66.18  93.48 1876.26  76.35   1.48      0      0      0      0      0      0   0.24 148.77   1.10      0   0.77   3.06      0 |   0.85
22 KGEO  |  1.86   1.38   0.59  41.36   2.26  19.32  38.07 525.15   2.51   5.02      0      0      0   0.00   2.93 112.51 1555.09  53.70   1.32      0   0.92   1.48      0 |   1.83
23 EXTL  |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
================================================================================================================================================================================
 TOTAL  |  0.92        0.98        1.39        1.00         0.94        0.94         0.93        0.96         0.93        0.95         0.73         0 |
              1.14         0.96        0.97        0.98         0.94        0.96         0.94        1.08         1.09        0.97         1.27         0.96
```

Appendix B Year 2007 mode choice summary

```
        Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
        Purpose: Internal HBS Trips    MODE: Est Auto Occ.


             DESTINATION
    ORIGIN |    1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 |  TOTAL
   ============================================================================================================================================================
    1 DC CR| 1.36  1.29  1.50  1.46  1.45  1.37  1.42  1.62  1.74  1.73  1.50     0  1.69  1.69     0     0  1.64  2.04     0     0     0     0     0 |  1.41
    2 DC NC| 1.37  1.29  1.47  1.47  1.46  1.38  1.43  1.64  1.78  1.76  1.76     0  1.69  1.69     0     0  1.65  2.05  2.00     0     0     0     0 |  1.38
    3 MTG  | 1.14  1.49  1.47  1.48  1.98  1.56  1.52  1.55  1.64  1.64  1.52  1.53  1.52  1.52     0     0  1.54  2.19  1.50  1.57  1.67     0     0 |  1.47
    4 PG   | 1.16  1.53  1.52  1.47  2.02  1.68  1.61  1.62  1.82  1.74  2.18  1.69  1.55  1.54  1.57  1.57  1.51  2.45  1.86     0     0     0     0 |  1.48
    5 ARLCR| 1.38  1.34  1.31  1.25  1.56  1.39  1.35  1.32  1.41  1.37  1.13     0  1.19  1.26     0     0  1.24  1.44  1.00     0  1.00     0     0 |  1.38
    6 ARNCR| 1.41  1.34  1.37  1.32  1.56  1.38  1.34  1.34  1.42  1.37  1.37     0  1.31  1.34     0  1.00  1.33  1.51  1.09     0  1.14     0     0 |  1.37
    7 ALX  | 1.42  1.33  1.39  1.34  1.59  1.40  1.43  1.49  1.65  1.56  1.11     0  1.29  1.36     0  1.18  1.38  2.15  1.45     0  1.32     0     0 |  1.44
    8 FFX  | 1.50  1.31  1.53  1.57  1.59  1.38  1.47  1.58  1.60  1.60  1.68  1.67  1.67  1.68  1.80  1.69  1.65  1.64  1.66  1.68  1.67     0     0 |  1.56
    9 LDN  | 1.54  1.30  1.56  1.58  1.64  1.40  1.49  1.61  1.57  1.62  1.63  1.69  1.69  1.70     0  1.50  1.69  1.63  1.69  1.60  1.70     0     0 |  1.57
   10 PW   | 1.56  1.22  1.55  1.61  1.67  1.41  1.52  1.65  1.68  1.57  1.68     0  1.69  1.70     0     0  1.69  1.60  1.62  1.67  1.64     0     0 |  1.58
   11 FRD  | 1.19  1.66  1.60  1.61  2.20  1.85  1.87  1.86  1.68  2.13  1.48  1.51  1.64  1.63     0     0  1.67  2.25     0  1.54     0     0     0 |  1.50
   12 CAR  | 1.10  1.67  1.64  1.60  2.33  2.41  3.00  2.17  2.08  5.00  1.56  1.47  1.58  1.61     0     0     0     0     0     0     0     0     0 |  1.48
   13 HOW  | 1.17  1.60  1.53  1.50  2.13  1.76  1.68  1.72  1.87  2.33  1.53  1.50  1.47  1.49     0     0  1.60  0.01     0  1.71     0     0     0 |  1.48
   14 AAR  | 1.20  1.62  1.63  1.53  2.08  1.78  1.70  1.77  2.10  1.93  1.73  1.67  1.55  1.48  1.51  1.58  1.57  2.75  0.01     0     0     0     0 |  1.49
   15 CAL  | 1.21  1.63  1.73  1.56  2.11  1.83  1.74  1.82  2.20  1.95     0     0  1.75  1.58  1.48  1.52  1.61  2.00     0     0     0     0     0 |  1.51
   16 STM  | 1.12  1.67  2.29  1.65  2.35  2.20  1.97  2.04  3.50  2.29     0     0  2.66  2.19  1.57  1.48  1.60     0     0     0  1.50  1.64     0 |  1.49
   17 CHS  | 1.19  1.64  1.78  1.53  2.10  1.79  1.67  1.72  2.18  1.88     0     0  2.04  1.74  1.50  1.50  1.48  2.80  0.01     0  1.50  1.59     0 |  1.48
   18 FAU  | 1.59  1.37  1.63  1.64  1.69  1.45  1.60  1.76  1.74  1.67  1.69     0  1.68  1.70     0     0  1.72  1.58  1.62  1.64  1.63  1.80     0 |  1.60
   19 STA  | 1.60  1.35  1.74  1.66  1.80  1.50  1.63  1.83  2.23  1.65     0     0     0  1.69     0     0  1.70  1.74  1.56     0  1.58  1.59     0 |  1.58
   20 CL/JF| 1.63  1.35  1.95  1.75  2.19  1.73  1.85  1.99  1.81  1.92  1.72  1.86  2.08  2.18     0     0     0  1.79  1.62  1.56  1.67     0     0 |  1.66
   21 SP/FB| 1.75  1.33  2.58  1.71  2.17  1.65  1.80  2.06  2.44  1.82     0     0     0     0     0     0  3.00  1.98  1.62     0  1.57  1.65     0 |  1.60
   22 KGEO | 1.81  1.38  2.81  1.83  2.22  1.76  1.86  2.19  2.46  1.97     0     0     0  2.71  1.81  1.72  1.76  2.19  1.67     0  1.65  1.56     0 |  1.69
   23 EXTL |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |     0
   ============================================================================================================================================================
    TOTAL    1.32        1.48        1.59        1.45        1.59        1.49        1.49        1.48        1.50        1.57        1.57        1.56     0 |
                   1.35        1.48        1.39        1.58        1.58        1.47        1.48        1.48        1.59        1.57              1.56            1.50
```

```
        Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
        Purpose: Internal HBS Trips    MODE: Obs Auto Occ.


             DESTINATION
    ORIGIN |    1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 |  TOTAL
   ============================================================================================================================================================
    1 DC CR| 1.28  1.25  1.00     0     0  1.00  2.00  1.18     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  1.21
    2 DC NC| 1.40  1.25  1.83  1.20  1.00  1.43  1.26  1.56  1.35     0     0     0  1.00  1.65     0     0  2.75     0     0     0     0     0     0 |  1.37
    3 MTG  | 1.07  1.37  1.41  1.45  2.00  1.41  1.00  1.55  1.00  3.50  1.53     0  1.81  2.50     0     0  2.00     0  1.00     0     0     0     0 |  1.42
    4 PG   | 1.09  1.37  1.45  1.46     0  2.48  1.00  1.20  1.00  1.00  1.00     0  1.94  1.54  1.00  1.00  1.73     0     0     0     0  1.00     0 |  1.46
    5 ARLCR|    0  1.00     0     0  1.52  1.16     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  1.24
    6 ARNCR| 1.34  1.20  1.00  1.00  1.99  1.42  1.44  1.41  2.00     0  1.00     0     0  3.50     0     0     0     0     0     0     0     0     0 |  1.43
    7 ALX  | 1.51  1.59  1.00  1.79  1.00  1.34  1.25  1.40     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  1.30
    8 FFX  | 2.25  1.00  1.15  1.00  1.00  1.45  1.41  1.53  1.62  1.98     0     0     0     0     0     0  1.00     0  1.00     0     0     0     0 |  1.53
    9 LDN  | 1.00     0  1.00     0     0  1.25     0  1.54  1.54  2.00     0     0     0     0     0     0     0     0  2.00  1.00     0     0     0 |  1.56
   10 PW   |    0     0     0     0     0  1.00  1.54  2.05  1.00  1.67     0     0     0     0     0     0     0  2.62  1.00     0  3.50  2.00     0 |  1.72
   11 FRD  |    0     0  1.66  2.00     0     0  1.00     0  1.40     0  1.49  1.35  1.00  2.00     0     0     0     0     0     0     0     0     0 |  1.49
   12 CAR  |    0  3.50  2.00  2.64     0     0     0     0     0     0  1.30  1.53  1.42  1.00     0     0     0     0     0     0     0     0     0 |  1.54
   13 HOW  | 1.00  1.00  1.55  1.25     0     0  1.00     0     0     0     0     0  1.36  1.50  2.09     0     0     0     0     0     0     0     0 |  1.51
   14 AAR  |    0  1.00     0  1.57     0  1.00     0  1.00     0  1.00     0  2.00  2.56  1.51  1.00     0  1.00     0     0     0     0     0     0 |  1.54
   15 CAL  |    0     0  3.50  1.58     0     0  1.00  2.85     0     0     0     0     0  1.59  1.52  1.60  1.63     0     0     0     0     0     0 |  1.62
   16 STM  |    0     0     0     0     0  1.00     0  1.00     0     0     0     0     0     0  1.50  1.45  2.45     0     0     0     0     0     0 |  1.51
   17 CHS  | 2.00     0  1.71  1.30     0     0  1.60     0     0     0     0     0     0  1.36  1.00  1.66  1.50     0     0     0     0     0     0 |  1.49
   18 FAU  |    0     0     0     0     0     0     0     0  1.00  2.55  1.24     0     0     0     0     0     0  1.47  1.63     0     0     0     0 |  1.47
   19 STA  |    0     0     0     0     0  2.00     0  1.90     0  1.00     0     0     0     0     0     0     0     0  1.82     0  1.65     0     0 |  1.75
   20 CL/JF|    0     0     0     0     0     0     0  1.00  2.22     0  1.35     0     0     0     0     0     0  1.00     0  1.32     0     0     0 |  1.35
   21 SP/FB|    0     0     0     0     0     0     0     0     0  1.59     0     0     0     0     0     0     0     0  1.18     0  1.63     0     0 |  1.59
   22 KGEO |    0     0     0     0     0     0     0     0  1.00     0     0     0  1.00     0     0     0     0     0  1.71     0  1.53  1.21     0 |  1.35
   23 EXTL |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |     0
   ============================================================================================================================================================
    TOTAL    1.30        1.43        1.58        1.31        1.59        1.48        1.57        1.48        1.59        1.73        1.66     0 |
                   1.27        1.44        1.41        1.54        1.68        1.52        1.53        1.47        1.57        1.31              1.22            1.50
```

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Est Pct. Tran

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	9.4	12.7	10.1	2.0	10.3	17.1	10.0	2.0	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	9.3
2 DC NC	13.8	6.7	6.8	2.8	4.7	10.2	6.3	0.9	0	0.4	0	0	0.1	0.0	0	0	0.1	0	0	0	0	0	0	6.6
3 MTG	4.0	1.2	1.2	0.4	24.3	4.2	0.4	0	0	16.3	0	0	0.1	0.0	0	0	0	0	0	0	0	0	0	1.2
4 PG	4.5	2.2	2.3	0.7	12.0	4.0	0.8	0.1	0	1.3	0	0	0.2	0.1	0	0	0.0	0	0	0	0	0	0	0.9
5 ARLCR	18.6	2.3	2.2	0	0.6	8.3	3.6	1.3	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	4.7
6 ARNCR	7.1	0.4	0.3	0	2.8	2.2	2.3	1.3	0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.1
7 ALX	5.6	0.1	0.1	0	1.3	2.6	1.3	1.2	0	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4
8 FFX	1.8	0.2	0.9	0.5	0.2	0.7	0.6	0.4	0.2	1.0	3.7	0	9.9	2.0	88.9	80.8	2.2	0	0.0	0	0.5	0	0	0.4
9 LDN	0.2	0	0	0	0	0	0	0.1	0.1	1.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
10 PW	5.3	7.6	37.6	13.6	6.5	6.2	4.1	2.5	3.5	0.2	19.6	0	80.4	37.1	100.0	100.0	23.0	0	0.0	0	0.3	0	0	0.7
11 FRD	0.1	0	0	0	0	0	0	0.0	0	4.8	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0.1
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0.2	0	0.0	0.1	0	0	0	0.9	0	80.3	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.0
14 AAR	0.4	0.0	0.0	0.0	0	0.0	0.0	0.4	0	13.5	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.0
15 CAL	0.1	0.0	0	0	0	0.0	0	0.0	0	2.7	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0	0.0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0.0
17 CHS	0	0	0	0.0	0	0	0	0.0	0	2.7	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0.2
18 FAU	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
19 STA	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	11.6	77.8	14.9	52.8	1.7	1.1	0.7	0.7	0	0.0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.0
22 KGEO	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8.3	5.0	1.5	0.8	3.0	2.7	1.5	0.5	0.1	0.2	0.1	0	0.1	0.0	0.0	0.2	0.2	0	0.0	0	0.0	0	0	0.9

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBS Trips   MODE: Obs Pct. Tran

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	4.2	30.7	19.3	0	0	22.6	0	0	0	0	0	0	0	100.0	0	0	0	0	0	0	0	0	0	13.1
2 DC NC	12.3	5.9	3.1	5.0	0	12.9	0	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.1
3 MTG	4.0	2.1	1.2	1.0	0	6.5	8.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2
4 PG	8.1	8.3	3.6	0.7	0	7.6	0	2.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1
5 ARLCR	100.0	40.4	0	0	0	10.3	0	100.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12.6
6 ARNCR	4.5	0	0	0	1.0	1.5	0	1.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5
7 ALX	0	4.1	8.3	0	0	9.9	1.1	1.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.9
8 FFX	11.6	23.1	0	0	2.1	2.1	1.6	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7
9 LDN	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
10 PW	100.0	0	0	0	0	4.4	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
11 FRD	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0.1
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
14 AAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 FAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8.2	6.2	1.4	0.8	0.8	3.7	0.9	0.7	0	0.0	0.1	0	0	0.0	0	0	0	0	0	0	0	0	0	0.9

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Est Transit

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	5246	2551	744	106	590	863	213	244	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10558
2 DC NC	27440	31238	5490	1648	1663	2487	805	776	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	71559
3 MTG	4737	2353	23963	576	484	222	19	48	0	54	0	0	4	0	0	0	0	0	0	0	0	0	0	32460
4 PG	9305	5500	3020	8487	1011	776	244	143	0	45	0	0	25	8	0	0	1	0	0	0	0	0	0	28567
5 ARLCR	820	70	22	2	60	309	70	90	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1443
6 ARNCR	6374	432	82	9	507	4477	733	861	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	13495
7 ALX	1955	151	21	2	178	876	2165	542	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	5904
8 FFX	5045	519	133	43	479	1764	1282	5911	21	299	2	0	4	2	8	22	7	0	0	0	12	0	0	15552
9 LDN	138	7	2	0	8	16	1	44	270	70	0	0	0	0	0	0	0	0	0	0	0	0	0	556
10 PW	238	126	164	86	47	148	137	875	64	1015	5	0	9	4	15	41	13	0	0	0	24	0	0	3011
11 FRD	3	0	1	0	1	0	0	2	0	4	354	0	0	0	0	0	0	0	0	0	0	0	0	365
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	71	11	14	15	12	5	0	25	0	45	0	0	163	2	0	0	0	0	0	0	0	0	0	363
14 AAR	288	35	10	15	80	36	3	99	0	62	0	0	6	19	0	0	0	0	0	0	0	0	0	654
15 CAL	3	0	0	0	1	1	0	1	0	2	0	0	0	0	17	0	0	0	0	0	0	0	0	25
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	26	2	0	0	0	0	0	0	29
17 CHS	42	5	0	1	18	10	3	8	0	18	0	0	0	0	0	0	248	0	0	0	0	0	0	353
18 FAU	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
19 STA	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	2	1	3	0	1	2	2	15	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	27
22 KGEO	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	61707	43000	33668	10988	5140	11992	5677	9690	355	1663	361	0	213	35	41	90	270	0	0	0	36	0	0	184926

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Obs Transit

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	4845	4851	607	295	48	1504	104	231	0	0	0	0	0	194	28	0	0	0	0	0	0	0	0	12707
2 DC NC	27630	31395	4258	2315	316	2980	387	469	22	31	0	0	33	143	0	0	0	0	0	0	22	0	0	70001
3 MTG	9572	5574	20047	1266	224	1185	46	56	45	19	0	0	42	178	0	0	0	0	0	0	0	0	0	38254
4 PG	5032	5555	2838	10179	125	621	76	177	37	0	3	0	10	56	0	0	0	0	0	0	0	0	0	24709
5 ARLCR	682	126	10	0	0	263	54	122	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1297
6 ARNCR	6254	1983	262	135	503	2621	367	921	35	4	0	0	0	46	0	0	0	15	0	29	0	0	0	13175
7 ALX	1882	657	154	44	72	631	2035	537	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6012
8 FFX	4709	1791	323	183	232	1637	1123	7100	120	27	0	0	0	23	0	0	0	29	0	0	0	0	0	17297
9 LDN	116	13	0	0	0	0	0	48	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	189
10 PW	396	226	21	0	0	162	0	165	0	630	0	0	0	0	0	0	0	0	0	0	0	0	0	1600
11 FRD	99	65	57	15	0	0	0	0	0	0	611	0	0	0	0	0	0	0	0	0	0	0	0	847
12 CAR	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
13 HOW	149	33	32	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	245
14 AAR	419	204	17	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	643
15 CAL	64	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89
16 STM	0	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77
17 CHS	132	192	0	3	37	85	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	462
18 FAU	47	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82
19 STA	33	0	0	0	0	92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125
20 CL/JF	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
21 SP/FB	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	62084	52797	28626	14473	1582	11812	4192	9839	311	711	614	0	85	640	28	0	0	44	0	29	22	0	0	187889

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Difference (Est-Obs) Transit

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	401	-2300	137	-189	542	-641	109	13	0	1	0	0	0	-194	-28	0	0	0	0	0	0	0	0	-2149
2 DC NC	-190	-157	1232	-667	1347	-493	418	307	-22	-19	0	0	-33	-143	0	0	0	0	0	0	-22	0	0	1558
3 MTG	-4835	-3221	3916	-690	260	-963	-27	-8	-45	35	0	0	-38	-178	0	0	0	0	0	0	0	0	0	-5794
4 PG	4273	-55	182	-1692	886	155	168	-34	-37	45	-3	0	15	-48	0	0	1	0	0	0	0	0	0	3858
5 ARLCR	138	-56	12	2	60	46	16	-32	-40	1	0	0	0	0	0	0	0	0	0	0	0	0	0	146
6 ARNCR	120	-1551	-180	-127	4	1856	366	-60	-35	16	0	0	0	-46	0	0	0	-15	0	-29	0	0	0	320
7 ALX	73	-506	-133	-42	106	245	130	5	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	-108
8 FFX	336	-1272	-190	-140	247	127	159	-1189	-99	272	2	0	4	-21	8	22	7	-29	0	0	12	0	0	-1745
9 LDN	22	-6	2	0	8	16	1	-4	258	70	0	0	0	0	0	0	0	0	0	0	0	0	0	367
10 PW	-158	-100	143	86	47	-14	137	710	64	385	5	0	9	4	15	41	13	0	0	0	24	0	0	1411
11 FRD	-96	-65	-56	-15	1	0	0	2	0	4	-257	0	0	0	0	0	0	0	0	0	0	0	0	-483
12 CAR	-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-23
13 HOW	-78	-22	-18	15	12	-26	0	25	0	45	0	0	163	2	0	0	0	0	0	0	0	0	0	118
14 AAR	-131	-169	-7	12	80	36	3	99	0	62	0	0	6	19	0	0	0	0	0	0	0	0	0	11
15 CAL	-61	0	0	0	-24	1	0	1	0	2	0	0	0	0	17	0	0	0	0	0	0	0	0	-64
16 STM	0	-77	0	0	0	0	0	0	0	0	0	0	0	0	1	26	2	0	0	0	0	0	0	-48
17 CHS	-90	-187	0	-2	-19	-75	3	-5	0	18	0	0	0	0	0	0	248	0	0	0	0	0	0	-109
18 FAU	-47	0	0	-35	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-78
19 STA	-33	0	0	0	0	-92	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-123
20 CL/JF	0	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-14
21 SP/FB	2	-40	3	0	1	2	2	15	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-14
22 KGEO	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	-377	-9797	5042	-3485	3558	180	1485	-149	44	952	-253	0	128	-605	13	0	0	-44	0	-29	14	0	0	-2963

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Ratio (Est/Obs) Transit

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1.08	0.53	1.23	0.36	12.29	0.57	2.05	1.06	0	1.22	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0.83
2 DC NC	0.99	0.99	1.29	0.71	5.26	0.83	2.08	1.66	0	0.39	0	0	0.01	0	0	0	0	0	0	0	0	0	0	1.02
3 MTG	0.49	0.42	1.20	0.45	2.16	0.19	0.42	0.85	0	2.83	0.03	0	0.11	0.00	0	0	0	0	0	0	0	0	0	0.85
4 PG	1.85	0.99	1.06	0.83	8.09	1.25	3.21	0.81	0	45.40	0	0	2.55	0.15	0	0	1.29	0	0	0	0	0	0	1.16
5 ARLCR	1.20	0.55	2.17	2.03	59.53	1.17	1.30	0.74	0	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	1.11
6 ARNCR	1.02	0.22	0.31	0.06	1.01	1.71	2.00	0.94	0	4.90	0	0	0	0	0	0	0	0	0	0	0	0	0	1.02
7 ALX	1.04	0.23	0.14	0.04	2.47	1.39	1.06	1.01	0	13.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0.98
8 FFX	1.07	0.29	0.41	0.23	2.06	1.08	1.14	0.83	0.17	11.07	2.29	0	4.03	0.08	7.88	22.06	6.50	0	0.13	0	11.97	0	0	0.90
9 LDN	1.19	0.53	1.83	0.02	7.76	15.60	1.19	0.92	22.48	70.33	0	0	0	0	0	0	0	0	0	0	0	0	0	2.94
10 PW	0.60	0.56	7.79	85.93	46.86	0.92	136.55	5.30	64.49	1.61	4.57	0	9.19	4.07	15.03	40.89	12.88	0	0.27	0	24.05	0	0	1.88
11 FRD	0.03	0.00	0.01	0	0.87	0.32	0	1.55	0	3.90	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0.43
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0.48	0.33	0.42	15.33	12.24	0.16	0.09	24.92	0	44.63	0	0	163.29	1.74	0	0	0	0	0	0	0	0	0	1.48
14 AAR	0.69	0.17	0.57	5.04	80.17	35.50	3.45	98.63	0	62.25	0	0	6.11	19.08	0.20	0	0	0	0	0	0	0	0	1.02
15 CAL	0.05	0.42	0.03	0	0.04	0.51	0.07	0.68	0	1.70	0	0	0	0	17.17	0	0	0	0	0	0	0	0	0.28
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.61	26.35	1.89	0	0	0	0	0	0	0.37
17 CHS	0.32	0.03	0.40	0.20	0.49	0.12	2.59	0.61	0	18.37	0	0	0	0	0	0.32	247.56	0	0	0	0	0	0	0.76
18 FAU	0.00	0	0	0	0	0	0	3.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05
19 STA	0	0	0	0	0	0	0	1.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	1.72	0.02	3.26	0.20	0.58	1.65	1.62	15.00	0	1.30	0	0	0	0	0	0	0	0	0	0	0.29	0	0	0.65
22 KGEO	0	0	0	0	0	0	0	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.87
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.99	0.81	1.18	0.76	3.25	1.02	1.35	0.98	1.14	2.34	0.59	0	2.50	0.05	1.46	0	0	0	0	0	1.65	0	0	0.98

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips    MODE: Est Auto Person

          DESTINATION
ORIGIN |    1       2       3       4       5       6       7       8       9      10      11      12      13      14      15      16      17      18      19      20      21      22     23 |  TOTAL
=========================================================================================================================================================================================================
 1 DC CR| 12820    8039    3100    1514     691    1850    1004    3223      88      22       0       0      40      48       1       1      26       5      13       0       5       0      0 |  32490
 2 DC NC| 42118  205968   37806   26233    3964   10123    6506   19817     550     199      28       6     734     782      44      23     349      31     100       0      47       3      0 | 355432
 3 MTG  | 21895   47932  901621   37394    1024    3431    1419   10581     530      74    5661    1759    7889    5049     121      92     377      53     195     307     266      22      0 |1047692
 4 PG   | 31201   76731   56695  528413    2412    7413    9207   22488     489     305      10      20    9404   12431    1497     921   11167      39     246       0     115     148      0 | 771352
 5 ARLCR|   273     624     230      98    1625    1855     640    1826      49      31       0       0       0       1       0       0       1       1       6       0       4       0      0 |   7264
 6 ARNCR|  8466   10251    3214    1976   10237   98511   13518   34310     704     587       2       0       5      29       1       7      37      29     157       0     144       6      0 | 182189
 7 ALX  |  4049    4632     949    1549    3803   11447   62593   24424     301     636       0       0       2      14       2      10      72      13     176       0     143      10      0 | 114824
 8 FFX  | 24196   28323   12043   11066   10730   40231   42860  961546   17782   17396     105      17      80     295      56     153     689    1237    4278     179    4693     270      0 |1178225
 9 LDN  |  2254    2406    1784     938     648    2062    1165   27281  213041    2182    2327     229      23      69       4       1      55    1007     354    8825     534      28      0 | 267218
10 PW   |  1648    1561     483     483     731    2358    3055   41366    3059  338802      11       2       1      10       1       5      40    5563    9826     117    6726     244      0 | 416092
11 FRD  |   230     311   20570     119     152     542     174    5392    7678      82  189652    7470    2560     235       0       0       1      21       1    2779       1       0      0 | 237970
12 CAR  |    32      66    6146      94      25      88      20     695     540       3    2992  140003    5025     241       0       0       0      54       0       0       0       0      1 | 156024
13 HOW  |   812    1930   11009    8441     126     308     188    1158      94       9    1388    4191  237359   16576      24       7      47       1       2      81       5       2      0 | 283757
14 AAR  |  3037    5690    7581   18358     743    1935    1706    5400     260     134      35     118   21771  463315    3008     274     519       5      28       2      16      14      0 | 533949
15 CAL  |   384     559     367    1507     150     422     610    1630      28      28       0       0      47    1029   89242    2044     769       0       2       0       1      13      0 |  98833
16 STM  |   333     440     151    1398     159     476    1103    2423      28      40       0       0      12     115    4523   78487    7235       1      25       0      34     239      0 |  97223
17 CHS  |  1005    1407     492    4269     396    1240    2281    6361     147     161       0       0      33     109    1781    2444  113999       3      30       0      31     694      0 | 136881
18 FAU  |    60      34      15       9      17      46      32    2421     688    2630       2       0       2       0       0       0       3   42520    1213     123     712      23      0 |  50552
19 STA  |    55      27      29       3      44     165     245    3109      90    4638       0       0       0       0       0       0       1     728   84964       0   15127     332      0 | 109558
20 CL/JF|     6      11    1153       2       9      31       6    3004    8004     293     718      15      72       2       0       0       0     420       1   41774       2       0      1 |  55523
21 SP/FB|    22       8      33       0      33     145     204    2933      81    2156       0       0       0       0       0       0       0     267   11920       0   96550     145      0 | 114496
22 KGEO |     3       3       2      16       8      32      53     680       5     596       0       0       0       0       2       6     203      63    2225       0    1806   15289      0 |  20992
23 EXTL |     0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0      0 |      0
=========================================================================================================================================================================================================
 TOTAL  154898         1065472   37727         148587          254236          202930          285056          100306          135590          115763          126960        0 |
               396954          643880          184712         1182069          371004          153829          500352           84475           52009           54242           17482       6268535
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips    MODE: Obs Auto Person

          DESTINATION
ORIGIN |    1       2       3       4       5       6       7       8       9      10      11      12      13      14      15      16      17      18      19      20      21      22     23 |  TOTAL
=========================================================================================================================================================================================================
 1 DC CR|  5514    8325     623     696       0     769     769     770       0       0       0       0     412     377       0       0       0       0       0       0       0       0      0 |  18255
 2 DC NC| 56616  193732   43263   13631      57    4669    2177   11817    3290     365       0       0     212     569     199       0     199       0       0       0     199       0      0 | 330996
 3 MTG  | 18969   45662  887958   19749     350    1499    2387   15983    4567       0    4059     477    5975    4173       0       0     233       0       0    2174       0       0      0 |1014214
 4 PG   | 21472   60268   61022  513883       0    5911    4315    6063    2241     682       0     533    8049   22096    5395       0   10517       0       0       0       0       0      0 | 722447
 5 ARLCR|     0     207     103       0     404    1610     202     788       0       0       0       0       0     221       0       0       0       0       0       0       0       0      0 |   3534
 6 ARNCR| 13108    6055    3201     406    5911  108180    8237   27880     307     207       0       0     547       0       0       0     519     102       0       0       0       0      0 | 174660
 7 ALX  |  4326    3536     932     340    1189    9794   70887   25179     719       0       0       0       0    1262       0       0       0     262       0       0       0       0      0 | 118426
 8 FFX  | 15905   10397   13531    4324    1305   36019   34207  992161   24823   16917     977       0     235     381       0       0       0       0    1930     939     237       0      0 |1154288
 9 LDN  |  2389     594    2441       0       0    2428     909   33569  207612     255    1314       0       0     292       0       0       0    2119       0     255       0       0      0 | 254177
10 PW   |   755     455    1445     185     301    7174    4039   35589    4448  343810       0       0       0       0       0     196       0    2018     651       0       0       0      0 | 401068
11 FRD  |  1120    1646   13060     506     372       0     361     629     702       0  191451   10441    4927    3035       0       0       0       0       0     396       0       0      0 | 228645
12 CAR  |     0       0    1703     917       0       0       0     100       0       0    1772  138328    6934     491       0       0       0       0       0       0       0       0      0 | 150244
13 HOW  |   494    1398    8104    9156       0     911     163     674       0       0     163    2191  231964   13605       0       0     138     571       0       0       0       0      0 | 269533
14 AAR  |   859    6616   14482   23154      83     445      71    2753       0       0     445       0   22879  452969    2545       0     680       0       0       0       0       0      0 | 527982
15 CAL  |  1238     509       0    1971       0       0       0       0       0       0       0       0     239    1866   78756    3119     899       0       0       0       0       0      0 |  88596
16 STM  |   286     444       0    2170       0       0       0       0       0       0       0       0       0     527    5373   76506    4966       0     460       0       0       0      0 |  90733
17 CHS  |  2136    3374     289   11144    1807    1259     185     437     251       0       0       0     145     501    1734    2669  103588       0       0       0     290     290      0 | 130101
18 FAU  |     0     565     333       0     408       0       0    2002    1321    3854       0       0       0       0       0       0       0   36494       0    2418       0       0      0 |  47395
19 STA  |     0       0     131       0     124     442       0     911       0    4943       0       0       0       0       0       0       0       0   63614       0   32457       0      0 | 102623
20 CL/JF|     0       0     157       0       0       0       0     808    5567      78     653       0      78       0       0       0       0       0       0   46420       0       0      0 |  53762
21 SP/FB|     0       0     296       0    1075       0       0     732       0    4730       0       0       0       0       0     615       0       0   12095     615   83652     257      0 | 104067
22 KGEO |     0     161       0       0       0       0     118       0       0       0       0       0       0       0       0       0       0       0    3016       0    3052   15186      0 |  21533
23 EXTL |     0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0      0 |      0
=========================================================================================================================================================================================================
 TOTAL  145187         1053075   13388         128909          255850          200832          282596           94002          121739           81766          122062        0 |
               343943          602232          181111         1158963          375841          151970          502365           83106           41564           51044           15733       6007278
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Difference (Est-Obs) Auto Person

          DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
===============================================================================================================================================================================
 1 DC CR|  7306   -286   2477    818    691   1081    235   2453     88     22      0      0   -372   -330      1      1     26      5     13      0      5      0      0 |  14235
 2 DC NC|-14498  12236  -5457  12603   3907   5454   4329   8000  -2739   -166     28      6    522    213   -156     23    150     31    100      0   -153      3      0 |  24436
 3 MTG  |  2926   2270  13662  17645    674   1932   -968    595  -5402  -4037     74   1602   1282   1914    876    121     92    145     53    195    307  -1909     22      0 |  33477
 4 PG   |  9729  16463  -4327  14531   2412   1502   4892  16425  -1752   -377     10   -513   1355  -9664  -3898    921    650     39    246      0    115    148      0 |  48905
 5 ARLCR|   273    417    127     98   1221    245    438   1038     49     31      0      0      0   -220      0      0      1      1      6      0      4      0      0 |   3730
 6 ARNCR| -4643   4196     13   1570   4326  -9669   5280   6430    397    381      2      0   -542     29      1      7   -482    -73    157      0    144      6      0 |   7529
 7 ALX  |  -276   1096     16   1209   2614   1653  -8294   -756   -418    636      0      0      2  -1248      2     10     72   -248    176      0    143     10      0 |  -3602
 8 FFX  |  8291  17927  -1488   6742   9425   4213   8653 -30614  -7041    478   -872     17   -155    -87     56    153    689   1237   2349   -760   4456    270      0 |  23938
 9 LDN  |  -135   1811   -658    938    648   -366    256  -6288   5430   1927   1013    229     23   -223      4      1     55  -1112    354   8570    534     28      0 |  13041
10 PW   |   893   1106   -962    298    430  -4817   -984   5777  -1389  -5008     11      2      1     10      1   -191     40   3545   9174    117   6726    244      0 |  15024
11 FRD  |  -890  -1335   7509   -386   -220    542   -187   4764   6976     82  -1799  -2971  -2367  -2800      0      0      1     21      1   2383      1      0      0 |   9325
12 CAR  |    32     66   4443   -823     25     88     20    595    540      3   1220   1675  -1909   -250      0      0      0      0     54      0      0      0      0 |   5780
13 HOW  |   318    532   2905   -715    126   -604     25    484     94      9   1225   1999   5395   2970     24      7    -91   -570      2     81      5      2      0 |  14224
14 AAR  |  2177   -925  -6901  -4796    660   1490   1634   2647    260    134   -409    118  -1108  10346    462    274   -161      5     28      2     16     14      0 |   5967
15 CAL  |  -854     50    367   -464    150    422    610   1630     28     28      0      0   -193   -837  10486  -1075   -129      0      2      0      1     13      0 |  10237
16 STM  |    48     -5    151   -772    159    476   1103   2423     28     40      0      0     12   -412   -850   1981   2269      1   -435      0     34    239      0 |   6490
17 CHS  | -1131  -1967    203  -6876  -1411    -20   2096   5923   -104    161      0      0   -112   -393     47   -226  10411      3     30      0   -259    404      0 |   6780
18 FAU  |    60   -531   -318      9   -391     46     32    419   -633  -1225      2      0      0      2      0      0      3   6026   1213  -2295    712     23      0 |   3157
19 STA  |    55     27   -101      3    -80   -276    245   2197     90   -306      0      0      0      0      0      0      1    728  21350      0 -17330    332      0 |   6935
20 CL/JF|     6     11    997      2      9     31      6   2196   2437    214     65     15     -6      2      0      0    420      1  -4646      2      0              |   1761
21 SP/FB|    22      8   -263      0  -1042    145    204   2201     81  -2573      0      0      0   -615      0    267   -175   -615  12897   -113      0              |  10430
22 KGEO |     3   -157      2     16      8     32     53    562      5    596      0      0      0      0      2      6    203     63   -791      0  -1246    103      0 |   -540
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
===============================================================================================================================================================================
 TOTAL    9711         12397         24340         19678         -1613         2098         2460         6304        13852        33997                4898           0 |
                 53011         41647          3601         23107         -4837         1859        -2014         1369        10445         3198         1749        261258
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Ratio (Est/Obs) Auto Person

          DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
===============================================================================================================================================================================
 1 DC CR|  2.32   0.97   4.98   2.17 691.18   2.41   1.31   4.19  87.97  22.46   0.25   0.01   0.10   0.13   1.47   1.36  26.34   4.55  12.70      0   4.76   0.15      0 |   1.78
 2 DC NC|  0.74   1.06   0.87   1.92  69.03   2.17   2.99   1.68   0.17   0.54  27.74   6.11   3.46   1.37   0.22  22.65   1.75  31.29 100.23   0.32   0.23   3.21      0 |   1.07
 3 MTG  |  1.15   1.05   1.02   1.89   2.92   2.29   0.59   0.66   0.12  73.84   1.39   3.69   1.32   1.21 120.89  92.21   1.62  53.07 194.91 306.81   0.12  22.13      0 |   1.03
 4 PG   |  1.45   1.27   0.93   1.03 2412.06  1.25   2.13   3.71   0.22   0.45   9.69   0.04   1.17   0.56   0.28 920.78   1.06  38.65 246.25      0 114.75 147.82      0 |   1.07
 5 ARLCR|273.19   3.02   2.23  98.19   4.02   1.15   3.17   2.32  48.51  31.43      0      0   0.30   0.00      0   0.13   0.89   1.39   5.66      0   4.06   0.13      0 |   2.06
 6 ARNCR|  0.65   1.69   1.00   4.87   1.73   0.91   1.64   1.23   2.29   2.84   2.43   0.03   0.01  28.57   1.11   6.76   0.07   0.28 156.78   0.15 143.92   6.25      0 |   1.04
 7 ALX  |  0.94   1.31   1.02   4.56   3.20   1.17   0.88   0.97   0.42 636.11   0.03      0   1.68   0.01   2.40   9.68  71.85   0.05 175.84      0 142.56   9.50      0 |   0.97
 8 FFX  |  1.52   2.72   0.89   2.56   8.22   1.12   1.25   0.97   0.72   1.03   0.11  16.79   0.34   0.77  55.59 153.00 689.28 1237.28  2.22   0.19  19.79 269.51      0 |   1.02
 9 LDN  |  0.94   4.05   0.73 937.51 647.50   0.85   1.28   0.81   1.03   8.56   1.77 229.32  23.27   0.24   3.53   1.31  55.36   0.48 354.30  34.61 533.70  27.92      0 |   1.05
10 PW   |  2.18   3.43   0.33   2.61   2.43   0.33   0.76   1.16   0.69   0.99  11.01   1.50   0.69  10.45   1.21   0.03  39.64   2.76  15.09 116.71 6726.16 244.01     0 |   1.04
11 FRD  |  0.21   0.19   1.57   0.24   0.41 542.43   0.48   8.58  10.93  81.94   0.99   0.72   0.52   0.08   0.15      0   0.57  20.75   1.49   7.02   1.11      0      0 |   1.04
12 CAR  | 32.26  66.07   3.61   0.10  25.16  88.01  20.04   6.98 540.25   2.76   1.69   1.01   0.72   0.49      0      0   0.44   0.01  53.53      0      0      0      0 |   1.04
13 HOW  |  1.64   1.38   1.36   0.92 125.57   0.34   1.15   1.72  93.81   9.40   8.52   1.91   1.02   1.22  23.98   7.14   0.34   0.00   2.13  81.14   4.73   2.25      0 |   1.05
14 AAR  |  3.53   0.86   0.52   0.79   8.93   4.35  23.87   1.96 260.06 133.74   0.08 118.41   0.95   1.02   1.18 273.54   0.76   5.19  28.11   2.48  16.14  14.08      0 |   1.01
15 CAL  |  0.31   1.10 366.87   0.76 150.48 421.74 609.85 1630.27 27.50  28.46      0   0.03   0.19   0.55   1.13   0.66   0.86   0.43   2.33      0   1.31  13.22      0 |   1.12
16 STM  |  1.17   0.99 151.01   0.64 159.29 476.47 1102.73 2423.37 28.19  39.95      0      0  11.93   0.22   0.84   1.03   1.46   0.94   0.05      0  33.69 239.44      0 |   1.07
17 CHS  |  0.47   0.42   1.70   0.38   0.22   0.98  12.34  14.55   0.59 161.06      0      0   0.23   0.22   1.03   0.92   1.10   3.36  29.92      0   0.11   2.39      0 |   1.05
18 FAU  | 59.83   0.06   0.05   8.79   0.04  45.57  32.06   1.21   0.52   0.68   2.10   0.18   0.42   2.09   0.19   0.03   3.28   1.17 1213.22  0.05 712.30  23.07      0 |   1.07
19 STA  | 54.56  27.36   0.22   3.15   0.36   0.37 244.87   3.41  89.59   0.94      0      0      0   0.23      0   0.24   1.21 728.32   1.34      0   0.47 332.08      0 |   1.07
20 CL/JF|  5.90  11.18   7.36   1.56   8.85  31.11   6.27   3.72   1.44   3.74   1.10  14.53   0.92   2.43      0      0 420.40   1.37   0.90   1.81      0      0 |   1.03
21 SP/FB| 21.51   7.69   0.11   0.18   0.03 145.29 204.35   4.01  81.04   0.46      0      0      0   0.00      0 266.86   0.99      0   1.15   0.56      0 |   1.10
22 KGEO |  2.61   0.02   1.63  16.02   8.36  32.41  52.83   5.78   4.77 595.61      0      0   0.05   0.19   2.14   5.91 203.14  63.02   0.74      0   0.59   1.01      0 |   0.97
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
===============================================================================================================================================================================
 TOTAL    1.07          2.82          0.99          1.01          1.01          1.07          1.11          1.42          1.04           0 |
                  1.15          1.07          1.02          1.02          0.99          1.01          1.00          1.02          1.25          1.06          1.11          1.04
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Est Auto Driver

          DESTINATION
ORIGIN |    1       2       3       4      5      6      7       8       9      10     11     12      13      14     15     16     17     18     19     20     21     22    23 |  TOTAL
=================================================================================================================================================================================
 1 DC CR|  8294    5318    2117    1077    505   1224    663    2197     57     15      0      0     27      34      1      1     20      3      8      0      3      0     0 |  21564
 2 DC NC| 27218  136638   25899   18653   2866   6616   4226   13395    354    130     21      5    502     545     31     15    254     20     66      0     30      2     0 | 237485
 3 MTG  | 14664   31954  578065   24054    635   2202    893    6303    309     44   3523   1080   4929    3132     72     54    228     31    116    183    157     13     0 | 672684
 4 PG   | 19906   50949   35091  338606   1446   4578   5677   13023    272    177      6     12   5814    7736    917    555   7038     21    144      0     67     88     0 | 492125
 5 ARLCR|   172     404     149      65    996   1190    411    1182     30     20      0      0      0       1      0      0      1      1      4      0      2      0     0 |   4627
 6 ARNCR|  5753    6751    2069    1297   6380  64194   8845   22362    435    370      1      0      3      18      1      4     23     17     98      0     89      4     0 | 118715
 7 ALX  |  2785    3057     593    1011   2349   7477  40313   15374    176    390      0      0      1       9      1      6     45      8    107      0     87      6     0 |  73793
 8 FFX  | 18989   19283    7558    6891   6549  26922  27775  604496  11088  10829     62     10     48     175     33     88    415    749   2579    107   2787    157     0 | 747591
 9 LDN  |  1759    1607    1105     575    387   1350    738   16795 135297   1342   1435    136     14      40      2      1     33    615    209   5458    309     16     0 | 169223
10 PW   |  1285    1041     290     293    426   1500   1878   24761   1820 215307      7      1      0       6      1      3     24   3453   6046     70   4058    145     0 | 262412
11 FRD  |   129     185   11732      70     77    293     92    2737   4322     43 121325   4689   1480     137      0      0      0     11      1   1707      1      0     0 | 149032
12 CAR  |    17      35    3266      50     12     44     10     331    262      1   1791  90236   2888     133      0      0      0      0     31      0      0      0     0 |  99107
13 HOW  |   510    1260    6818    5334     73    186    112     636     51      5    854   2636 152333   10458     14      4     28      1      1     48      3      1     0 | 181367
14 AAR  |  1821    3623    4420   11342    417   1129    981    2888    134     72     21     70  13304  296585   1884    163    313      3     15      1      9      8     0 | 339202
15 CAL  |   205     331     183     870     74    218    313     796     13     14      0      0     24     616  57469   1262    450      0      1      0      1      8     0 |  62848
16 STM  |   160     229      71     715     73    234    528    1140     13     19      0      0      6      55   2710  50268   4192      0     12      0     17    142     0 |  60585
17 CHS  |   576     877     259    2632    214    704   1310    3386     73     86      0      0     17      62   1112   1523  73327      2     17      0     18    421     0 |  86617
18 FAU  |    49      22       9       5      9     28     18    1299    392   1569      1      0      1       0      0      2  27012    744     75    430     14      0 |  31680
19 STA  |    40      17      13       2     22     90    130    1601     42   2760      0      0      0       0      0      0      1    439  54221      0   9474    206     0 |  69060
20 CL/JF|     4       5     542       1      4     14      3    1429   4302    148    403      8     34       1      0      0      0    237      1  26634      1      0     0 |  33772
21 SP/FB|    14       3      12       0     15     69     96    1365     35   1145      0      0      0       0      0      0      0    145   7317      0  61464     89     0 |  71769
22 KGEO |     2       2       1       7      4     15     24     299      2    288      0      0      0       0      1      3    110     31   1298      0   1059   9773     0 |  12918
23 EXTL |     0       0       0       0      0      0      0       0      0      0      0      0      0       0      0      0      0      0      0      0      0      0     0 |      0
=================================================================================================================================================================================
TOTAL  104352          680262         23534         95037          159479        129451         181424         64250          86504         73006          80066         0 |
          263590          413549         120276         737838         234774         98883          319744         53950          32800         34314          11093    3998175
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Obs Auto Driver

          DESTINATION
ORIGIN |    1       2       3       4      5      6      7       8       9      10     11     12      13      14     15     16     17     18     19     20     21     22    23 |  TOTAL
=================================================================================================================================================================================
 1 DC CR|  4038    5436     623     464      0    493    769     770      0      0      0      0    412     377      0      0      0      0      0      0      0      0     0 |  13383
 2 DC NC| 36123  126833   28341   11086     57   3575   1872    7439   1918    182      0      0    212     457    199      0    100      0      0      0    199      0     0 | 218593
 3 MTG  | 14203   28283  563878   15433    350   1117   1303   12139   3347      0   2734    477   4457    2431      0      0    233      0      0      0    621      0     0 | 651006
 4 PG   | 11660   37989   36514  326503      0   2945   2350    4731    930    682      0    352   5114   15403   3760      0   5934      0      0      0      0      0     0 | 454867
 5 ARLCR|     0     207     103       0    404   1164    202     420      0      0      0      0      0     221      0      0      0      0      0      0      0      0     0 |   2721
 6 ARNCR|  8274    4802    2175     203   3069  71703   6333   18904    204    207      0      0    547       0      0      0    519    102      0      0      0      0     0 | 117042
 7 ALX  |  3543    1805     751     340    501   7384  43005   16480    392      0      0      0      0     361      0      0    262      0      0      0      0      0     0 |  74824
 8 FFX  | 12053    7732    7870    4324    765  23939  21451  623930  14757  12650    977      0    235     381      0      0      0      0    551    470    119      0     0 | 732203
 9 LDN  |  2389     454    2441       0      0   1614    909   21438 120287    255    584      0      0     292      0      0      0   1671      0    255      0      0     0 | 152588
10 PW   |   574     455    1445     185    301   4063   1802   23835   3135 212012      0      0      0       0      0     98      0   1387    553      0      0      0     0 | 249846
11 FRD  |   560    1199    7946     506    372      0    361     629    702      0 121625   6343   2529    1349      0      0      0      0      0    396      0      0     0 | 144517
12 CAR  |     0       0    1410     708      0      0    100       0      0      0    986  84965   3703     491      0      0      0      0      0      0      0      0     0 |  92362
13 HOW  |   494     832    5595    6338      0    433    163     674      0      0    163   1149 144027    9951      0      0    138    571      0      0      0      0     0 | 170528
14 AAR  |   509    3452    7676   14620     83    445     71     858      0      0    372      0  13928  292077   1526      0    680    257      0      0      0      0     0 | 336299
15 CAL  |   619     254       0    1369      0      0      0       0      0      0      0      0    239    1609  49390   2522    257      0      0      0      0      0     0 |  56258
16 STM  |   286     444       0    1643      0      0      0       0      0      0      0      0      0     264   2965  50179   4445      0    460      0      0      0     0 |  60686
17 CHS  |  1905    2191     289    7769    803    619    185     437    251      0      0      0    145     501   1734   2379  67488      0      0      0    145    145     0 |  86986
18 FAU  |     0     565     333       0    204      0      0    2002   1154   2624      0      0      0       0      0      0      0  24952      0   1319      0      0     0 |  33153
19 STA  |     0       0     131       0    124    442      0     781      0   4409      0      0      0       0      0      0      0      0  41675      0  18823      0     0 |  66384
20 CL/JF|     0       0     157       0      0      0      0     730   3192     78    520      0     78       0      0      0      0      0      0  29963      0      0     0 |  34719
21 SP/FB|     0       0     296       0   1075      0      0     732      0   2111      0      0      0       0      0    308      0      0   7682    308  52493    129     0 |  65131
22 KGEO |     0     161       0       0      0      0    118       0      0      0      0      0      0       0      0      0      0      0   1729      0   2359   9415     0 |  13782
23 EXTL |     0       0       0       0      0      0      0       0      0      0      0      0      0       0      0      0      0      0      0      0      0      0     0 |      0
=================================================================================================================================================================================
TOTAL   97228          667974          8110          80776         150270        127961         175625         59574          79793         52651          74759         0 |
          223095          391491         119938         737146        235210         93285          326166         55485          28944         32710          9689     3827878
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Difference (Est-Obs) Auto Driver

          DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=========================================================================================================================================================================
 1 DC CR|  4256   -118   1495    613    505    730   -106   1427     57     15      0      0   -385   -343      1      1     20      3      8      0      3      0     0 |   8181
 2 DC NC| -8905   9805  -2442   7567   2809   3041   2353   5956  -1564    -53     21      5    290     88   -169     15    155     20     66      0   -169      2     0 |  18891
 3 MTG  |   462   3670  14187   8621    285   1085   -410  -5793  -3037     44    788    604    472    702     72     54     -4     31    116    183   -465     13     0 |  21677
 4 PG   |  8246  12960  -1422  12102   1446   1633   3327   8292   -658   -504      6   -340    701  -7667  -2843    555   1104     21    144      0     67     88     0 |  37257
 5 ARLCR|   172    198     45     65    592     26    210    762     30     20      0      0      0   -221      0      0      1      1      4      0      2      0     0 |   1906
 6 ARNCR| -2521   1949   -106   1094   3311  -7509   2513   3457    230    164      1      0   -544     18      1      4   -496    -84     98      0     89      4     0 |   1673
 7 ALX  |  -758   1252   -159    671   1847     93  -2692  -1107   -216    390      0      0      1   -352      1      6     45   -254    107      0     87      6     0 |  -1031
 8 FFX  |  6936  11551   -312   2567   5784   2982   6324 -19433  -3668  -1821   -915     10   -187   -206     33     88    415    749   2028   -363   2669    157     0 |  15388
 9 LDN  |  -630   1154  -1336    575    387   -264   -171  -4643  15010   1087    851    136     14   -252      2      1     33  -1056    209   5203    309     16     0 |  16634
10 PW   |   711    586  -1156    108    125  -2564     76    926  -1315   3294      7      1      0      6      1    -95     24   2066   5493     70   4058    145     0 |  12566
11 FRD  |  -431  -1014   3786   -435   -295    293   -269   2108   3620     43   -300  -1654  -1049  -1213      0      0      0     11      1   1311      1      0     0 |   4515
12 CAR  |    17     35   1855   -658     12     44     10    232    262      1    806   5271   -815   -358      0      0      0      0     31      0      0      0     0 |   6746
13 HOW  |    16    427   1223  -1004     73   -246    -51    -38     51      5    692   1487   8306    507     14      4   -110   -570      1     48      3      1     0 |  10839
14 AAR  |  1312    170  -3256  -3278    334    684    910   2030    134     72   -352     70   -624   4508    358    163   -367      3     15      1      9      8     0 |   2904
15 CAL  |  -414     77    183   -499     74    218    313    796     13     14      0      0   -215   -993   8080  -1259    193      0      1      0      1      8     0 |   6590
16 STM  |  -125   -215     71   -928     73    234    528   1140     13     19      0      0      6   -209   -255     90   -254      0   -448      0     17    142     0 |   -101
17 CHS  | -1329  -1315    -29  -5136   -589     84   1125   2949   -178     86      0      0   -128   -439   -621   -857   5839      2     17      0   -127    277     0 |   -369
18 FAU  |    49   -543   -324      5   -195     28     18   -703   -763  -1055      1      0      0      1      0      0      2   2060    744  -1244    430     14     0 |  -1473
19 STA  |    40     17   -117      2   -102   -351    130    821     42  -1649      0      0      0      0      0      0      1    439  12545      0  -9349    206     0 |   2676
20 CL/JF|     4      5    385      1      4     14      3    699   1110     69   -117      8    -45      1      0      0    237      1  -3328      1      0      0     0 |   -947
21 SP/FB|    14      3   -284      0  -1060     69     96    634     35   -966      0      0      0      0   -308      0    145   -364   -308   8971    -40      0     0 |   6637
22 KGEO |     2   -159      1      7      4     15     24    182      2    288      0      0      0      0      1      3    110     31   -431      0  -1300    358     0 |   -864
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |      0
=========================================================================================================================================================================
TOTAL   7124       12287         15424         14261          9209          1490          5799          4676          6711         20355          5307          0 |
            40496         22059           338           692          -437          5598         -6422         -1535          3855          1605          1404       170297
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Ratio (Est/Obs) Auto Driver

          DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=========================================================================================================================================================================
 1 DC CR|  2.05   0.98   3.40   2.32 504.87   2.48   0.86   2.85  56.87  14.66   0.24   0.01   0.07   0.09   1.16   0.91  20.01   2.91   8.36      0   3.05   0.10     0 |   1.61
 2 DC NC|  0.75   1.08   0.91   1.68  49.90   1.85   2.26   1.80   0.18   0.71  21.14   4.90   2.37   1.19   0.15  15.13   2.55  19.86  66.16   0.21   0.15   2.08     0 |   1.09
 3 MTG  |  1.03   1.13   1.03   1.56   1.81   1.97   0.69   0.52   0.09  43.88   1.29   2.27   1.11   1.29  71.98  53.88   0.98  30.61 116.06 183.00   0.25  12.83     0 |   1.03
 4 PG   |  1.71   1.34   0.96   1.04 1446.39  1.55   2.42   2.75   0.29   0.26   5.78   0.03   1.14   0.50   0.24 554.66   1.19  21.06 143.77      0  67.38  87.78     0 |   1.08
 5 ARLCR| 172.11  1.96   1.44  64.89   2.47   1.02   2.04   2.81  29.81  19.69      0      0   0.18   0.00      0   0.08   0.55   0.84   3.56      0   2.49   0.08     0 |   1.70
 6 ARNCR|  0.70   1.41   0.95   6.39   2.08   0.90   1.40   1.18   2.13   1.79   1.45   0.02   0.01  17.73   0.66   4.08   0.04   0.17  98.03   0.09  88.91   3.78     0 |   1.01
 7 ALX  |  0.79   1.69   0.79   2.97   4.69   1.01   0.94   0.93   0.45 390.49   0.02      0   1.01   0.02   1.44   5.83  45.38   0.03 107.21      0  86.52   5.74     0 |   0.99
 8 FFX  |  1.58   2.49   0.96   1.59   8.56   1.12   1.29   0.97   0.75   0.86   0.06   9.92   0.20   0.46  32.68  88.22 415.19 749.33   4.68   0.23  23.51 156.94     0 |   1.02
 9 LDN  |  0.74   3.54   0.45 575.28 386.64   0.84   0.81   0.78   1.12   5.26   2.46 135.57  13.78   0.24   2.05   0.77  32.83   0.37 208.98  21.40 309.03  15.89     0 |   1.11
10 PW   |  2.24   2.29   0.20   1.58   1.41   0.37   1.04   1.04   0.58   1.02   6.55   0.88   0.41   6.14   0.72   0.03  23.58   2.49  10.93  69.63 4058.06 144.54    0 |   1.05
11 FRD  |  0.23   0.15   1.48   0.14   0.21 293.35   0.25   4.35   6.15  43.19   1.00   0.74   0.59   0.10   0.09      0   0.34  11.30   0.71   4.31   0.64      0     0 |   1.03
12 CAR  | 16.55  35.31   2.32   0.07  12.02  44.35  10.15   3.33 262.32   1.22   1.82   1.06   0.78   0.27      0      0      0   0.19  31.34      0      0      0     0 |   1.07
13 HOW  |  1.03   1.51   1.22   0.84  73.49   0.43   0.69   0.94  50.90   5.27   5.25   2.29   1.06   1.05  14.19   4.12   0.20   0.00   1.24  47.54   2.75   1.27     0 |   1.06
14 AAR  |  3.58   1.05   0.58   0.78   5.01   2.54  13.73   3.36 133.70  71.77   0.06  70.42   0.96   1.02   1.23 162.67   0.46   2.62  15.11   1.43   9.19   8.07     0 |   1.01
15 CAL  |  0.33   1.30 183.23   0.64  74.27 217.97 313.31 795.60  12.90  13.56      0   0.02   0.10   0.38   1.16   0.50   1.75   0.18   1.22      0   0.68   7.74     0 |   1.12
16 STM  |  0.56   0.52  71.03   0.44  73.39 233.94 528.40 1140.19 13.09  18.51      0      0   5.55   0.21   0.91   1.00   0.94   0.37   0.03      0  17.39 142.47     0 |   1.00
17 CHS  |  0.30   0.40   0.90   0.34   0.27   1.14   7.09   7.74   0.29  85.98      0      0   0.12   0.12   0.64   0.64   1.09   1.64  17.06      0   0.12   2.91     0 |   1.00
18 FAU  | 49.27   0.04   0.03   5.29   0.05  27.63  18.44   0.65   0.34   0.60   1.25   0.11   0.25   1.21   0.11   0.02   1.91   1.08 744.25   0.06 429.84  13.70     0 |   0.96
19 STA  | 39.81  16.72   0.10   1.88   0.18   0.20 130.45   2.05  41.93   0.63      0      0      0   0.13      0   0.14   0.72 439.48   1.30      0   0.50 206.45     0 |   1.04
20 CL/JF|  4.26   4.98   3.46   0.60   3.85  14.45   2.83   1.96   1.35   1.89   0.77   7.94   0.43   1.06      0      0 237.37   0.72   0.89   1.05      0      0     0 |   0.97
21 SP/FB| 14.45   2.92   0.04   0.06   0.01  68.64  95.90   1.87  34.78   0.54      0      0      0      0   0.00      0 144.91   0.95      0   1.17   0.69      0     0 |   1.10
22 KGEO |  1.67   0.01   0.56   7.07   3.57  14.57  23.66   2.54   1.92 287.98      0      0   0.01   0.06   1.07   3.38 110.19  31.26   0.75      0   0.45   1.04     0 |   0.94
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |      0
=========================================================================================================================================================================
TOTAL   1.07        1.02          2.90          1.18          1.06          1.01          1.03          1.08          1.08          1.39          1.07          0 |
            1.18          1.06          1.00          1.00          1.00          1.06          0.98          0.97          1.13          1.05          1.14          1.04
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips    MODE: Est Motr Psn

        DESTINATION
ORIGIN |    1       2       3       4       5       6       7       8       9      10      11      12      13      14      15      16      17      18      19      20      21      22      23 |  TOTAL
=================================================================================================================================================================================================
 1 DC CR| 18066   10590    3844    1620    1281    2713    1217    3467      88      24       0       0      40      48       1       1      26       5      13       0       5       0       0 |  43049
 2 DC NC| 69558  237206   43296   27881    5627   12610    7311   20593     550     211      28       6     734     782      44      23     349      31     100       0      47       3       0 | 426991
 3 MTG   | 26632   50285  925583   37970    1508    3653    1438   10629     530     128    5661    1759    7894    5049     121      92     377      53     195     307     266      22       0 |1080152
 4 PG    | 40506   82231   59715  536901    3424    8189    9451   22631     489     351      10      20    9430   12440    1497     921   11168      39     246       0     115     148       0 | 799920
 5 ARLCR | 1093     694     252     100    1685    2164     710    1916      49      32       0       0       0       1       0       0       1       1       6       0       4       0       0 |   8707
 6 ARNCR | 14840   10683    3296    1984   10744  102988   14251   35171     704     607       2       0       5      29       1       7      37      29     157       0     144       6       0 | 195684
 7 ALX   | 6004     4783     970    1551    3981   12323   64758   24966     301     649       0       0       2      14       2      10      72      13     176       0     143      10       0 | 120727
 8 FFX   | 29241   28842   12176   11108   11209   41996   44141  967457   17803   17695     107      17      84     297      63     175     696    1237    4278     179    4705     270       0 |1193777
 9 LDN   | 2392     2413    1785     938     655    2078    1167   27325  213311    2253    2327     229      23      69       4       1      55    1007     354    8825     534      28       0 | 267773
10 PW    | 1886     1687     647     569     778    2506    3192   42241    3123  339817      16       2      10      15      16      46      53    5563    9826     117    6750     244       0 | 419103
11 FRD   | 232      311   20570     119     153     543     174    5394    7678      86  190006    7470    2560     235       0       0       1      21       1    2779       1       0       0 | 238334
12 CAR   | 32       66    6146      94      25      88      20     695     540       3    2992  140003    5025     241       0       0       0       0       0      54       0       0       0 | 156024
13 HOW   | 884     1941   11023    8456     138     312     188    1183      94      54    1388    4191  237522   16577      24       7      47       1       2      81       5       2       0 | 284119
14 AAR   | 3325    5726    7590   18373     823    1971    1709    5499     260     196      35     118   21777  463334    3008     274     519       5      28       2      16      14       0 | 534603
15 CAL   | 387     559     367    1507     151     422     610    1631      28      30       0       0      47    1029   89259    2044     769       0       2       0       1      13       0 |  98858
16 STM   | 333     440     151    1398     159     476    1103    2423      28      40       0       0      12     115    4524   78514    7237       1      25       0      34     239       0 |  97252
17 CHS   | 1047    1412     492    4269     414    1250    2284    6369     147     179       0       0      33     109    1781    2444  114247       3      30       0      31     694       0 | 137234
18 FAU   | 60      34      15       9      17      46      32    2425     688    2630       2       0       0       2       0       0       3   42520    1213     123     712      23       0 |  50556
19 STA   | 55      27      29       3      44     165     245    3111      90    4638       0       0       0       0       0       0       1     728   84964       0   15127     332       0 | 109560
20 CL/JF | 6       11    1153       2       9      31       6    3004    8004     293     718      15      72       2       0       0       0     420       1   41774       2       0       0 |  55523
21 SP/FB | 23       9      36       0      33     147     206    2948      81    2158       0       0       0       0       0       0       0     267   11920       0   96550     145       0 | 114523
22 KGEO  | 3       3       2      16       8      32      53     681       5     596       0       0       0       0       2       6     203      63    2225       0    1806   15289       0 |  20993
23 EXTL  | 0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0 |      0
=================================================================================================================================================================================================
TOTAL   216605        1099140        42867         154264         254592         203292         285269         100347         135860         115764         126996              0 |
               439954         654868         196704        1191759         372667         153829         500387          84564          52009          54242          17482      6453461


Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips    MODE: Obs Motr Psn

        DESTINATION
ORIGIN |    1       2       3       4       5       6       7       8       9      10      11      12      13      14      15      16      17      18      19      20      21      22      23 |  TOTAL
=================================================================================================================================================================================================
 1 DC CR| 10359   13176    1230     991      48    2273     873    1001       0       0       0       0     412     571      28       0       0       0       0       0       0       0       0 |  30962
 2 DC NC| 84246  225127   47521   15946     373    7649    2564   12286    3312     396       0       0     245     712     199       0     199       0       0       0     221       0       0 | 400997
 3 MTG   | 28541   51236  908005   21015     574    2684    2433   16039    4612      19    4059     477    6017    4351       0       0     233       0       0    2174       0       0       0 |1052468
 4 PG    | 26504   65823   63860  524062     125    6532    4391    6240    2278     682       3     533    8059   22152    5395       0   10517       0       0       0       0       0       0 | 747156
 5 ARLCR | 682     333     113       0     404    1873     256     910      40       0       0       0       0     221       0       0       0       0       0       0       0       0       0 |   4831
 6 ARNCR | 19362    8038    3463     541    6414  110694   28801   28801     342     211       0       0     547      46       0       0     519     117       0      29       0       0       0 | 187835
 7 ALX   | 6208    4193    1086     384    1261   10425   72922   25716     719       0       0       0       0    1262       0       0     262       0       0       0       0       0       0 | 124438
 8 FFX   | 20614   12188   13854    4507    1537   37656   35330  999261   24943   16944     977       0     235     404       0       0       0      29    1930     939     237       0       0 |1171585
 9 LDN   | 2505     607    2441       0       0    2428     909   33617  207624     255    1314       0       0     292       0       0       0    2119       0     255       0       0       0 | 254366
10 PW    | 1151     681    1466     185     301    7336    4039   35754    4448  344440       0       0       0       0       0     196       0    2018     651       0       0       0       0 | 402668
11 FRD   | 1219    1711   13117     521     372       0     361     629     702       0  192062   10441    4927    3035       0       0       0       0       0     396       0       0       0 | 229492
12 CAR   | 23       0    1703     917       0       0       0     100       0       0    1772  138328    6934     491       0       0       0       0       0       0       0       0       0 | 150267
13 HOW   | 643     1431    8136    9156       0     942     163     674       0       0     163    2191  231964   13605       0       0     138     571       0       0       0       0       0 | 269778
14 AAR   | 1278    6820   14499   23157      83     445      71    2753       0       0     445       0   22879  452969    2545       0     680       0       0       0       0       0       0 | 528625
15 CAL   | 1302     509       0    1971      25       0       0       0       0       0       0       0     239    1866   78756    3119     899       0       0       0       0       0       0 |  88685
16 STM   | 286     521       0    2170       0       0       0       0       0       0       0       0       0     527    5373   76506    4966       0     460       0       0       0       0 |  90810
17 CHS   | 2268    3566     289   11147    1844    1344     185     450     251       0       0       0     145     501    1734    2669  103588       0       0       0     290     290       0 | 130563
18 FAU   | 47     565     333      35     408       0       0    2002    1321    3854       0       0       0       0       0       0       0   36494       0    2418       0       0       0 |  47477
19 STA   | 33       0     131       0     124     534       0     911       0    4943       0       0       0       0       0       0       0       0   63614       0   32457       0       0 | 102748
20 CL/JF | 0       14     157       0       0       0     808    5567      78     653       0       0      78       0       0       0       0       0       0   46420       0       0       0 |  53776
21 SP/FB | 0       41     296       0    1075       0       0     732       0    4730       0       0       0       0       0     615       0       0   12095     615   83652     257       0 | 104108
22 KGEO  | 0      161       0       0       0       0     118       0       0       0       0       0       0       0       0       0       0       0    3016       0    3052   15186       0 |  21533
23 EXTL  | 0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0 |      0
=================================================================================================================================================================================================
TOTAL   207271        1081701        14970         133101         256161         201446         282681          94030         121739          81766         122084              0 |
               396740         616705         192923        1168802         376552         151970         503005          83106          41608          51073          15733      6195167
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Difference (Est-Obs) Motorized Person

        DESTINATION
ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=======================================================================================================================================================================
 1 DC CR|  7707  -2586   2614    628   1233    440    344   2466     88     24      0      0   -372   -524    -27      1     26      5     13      0      5      0     0 |  12086
 2 DC NC|-14688  12079  -4225  11935   5254   4961   4746   8308  -2761   -185     28      6    489     70   -156     23    150     31    100      0   -175      3     0 |  25994
 3 MTG  | -1909   -951  17578  16955    934    969   -995  -5410  -4082    109   1602   1282   1877    698    121     92    145     53    195    307  -1909     22     0 |  27683
 4 PG   | 14002  16408  -4145  12839   3299   1657   5060  16391  -1789   -331      7   -513   1370  -9712  -3898    921    651     39    246      0    115    148     0 |  52763
 5 ARLCR|   411    361    138    100   1281    291    454   1006      9     32      0      0      0   -220      0      0      1      1      6      0      4      0     0 |   3876
 6 ARNCR| -4523   2645   -168   1443   4330  -7813   5647   6370    362    396      2      0   -542    -17      1      7   -482    -88    157    -29    144      6     0 |   7849
 7 ALX  |  -203    590   -116   1167   2720   1898  -8164   -751   -418    649      0      0      2  -1248      2     10     72   -248    176      0    143     10     0 |  -3711
 8 FFX  |  8627  16655  -1678   6601   9672   4340   8811 -31804  -7140    750   -870     17   -151   -108     63    175    696   1208   2349   -760   4468    270     0 |  22192
 9 LDN  |  -113   1805   -656    938    655   -350    258  -6292   5687   1998   1013    229     23   -223      4      1     55  -1112    354   8570    534     28     0 |  13407
10 PW   |   735   1006   -819    384    477  -4830   -847   6487  -1325  -4623     16      2     10     15     16   -150     53   3545   9175    117   6750    244     0 |  16435
11 FRD  |  -987  -1400   7453   -401   -220    543   -187   4765   6976     86  -2056  -2971  -2367  -2800      0      0      1     21      1   2383      1      0     0 |   8842
12 CAR  |     9     66   4443   -823     25     88     20    595    540      3   1220   1675  -1909   -250      0      0      0      0     54      0      0      0     0 |   5757
13 HOW  |   240    510   2887   -700    138   -630     25    509     94     54   1225   1999   5559   2972     24      7    -91   -570      2     81      5      2     0 |  14342
14 AAR  |  2047  -1094  -6908  -4784    740   1526   1638   2746    260    196   -409    118  -1102  10365    463    274   -161      5     28      2     16     14     0 |   5978
15 CAL  |  -915     51    367   -464    126    422    961   1631     28     30      0      0   -193   -837  10503  -1075   -129      0      2      0      1     13     0 |  10173
16 STM  |    48    -82    151   -772    159    476   1103   2423     28     40      0      0     12   -412   -849   2008   2270      1   -435      0     34    239     0 |   6442
17 CHS  | -1221  -2154    204  -6878  -1430    -94   2099   5918   -104    179      0      0   -112   -393     47   -225  10658      3     30      0   -259    404     0 |   6671
18 FAU  |    13   -531   -318    -26   -391     46     32    423   -633  -1225      2      0      0      2      0      0      3   6026   1213  -2295    712     23     0 |   3079
19 STA  |    22     27   -101      3    -80   -368    245   2199     90   -306      0      0      0      0      0      0      1    728  21350      0 -17330    332     0 |   6812
20 CL/JF|     6     -3    997      2      9     31      6   2196   2437    214     65     15     -6      2      0      0    420      1  -4646      0     31      0     0 |   1747
21 SP/FB|    23    -32   -260      0  -1041    147    206   2216     81  -2572      0      0      0   -615      0    267   -175   -615  12898   -113      0     0 |  10415
22 KGEO |     3   -157      2     16      8     32     53    563      5    596      0      0      0      2      6    203     63   -791      0  -1246    103      0     0 |   -540
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |      0
=======================================================================================================================================================================
 TOTAL |  9334        17439        27897        21163        -1569        1846         2588         6317        14122        33997        4913        0 |
           43213        38163         3781        22957        -3885        1859        -2619         1458        10401         3169        1749              258295


Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Ratio (Est/Obs) Motorized Person

        DESTINATION
ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=======================================================================================================================================================================
 1 DC CR|  1.74   0.80   3.13   1.63  26.69   1.19   1.39   3.46  87.97  23.68   0.25   0.01   0.10   0.08   0.05   1.36  26.34   4.55  12.70      0   4.76   0.15     0 |   1.39
 2 DC NC|  0.83   1.05   0.91   1.75  15.07   1.65   2.85   1.68   0.17   0.53  27.74   6.11   3.00   1.10   0.22  22.65   1.75  31.29 100.23   0.32   0.21   3.21     0 |   1.06
 3 MTG  |  0.93   0.98   1.02   1.81   2.63   1.36   0.59   0.66   0.11   6.72   1.39   3.69   1.31   1.16 120.81  92.27   1.62  53.07 194.91 306.81   0.12  22.13     0 |   1.03
 4 PG   |  1.53   1.25   0.94   1.02  27.39   1.25   2.15   3.63   0.21   0.51   3.23   0.04   1.17   0.56   0.28 920.78   1.06  38.65 246.25      0 114.75 147.82     0 |   1.07
 5 ARLCR|  1.60   2.09   2.22 100.22   4.17   1.16   2.77   2.11   1.21  32.40      0      0   0.30   0.00      0   0.13   0.89   1.39   5.66      0   4.06   0.13     0 |   1.80
 6 ARNCR|  0.77   1.33   0.95   3.67   1.68   0.93   1.66   1.22   2.06   2.88   2.43   0.03   0.01   0.62   1.11   6.76   0.07   0.25 156.78   0.01 143.92   6.25     0 |   1.04
 7 ALX  |  0.97   1.14   0.89   4.04   3.16   1.18   0.89   0.97   0.42 649.30   0.03      0   1.68   0.01   2.40   9.68  71.85   0.05 175.84      0 142.56   9.50     0 |   0.97
 8 FFX  |  1.42   2.37   0.88   2.46   7.29   1.12   1.25   0.97   0.71   1.04   0.11  16.79   0.36   0.73  63.47 175.06 695.78  42.66   2.22   0.19  19.84 269.51     0 |   1.02
 9 LDN  |  0.95   3.97   0.73 937.53 655.26   0.86   1.28   0.81   1.03   8.83   1.77 229.32  23.27   3.53   1.31  55.36   0.48 354.30  34.61 533.70  27.92     0 |   1.05
10 PW   |  1.64   2.48   0.44   3.07   2.58   0.34   0.79   1.18   0.70   0.99  15.58   1.50   9.88  14.52  16.24   0.23  52.52   2.76  15.09 116.71 6750.21 244.01     0 |   1.04
11 FRD  |  0.19   0.18   1.57   0.23   0.41 542.75   0.48   8.58  10.93  85.84   0.99   0.72   0.52   0.08   0.15      0   0.57  20.75   1.49   7.02   1.11      0     0 |   1.04
12 CAR  |  1.40  66.07   3.61   0.10  25.16  88.01  20.04   6.98 540.25   2.76   1.69   1.01   0.72   0.49      0      0      0   0.44   0.01  53.53      0      0     0 |   1.04
13 HOW  |  1.37   1.36   1.35   0.92 137.81   0.33   1.15   1.76  93.81  54.03   8.52   1.91   1.02   1.22  23.98   7.14   0.34   0.00   2.13  81.14   4.73   2.25     0 |   1.05
14 AAR  |  2.60   0.84   0.52   0.79   9.89   4.43  23.91   2.00 260.06 195.99   0.08 118.41   0.95   1.02   1.18 273.54   0.76   5.19  28.11   2.48  16.14  14.08     0 |   1.01
15 CAL  |  0.30   1.10 366.90   0.76   6.06 422.25 609.92 1630.95  27.50  30.16      0   0.03   0.19   0.55   1.13   0.66   0.86   0.43   2.33      0   1.31  13.22     0 |   1.11
16 STM  |  1.17   0.84 151.01   0.64 159.29 476.47 1102.73 2423.37  28.19  39.95      0      0  11.93   0.22   0.84   1.03   1.46   0.94   0.05      0  33.69 239.44     0 |   1.07
17 CHS  |  0.46   0.40   1.71   0.38   0.22   0.93  12.36  14.15   0.59 179.43      0      0   0.23   0.22   1.03   0.92   1.10   3.36  29.92      0   0.11   2.39     0 |   1.05
18 FAU  |  1.28   0.06   0.05   0.25   0.04  45.57  32.06   1.21   0.52   0.68   2.10   0.18   0.42   2.09   0.19   0.03   3.28   1.17 1213.22      0.05 712.30  23.07     0 |   1.06
19 STA  |  1.65  27.36   0.22   3.15   0.36   0.31 244.87   3.41  89.59   0.94      0      0      0   0.23      0   0.24   1.21 728.32   1.34      0   0.47 332.08     0 |   1.07
20 CL/JF|  5.90   0.80   7.36   1.56   8.85  31.11   6.27   3.72   1.44   3.74   1.10  14.53   0.92   2.43      0   0.00      0 420.40   1.37   0.90   1.81      0     0 |   1.03
21 SP/FB| 23.23   0.21   0.12   0.38   0.03 146.94 205.97   4.03  81.04   0.46      0      0      0      0   0.00      0 266.86   0.99      0   1.15   0.56     0 |   1.10
22 KGEO |  2.61   0.02   1.63  16.02   8.36  32.41  52.83   5.78   4.77 595.61      0      0   0.05   0.19   2.14   5.91 203.14  63.02   0.74      0   0.59   1.01     0 |   0.97
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |      0
=======================================================================================================================================================================
 TOTAL |  1.05         1.02         2.86         1.16         0.99         1.01         1.01         1.07         1.12         1.42         1.04         0 |
           1.11         1.06         1.02         1.02         0.99         1.01         0.99         1.02         1.25         1.06         1.11              1.04
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips    MODE: Est Auto Occ.

         DESTINATION
ORIGIN |   1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 |  TOTAL
=============================================================================================================================================================
 1 DC CR| 1.55  1.51  1.46  1.41  1.37  1.51  1.52  1.47  1.55  1.53  1.04  1.00  1.45  1.40  1.27  1.49  1.32  1.56  1.52     0  1.56  1.50     0 |  1.51
 2 DC NC| 1.55  1.51  1.46  1.41  1.38  1.53  1.54  1.48  1.56  1.53  1.31  1.25  1.46  1.44  1.42  1.50  1.37  1.58  1.51  1.52  1.54  1.54     0 |  1.50
 3 MTG  | 1.49  1.50  1.56  1.55  1.61  1.56  1.59  1.67  1.72  1.68  1.61  1.63  1.60  1.61  1.68  1.71  1.65  1.73  1.68  1.68  1.70  1.72     0 |  1.56
 4 PG   | 1.57  1.51  1.62  1.56  1.67  1.62  1.62  1.73  1.80  1.72  1.68  1.67  1.62  1.61  1.63  1.66  1.59  1.84  1.71     0  1.70  1.68     0 |  1.57
 5 ARLCR| 1.59  1.54  1.55  1.51  1.63  1.56  1.55  1.54  1.63  1.60     0     0  1.67  1.59     0  1.63  1.62  1.65  1.59     0  1.63  1.63     0 |  1.57
 6 ARNCR| 1.47  1.52  1.55  1.52  1.60  1.53  1.53  1.53  1.62  1.58  1.68  1.50  1.64  1.61  1.68  1.66  1.60  1.65  1.60  1.67  1.62  1.65     0 |  1.53
 7 ALX  | 1.45  1.52  1.60  1.53  1.62  1.53  1.55  1.59  1.71  1.63  1.50     0  1.66  1.62  1.67  1.66  1.58  1.72  1.64     0  1.65  1.66     0 |  1.56
 8 FFX  | 1.27  1.47  1.59  1.61  1.64  1.49  1.54  1.59  1.60  1.61  1.68  1.69  1.68  1.68  1.70  1.73  1.66  1.65  1.66  1.68  1.68  1.72     0 |  1.58
 9 LDN  | 1.28  1.50  1.61  1.63  1.67  1.53  1.58  1.62  1.57  1.63  1.62  1.69  1.69  1.70  1.72  1.70  1.69  1.64  1.70  1.62  1.73  1.76     0 |  1.58
10 PW   | 1.28  1.50  1.67  1.65  1.72  1.57  1.63  1.67  1.68  1.57  1.68  1.70  1.68  1.70  1.68  1.74  1.68  1.61  1.63  1.68  1.66  1.69     0 |  1.59
11 FRD  | 1.78  1.68  1.75  1.70  1.97  1.85  1.89  1.97  1.78  1.90  1.56  1.59  1.73  1.72  1.67     0  1.68  1.84  2.10  1.63  1.73     0     0 |  1.60
12 CAR  | 1.95  1.87  1.88  1.89  2.09  1.98  1.97  2.10  2.06  2.26  1.67  1.55  1.74  1.82     0     0  2.32  0.01  1.71     0     0     0     0 |  1.57
13 HOW  | 1.59  1.53  1.61  1.58  1.71  1.65  1.68  1.82  1.84  1.78  1.62  1.59  1.56  1.58  1.69  1.73  1.68  1.81  1.72  1.71  1.72  1.77     0 |  1.56
14 AAR  | 1.67  1.57  1.71  1.62  1.78  1.71  1.74  1.87  1.95  1.86  1.72  1.68  1.64  1.56  1.60  1.68  1.66  1.98  1.86  1.73  1.76  1.74     0 |  1.57
15 CAL  | 1.88  1.69  2.00  1.73  2.03  1.93  1.95  2.05  2.13  2.10     0  1.50  1.96  1.67  1.55  1.62  1.71  2.39  1.91     0  1.93  1.71     0 |  1.57
16 STM  | 2.08  1.92  2.13  1.96  2.17  2.04  2.09  2.13  2.15  2.16     0     0  2.15  2.11  1.67  1.56  1.73  2.54  1.99     0  1.94  1.68     0 |  1.60
17 CHS  | 1.74  1.60  1.90  1.62  1.85  1.76  1.74  1.88  2.00  1.87     0     0  1.89  1.76  1.60  1.60  1.55  2.05  1.75     0  1.75  1.65     0 |  1.58
18 FAU  | 1.21  1.55  1.71  1.66  1.79  1.65  1.74  1.86  1.76  1.68  1.68  1.64  1.68  1.73  1.73  1.50  1.72  1.57  1.63  1.64  1.66  1.68     0 |  1.60
19 STA  | 1.37  1.64  2.18  1.68  1.98  1.83  1.88  1.94  2.14  1.68     0     0     0  1.77     0  1.71  1.68  1.66  1.57     0  1.60  1.61     0 |  1.59
20 CL/JF| 1.38  2.24  2.13  2.60  2.30  2.15  2.22  2.10  1.86  1.98  1.78  1.83  2.15  2.29     0     0  1.77  1.90  1.57  1.72     0     0 |  1.64
21 SP/FB| 1.49  2.63  2.79  3.00  2.25  2.12  2.13  2.15  2.33  1.88     0     0     0     0     0  1.50     0  1.84  1.63     0  1.57  1.63     0 |  1.60
22 KGEO | 1.56  2.17  2.91  2.27  2.34  2.22  2.23  2.27  2.48  2.07     0     0  5.00  3.17  2.00  1.75  1.84  2.02  1.71     0  1.71  1.56     0 |  1.63
23 EXTL |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |     0
=============================================================================================================================================================
 TOTAL   1.48        1.57        1.60        1.56        1.59        1.57        1.57        1.56        1.57        1.59        1.59        0 |
               1.51        1.56        1.54        1.60        1.58        1.56        1.56        1.57        1.59        1.58        1.58              1.57


Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips    MODE: Obs Auto Occ.

         DESTINATION
ORIGIN |   1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 |  TOTAL
=============================================================================================================================================================
 1 DC CR| 1.37  1.53  1.00  1.50     0  1.56  1.00  1.00     0     0     0     0  1.00  1.00     0     0     0     0     0     0     0     0     0 |  1.36
 2 DC NC| 1.57  1.53  1.53  1.23  1.00  1.31  1.16  1.59  1.72  2.00     0     0  1.00  1.25  1.00     0  2.00     0     0     0  1.00     0     0 |  1.51
 3 MTG  | 1.34  1.61  1.57  1.28  1.00  1.34  1.83  1.32  1.36     0  1.48  1.00  1.34  1.72     0     0  1.00     0     0     0  3.50     0     0 |  1.56
 4 PG   | 1.84  1.59  1.67  1.57     0  2.01  1.84  1.28  2.41  1.00     0  1.52  1.57  1.43  1.43     0  1.77     0     0     0     0     0     0 |  1.59
 5 ARLCR|    0  1.00  1.00     0  1.00  1.38  1.00  1.88     0     0     0     0     0  1.00     0     0     0     0     0     0     0     0     0 |  1.30
 6 ARNCR| 1.58  1.26  1.47  2.00  1.93  1.51  1.30  1.47  1.50  1.00     0     0  1.00     0     0     0  1.00  1.00     0     0     0     0     0 |  1.49
 7 ALX  | 1.22  1.96  1.24  1.00  2.37  1.33  1.65  1.53  1.83     0     0     0     0  3.50     0     0     0  1.00     0     0     0     0     0 |  1.58
 8 FFX  | 1.32  1.34  1.72  1.00  1.71  1.50  1.59  1.59  1.68  1.34  1.00     0  1.00  1.00     0     0     0     0  3.50  2.00  2.00     0     0 |  1.58
 9 LDN  | 1.00  1.31  1.00     0     0  1.50  1.00  1.57  1.73  1.00  2.25     0     0  1.00     0     0     0  1.27     0  1.00     0     0     0 |  1.67
10 PW   | 1.32  1.00  1.00  1.00  1.00  1.77  2.24  1.49  1.42  1.62     0     0     0     0     0  2.00     0  1.45  1.18     0     0     0     0 |  1.61
11 FRD  | 2.00  1.37  1.64  1.00  1.00     0  1.00  1.00  1.00     0  1.57  1.65  1.95  2.25     0     0     0     0     0  1.00     0     0     0 |  1.58
12 CAR  |    0     0  1.21  1.30     0     0     0  1.00     0     0  1.80  1.63  1.87  1.00     0     0     0     0     0     0     0     0     0 |  1.63
13 HOW  | 1.00  1.68  1.45  1.44     0  2.11  1.00  1.00     0     0  1.00  1.91  1.61  1.37     0     0  1.00  1.00     0     0     0     0     0 |  1.58
14 AAR  | 1.69  1.92  1.89  1.58  1.00  1.00  1.00  3.21     0     0  1.19     0  1.64  1.55  1.67     0  1.00     0     0     0     0     0     0 |  1.57
15 CAL  | 2.00  2.00     0  1.44     0     0     0     0     0     0     0     0  1.00  1.16  1.59  1.24  3.50     0     0     0     0     0     0 |  1.57
16 STM  | 1.00  1.00     0  1.32     0     0     0     0     0     0     0     0     0  2.00  1.81  1.52  1.12     0  1.00     0     0     0     0 |  1.50
17 CHS  | 1.12  1.54  1.00  1.43  2.25  2.03  1.00  1.00  1.00     0     0     0  1.00  1.00  1.00  1.12  1.53     0     0  2.00  2.00     0     0 |  1.50
18 FAU  |    0  1.00  1.00     0  2.00     0     0  1.00  1.14  1.47     0     0     0     0     0     0     0  1.46     0  1.83     0     0     0 |  1.43
19 STA  |    0     0  1.00     0  1.00  1.00     0  1.17     0  1.12     0     0     0     0     0     0     0     0  1.53     0  1.72     0     0 |  1.55
20 CL/JF|    0     0  1.00     0     0     0     0  1.11  1.74  1.00  1.25     0  1.00     0     0     0     0     0  1.55     0     0     0     0 |  1.55
21 SP/FB|    0     0  1.00     0  1.00     0     0  1.00     0  2.24     0     0     0     0     0  2.00     0     0  1.57  2.00  1.59  2.00     0 |  1.60
22 KGEO |    0  1.00     0     0     0     0     0  1.00     0     0     0     0     0     0     0     0     0     0  1.74     0  1.29  1.61     0 |  1.56
23 EXTL |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |     0
=============================================================================================================================================================
 TOTAL   1.49        1.58        1.65        1.60        1.70        1.57        1.61        1.58        1.53        1.55        1.63        0 |
               1.54        1.54        1.51        1.57        1.60        1.63        1.54        1.50        1.44        1.56        1.62              1.57
```

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Est Pct. Tran

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	29.0	24.1	19.4	6.5	46.0	31.8	17.5	7.0	0	5.2	0	0	0.0	0	0	0	0	0	0	0	0	0	0	24.5
2 DC NC	39.4	13.2	12.7	5.9	29.6	19.7	11.0	3.8	0	5.7	0	0	0.0	0	0	0	0	0	0	0	0	0	0	16.8
3 MTG	17.8	4.7	2.6	1.5	32.1	6.1	1.3	0.4	0	42.2	0.0	0	0.1	0.0	0	0	0	0	0	0	0	0	0	3.0
4 PG	23.0	6.7	5.1	1.6	29.5	9.5	2.6	0.6	0	12.9	0	0	0.3	0.1	0	0	0.0	0	0	0	0	0	0	3.6
5 ARLCR	75.0	10.0	8.6	2.0	3.5	14.3	9.9	4.7	0	3.0	0	0	0	0	0	0	0	0	0	0	0	0	0	16.6
6 ARNCR	43.0	4.0	2.5	0.4	4.7	4.3	5.1	2.4	0	3.2	0	0	0	0	0	0	0	0	0	0	0	0	0	6.9
7 ALX	32.6	3.2	2.2	0.1	4.5	7.1	3.3	2.2	0	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.9
8 FFX	17.3	1.8	1.1	0.4	4.3	4.2	2.9	0.6	0.1	1.7	2.1	0	4.8	0.6	12.4	12.6	0.9	0	0.0	0	0.3	0	0	1.3
9 LDN	5.8	0.3	0.1	0.0	1.2	0.8	0.1	0.2	0.1	3.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
10 PW	12.6	7.5	25.3	15.1	6.0	5.9	4.3	2.1	2.1	0.3	29.3	0	93.0	28.0	92.5	88.9	24.5	0	0.0	0	0.4	0	0	0.7
11 FRD	1.2	0.1	0.0	0	0.6	0.1	0	0.0	0	4.5	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0.2
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	8.1	0.6	0.1	0.2	8.9	1.5	0.0	2.1	0	82.6	0	0	0.1	0.0	0	0	0	0	0	0	0	0	0	0.1
14 AAR	8.7	0.6	0.1	0.1	9.7	1.8	0.2	1.8	0	31.8	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0.1
15 CAL	0.8	0.1	0.0	0	0.6	0.1	0.0	0.0	0	5.6	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0	0.0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0.0
17 CHS	4.0	0.4	0.1	0.0	4.4	0.8	0.1	0.1	0	10.2	0	0	0	0	0	0.0	0.2	0	0	0	0	0	0	0.3
18 FAU	0.3	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
19 STA	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	7.4	10.4	9.0	52.6	1.7	1.1	0.8	0.5	0	0.1	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.0
22 KGEO	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	28.5	9.8	3.1	1.7	12.0	6.1	3.7	0.8	0.1	0.4	0.2	0	0.1	0.0	0.0	0.1	0.2	0	0.0	0	0.0	0	0	2.9

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal HBO Trips   MODE: Obs Pct. Tran

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	46.8	36.8	49.4	29.8	100.0	66.2	11.9	23.1	0	0	0	0	0	34.0	100.0	0	0	0	0	0	0	0	0	41.0
2 DC NC	32.8	13.9	9.0	14.5	84.6	39.0	15.1	3.8	0.7	7.8	0	0	13.5	20.1	0	0	0	0	0	9.9	0	0	0	17.5
3 MTG	33.5	10.9	2.2	6.0	39.0	44.2	1.9	0.3	1.0	100.0	0	0	0.7	4.1	0	0	0	0	0	0	0	0	0	3.6
4 PG	19.0	8.4	4.4	1.9	100.0	9.5	1.7	2.8	1.6	0	100.0	0	0.1	0.3	0	0	0	0	0	0	0	0	0	3.3
5 ARLCR	100.0	37.9	8.8	0	0	14.0	21.1	13.4	100.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26.8
6 ARNCR	32.3	24.7	7.6	24.9	7.8	4.3	4.3	3.2	10.2	1.9	0	0	0	100.0	0	0	12.9	0	100.0	0	0	0	0	7.0
7 ALX	30.3	15.7	14.2	11.5	5.7	6.1	2.8	2.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.8
8 FFX	22.8	14.7	2.3	4.1	15.1	4.3	3.2	0.7	0.5	0.2	0	0	0	5.7	0	0	0	100.0	0	0	0	0	0	1.5
9 LDN	4.6	2.1	0	0	0	0	0.1	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
10 PW	34.4	33.2	1.4	0	0	2.2	0	0.5	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4
11 FRD	8.1	3.8	0.4	2.9	0	0	0	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4
12 CAR	100.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
13 HOW	23.2	2.3	0.4	0	0	3.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
14 AAR	32.8	3.0	0.1	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
15 CAL	4.9	0	0	0	100.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
16 STM	0	14.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
17 CHS	5.8	5.4	0	0.0	2.0	6.3	0	2.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4
18 FAU	100.0	0	0	100.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
19 STA	100.0	0	0	0	0	17.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
20 CL/JF	0	100.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
21 SP/FB	0	100.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	30.0	13.3	2.6	2.3	10.6	6.1	3.1	0.8	0.1	0.2	0.3	0	0.0	0.1	0.0	0	0.0	0.1	0	0.1	0.0	0	0	3.0

Appendix B Year 2007 mode choice summary

```
        Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
        Purpose: Internal NHW Trips    MODE: Est Transit

             DESTINATION
    ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
   ==============================================================================================================================================================================
    1 DC CR| 18298   9221   2441   1504   1954   2915   1179    867      0     18      0      0      2      2      1      0      0      0      0      0      1      0      0 |  38402
    2 DC NC| 11526   8425   2440   1213    957   1255    456    317      0     10      0      0      1      0      0      0      0      0      0      0      0      0      0 |  26601
    3 MTG  |  3253   1037   7948    175    462    296     67     47      0     15      0      0      1      0      0      0      0      0      0      0      0      0      0 |  13301
    4 PG   |  3134    773    253   1007    275    201     50      9      0     15      0      0      0      0      0      0      0      0      0      0      0      0      0 |   5717
    5 ARLCR|  1939    363    122     33    325    825    316    169      0      3      0      0      0      0      0      0      0      0      0      0      0      0      0 |   4094
    6 ARNCR|  2918    519    176     42   1238   2198    635    492      0      7      0      0      0      0      0      0      0      0      0      0      0      0      0 |   8225
    7 ALX  |  1167    164     62     18    313    594   1165    189      0      8      0      0      0      0      0      0      0      0      0      0      0      0      0 |   3680
    8 FFX  |  2290    156     84     11    402    634    409   1954      1     38      1      0      1      0      0      0      1      0      0      0      0      0      0 |   5983
    9 LDN  |    62      0      0      0      8      5      0      2     46      5      0      0      0      0      0      0      0      0      0      0      0      0      0 |    130
   10 PW   |   144     11     17     14     19     20     20     44      2     66      2      0      2      1      1      1      2      0      0      0      1      0      0 |    366
   11 FRD  |     2      0      0      0      0      0      0      0      0      0    153      0      0      0      0      0      0      0      0      0      0      0      0 |    155
   12 CAR  |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
   13 HOW  |    51      4      4      1      3      2      0      1      0      3      0      0      5      0      0      0      0      0      0      0      0      0      0 |     74
   14 AAR  |   171     12      5      3      5      3      2      3      0      3      0      0      0      0      0      0      0      0      0      0      0      0      0 |    208
   15 CAL  |     1      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      2
   16 STM  |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     11      1      0      0      0      0      0      0 |     12
   17 CHS  |    38      4      1      0      2      1      0      1      0      2      0      0      0      0      0      1     62      0      0      0      0      0      0 |    110
   18 FAU  |     0      0      0      0      0      0      0      1      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      1
   19 STA  |     0      0      0      0      0      0      0      1      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      1
   20 CL/JF|     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
   21 SP/FB|     1      0      1      0      0      0      0      2      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      5
   22 KGEO |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
   23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
   ==============================================================================================================================================================================
    TOTAL  44994         13555         5962         4299         49           156           12            2            65            0            1            0 |
             20691         4021         8949         4099         194            0             4            13            0            0            0 | 107065
```

```
        Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
        Purpose: Internal NHW Trips    MODE: Obs Transit

             DESTINATION
    ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
   ==============================================================================================================================================================================
    1 DC CR| 19512  10054   2658   1761    920   4465    394   1054     48     60      0      0     79     89      0      0      0     12      0      0      0      0      0 |  41106
    2 DC NC| 10435   8323   1306   1147    338   1992    523    530      0     23      0      0      0      0      0      0      0      0      0     18      0      0      0 |  24635
    3 MTG  |  4630   2130   5072    662    118    377     67     66      0      0      0      0     25      0      0      0      0      0      0      0      0      0      0 |  13147
    4 PG   |  2249   1436   1085   1467     52    373    125     35      0      0      0      0      0     31      0      0      0      0      0      0      0      0      0 |   6853
    5 ARLCR|   811    360     43     58      0    585     75    111      0     15      0      0      0     28      0      0      0      0      0      0      0      0      0 |   2086
    6 ARNCR|  4098   1184    164    418    313   3356    423    632     36      0      0      0      0     35      0      0      0      0     17      0      0      0      0 |  10676
    7 ALX  |  1020    329     50     98    137    664    673    215      0     26      0      0      0      0      0      0      0      0      0      0      0      0      0 |   3212
    8 FFX  |  2021    532     90     21    128    822    416   1667      9      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |   5706
    9 LDN  |    82      0      0      0      0     47      0     11      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |    140
   10 PW   |   115     14     10      0      0     98      0     65      0    146      0      0      0      0      0      0      0      0      0      0      0      0      0 |    448
   11 FRD  |    48      0      0      0      0      0      0      0      0      0    179      0      0      0      0      0      0      0      0      0      0      0      0 |    227
   12 CAR  |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
   13 HOW  |   109      0      0      0      0     48     24      0      0      0      0      0     27      0      0      0      0      0      0      0      0      0      0 |    208
   14 AAR  |   137     30      0      0      0     74     31      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |    272
   15 CAL  |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
   16 STM  |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
   17 CHS  |    42      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |     42
   18 FAU  |     0      0     33      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |     33
   19 STA  |    10      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |     10
   20 CL/JF|     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
   21 SP/FB|     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
   22 KGEO |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
   23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
   ==============================================================================================================================================================================
    TOTAL  45319         10511         2006         2751         93           179           131            0            0            17            0            0 |
             24392         5632        12901         4386         270            0           183            0            12            18            0 | 108801
```

Appendix B Year 2007 mode choice summary

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	-1214	-833	-217	-257	1034	-1550	785	-187	-48	-42	0	0	-77	-87	1	0	0	-12	0	0	1	0	0	-2704
2 DC NC	1091	102	1134	66	619	-737	-67	-213	0	-13	0	0	1	0	0	0	0	0	0	-18	0	0	0	1966
3 MTG	-1377	-1093	2876	-487	344	-81	0	-19	0	15	0	0	-24	0	0	0	0	0	0	0	0	0	0	154
4 PG	885	-663	-832	-460	223	-172	-75	-26	0	15	0	0	0	-31	0	0	0	0	0	0	0	0	0	-1136
5 ARLCR	1128	3	79	-25	325	240	241	58	0	-12	0	0	0	-28	0	0	0	0	0	0	0	0	0	2008
6 ARNCR	-1180	-665	12	-376	925	-1158	212	-140	-36	7	0	0	0	-35	0	0	0	0	-17	0	0	0	0	-2451
7 ALX	147	-165	12	-80	176	-70	492	-26	0	-18	0	0	0	0	0	0	0	0	0	0	0	0	0	468
8 FFX	269	-376	-6	-10	274	-188	-7	287	-8	38	1	0	1	0	0	0	1	0	0	0	0	0	0	277
9 LDN	-20	0	0	0	8	-42	0	-9	46	5	0	0	0	0	0	0	0	0	0	0	0	0	0	-10
10 PW	29	-3	7	14	19	-78	20	-21	2	-80	2	0	2	1	1	1	2	0	0	0	1	0	0	-82
11 FRD	-46	0	0	0	0	0	0	0	0	0	-26	0	0	0	0	0	0	0	0	0	0	0	0	-72
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	-58	4	4	1	3	-47	-24	1	0	3	0	0	-22	0	0	0	0	0	0	0	0	0	0	-134
14 AAR	34	-18	5	3	5	-71	-29	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	-64
15 CAL	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	1	0	0	0	0	0	0	12
17 CHS	-4	4	1	0	2	1	0	1	0	2	0	0	0	0	0	1	62	0	0	0	0	0	0	68
18 FAU	0	0	-33	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-32
19 STA	-10	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-9
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	1	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	-325	-3701	3044	-1611	3956	-3952	1548	-287	-44	-76	-23	0	-119	-179	0	0	0	-12	-17	-18	0	0	0	-1736

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0.94	0.92	0.92	0.85	2.12	0.65	2.99	0.82	0	0.30	0	0	0.02	0.02	0.63	0.01	0.32	0	0	0	0.65	0	0	0.93
2 DC NC	1.10	1.01	1.87	1.06	2.83	0.63	0.87	0.60	0	0.44	0	0	0.51	0.15	0.08	0	0.04	0	0	0	0.03	0	0	1.08
3 MTG	0.70	0.49	1.57	0.26	3.91	0.79	1.00	0.71	0	14.98	0.01	0	0.05	0	0.01	0	0	0	0	0	0	0	0	1.01
4 PG	1.39	0.54	0.23	0.69	5.29	0.54	0.40	0.25	0	14.86	0	0	0.18	0.01	0	0	0.03	0	0	0	0	0	0	0.83
5 ARLCR	2.39	1.01	2.85	0.56	324.64	1.41	4.21	1.52	0	0.21	0	0	0	0	0	0	0	0	0	0	0	0	0	1.96
6 ARNCR	0.71	0.44	1.08	0.10	3.95	0.65	1.50	0.78	0	7.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0.77
7 ALX	1.14	0.50	1.24	0.19	2.28	0.89	1.73	0.88	0	0.30	0	0	0	0	0	0	0	0	0	0	0	0	0	1.15
8 FFX	1.13	0.29	0.93	0.53	3.14	0.77	0.98	1.17	0.08	37.99	0.79	0	1.02	0.46	0.28	0.35	0.81	0	0	0	0.21	0	0	1.05
9 LDN	0.75	0.40	0.42	0	8.39	0.11	0.35	0.20	45.83	5.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0.93
10 PW	1.25	0.79	1.67	13.95	19.26	0.20	20.36	0.68	2.10	0.45	1.93	0	2.48	1.29	0.69	0.91	2.00	0	0	0	0.53	0	0	0.82
11 FRD	0.04	0.04	0.15	0	0.11	0.04	0	0.04	0	0.12	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0.68
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0.46	4.30	3.99	1.13	2.70	0.03	0.02	1.30	0	3.03	0	0	0.18	0	0	0	0	0	0	0	0	0	0	0.36
14 AAR	1.25	0.42	4.66	2.62	5.00	0.04	0.06	3.47	0	3.35	0	0	0	0.20	0	0	0	0	0	0	0	0	0	0.76
15 CAL	1.16	0.09	0.02	0	0.05	0.02	0	0.03	0	0.08	0	0	0	0	0.39	0	0	0	0	0	0	0	0	1.84
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11.29	0.73	0	0	0	0	0	0	12.02
17 CHS	0.90	3.89	0.94	0	1.85	1.05	0.17	0.58	0	1.69	0	0	0	0	0	0.50	61.56	0	0	0	0	0	0	2.62
18 FAU	0.05	0	0	0	0	0	0	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02
19 STA	0.02	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.12
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0.78	0.25	0.56	0.27	0.09	0.17	0.18	2.47	0	0.14	0	0	0	0	0	0	0	0	0	0	0	0	0	4.91
22 KGEO	0	0	0	0	0	0	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.05
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.99	0.85	1.29	0.71	2.97	0.69	1.56	0.93	0.52	0.72	0.87	0	0.09	0.02	0	0	0	0	0	0	0	0	0	0.98

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips   MODE: Est Auto Person

        DESTINATION
ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |   TOTAL
=========================================================================================================================================================================
 1 DC CR| 31630  14507   5105  10022   1874   3326   2434   5813    404    768    324     76    614   1604    166    111    633    121    207     42    138     12      0 |  79933
 2 DC NC| 12225  32953   7765  12755   1123   2443   1962   4708    318    565    314     75    769   1732    157     91    611     88    145     39     97      9      0 |  80943
 3 MTG  |  4311   9292 155735  10541    453   1685   1038   6467    628    625   2282    444   2397   2350    133     75    325    155    153    164    115      8      0 | 199377
 4 PG   |  8689  13323  10515 109488    701   1723   2168   4045    268    548    403    161   3073   6988    582    293   2143     95    179     48    130     22      0 | 165586
 5 ARLCR|  1744   1694    777    909   5207   3138   1460   3086    168    341     37      8     47    121     14     10     54     30     52     10     34      3      0 |  18942
 6 ARNCR|  3205   3120   1763   1835   2697  21222   3543   9410    447    850     77     14     97    253     26     17    113     73    115     22     79      5      0 |  48982
 7 ALX  |  2412   2213   1027   2114   1401   3588  19881   9025    297   1010     56     12     81    237     38     30    193     61    155     17    101      8      0 |  43956
 8 FFX  |  4012   4636   5962   3900   2776   9079   8681 227141   8297   8216    324     59    320    625     80     64    368    706    675    160    432     23      0 | 286534
 9 LDN  |   277    255    548    229    146    403    272   8281  39427    992    217     21     43     63      4      4     24    192     48    248     36      1      0 |  51733
10 PW   |   583    511    579    515    311    818    967   8027    931  55488     43      7     43    107     14     12     68    707   1053     48    463     19      0 |  71314
11 FRD  |   323    313   2360    419     39     81     60    383    261     56  45128   1008    586    365     13      8     33     31     20    444     16      1      0 |  51947
12 CAR  |    89     84    508    184      9     17     14     80     29     11   1041  26207    507    267      6      3     13      6      5     51      4      0      0 |  29136
13 HOW  |   641    832   2545   3295     51    107     92    384     54     52    530    456  33009   4815     45     26     92     20     19     44     16      2      0 |  47128
14 AAR  |  1521   1781   2527   7226    123    263    252    731     84    128    347    246   5009  88151    363    113    355     38     57     41     47      9      0 | 109414
15 CAL  |   180    167    148    628     16     29     42     97      7     19     14      6     51    391  13610    830    350      5     10      2     11      9      0 |  16623
16 STM  |   132    110     94    352     12     22     35     81      7     17     10      4     33    139    887  36711    734      6     19      2     33     39      0 |  39478
17 CHS  |   624    620    357   2244     55    116    193    385     28     74     32     11     98    372    333    659  25713     18     42      5     44     70      0 |  32093
18 FAU  |   102     72    130     81     26     63     55    690    191    723     25      4     16     31      4      4     16   8037    145     39    112      5      0 |  10573
19 STA  |   176    119    133    153     43     94    132    624     47   1073     16      3     17     50      8     12     37    142  12374      5   2148     55      0 |  17461
20 CL/JF|    36     32    147     42      8     19     15    154    243     50    371     40     42     37      2      1      5     39      5  10065      5      0      0 |  11360
21 SP/FB|   120     89     99    110     29     64     85    398     36    464     12      3     14     40      8     21     36    107   2075      5  20034     82      0 |  23931
22 KGEO |    11      7      7     19      2      4      7     22      1     20      1      0      2      8      7     28     60      5     57      0     86   1961      0 |   2316
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
=========================================================================================================================================================================
 TOTAL | 73044         198831         17101         43388         52173         51604         46869         16501         31976         17614         24181             0 |
            86731         167062         48304         290030         72090         28865         108745         39124         10681         11502         2343      1438760
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips   MODE: Obs Auto Person

        DESTINATION
ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |   TOTAL
=========================================================================================================================================================================
 1 DC CR| 24492  17645   9284  12601    382   7308   5548  12447   1623    635      0      0      0   1974      0      0   1289      0    610      0      0    218      0 |  96057
 2 DC NC| 13372  35152  14187  21173    500   2117   1074   8691    691    271      0      0    172   1917    951      0   1302      0    568      0    610      0      0 | 102748
 3 MTG  |  7988   6881 182470  15389      0   2390    922   6513   1316    186   5969    455   2368   2535      0      0      0    330      0      0      0      0      0 | 235541
 4 PG   |  7299   9492  14249 117882    410    941    503   4562    661    281      0      0   4576  11109    376      0   2326      0      0      0      0      0      0 | 174665
 5 ARLCR|  1501   1095    674    578   1093   2132   1275   3740      0    666      0      0      0      0      0      0      0      0      0      0      0      0      0 |  12755
 6 ARNCR|  5572   1670   2579    958   3172  22054   4424  17269    243    976      0      0      0    383      0      0    156      0    929      0      0      0      0 |  60384
 7 ALX  |  2706   1733    589   1054    799   3330  22215   7306    618    857      0      0   1832    757      0      0    394      0    320      0      0      0      0 |  44510
 8 FFX  | 12244   8314  12004   5143   2308  13260   6809 244825  10629  16271    610      0     54    280    238    235   1866    909   2885    521   1344      0      0 | 340747
 9 LDN  |  1491    356    460    984      0    719    300   9678  36901   1147      0      0      0      0      0      0      0      0    260     78      0      0      0 |  52374
10 PW   |     0    367    770    203      0   1102   1002  16194    804  53581      0      0      0      0      0      0      0    759    797      0    129    164      0 |  75870
11 FRD  |     0      0   3837   1533      0      0      0      0      0    298  51834   1142    883      0      0      0      0      0      0    539      0      0      0 |  60066
12 CAR  |     0      0    679      0      0      0      0      0      0      0   1302  23345   1072   1026      0      0      0      0      0      0      0      0      0 |  27424
13 HOW  |   740    707   1876   2185      0      0   1368    210      0      0    387   1630  35663  10060      0      0    392      0      0      0      0      0      0 |  55217
14 AAR  |  1217    602   3742   6812    188   1292      0    191      0    363      0    969   6472  86800    765    527      0      0      0      0      0      0      0 | 109941
15 CAL  |   801      0      0    510      0      0      0    674      0      0      0      0    239    889  14131    760    249      0      0      0      0      0      0 |  18254
16 STM  |     0      0      0    460      0      0      0    523      0      0      0      0      0      0   1343  38555   1136      0      0      0      0      0      0 |  42017
17 CHS  |   142    491      0   2971      0    295    680      0      0      0      0      0      0    401      0   1403  26668      0      0      0      0      0      0 |  33053
18 FAU  |     0      0      0      0      0      0      0    685    351    286      0      0      0      0      0      0      0   3937      0      0      0      0      0 |   5259
19 STA  |     0   1014      0      0      0      0      0    856      0   1228      0      0      0      0      0      0      0      0  10130      0   2452    118      0 |  15799
20 CL/JF|     0      0      0      0      0      0      0      0    488      0    545      0      0      0      0      0      0      0      0   2923    539      0      0 |   4495
21 SP/FB|     0    266      0      0    558    568      0    337      0    131      0      0      0      0      0      0      0      0   2784      0  22091    593      0 |  27328
22 KGEO |   335    173      0      0      0      0      0      0      0    164      0      0      0      0      0      0    596      0      0      0   1643   5357      0 |   8267
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
=========================================================================================================================================================================
 TOTAL | 79900         247229          9410         46120         54325         60646         53333         17805         36374         19614         28807             0 |
            85957         190434         57510         334698         77341         27541         118130         41480         5605         4060         6450      1602771
```

Appendix B Year 2007 mode choice summary

```
        Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
        Purpose: Internal NHW Trips    MODE: Difference (Est-Obs) Auto Person

            DESTINATION
     ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
     ================================================================================================================================================================================
      1 DC CR|  7138  -3138  -4179  -2579   1491  -3982  -3113  -6634  -1219    133    324     76    614   -370    166    111   -655    121   -403     42    138   -206      0 | -16123
      2 DC NC| -1148  -2199  -6422  -8418    623    326    889  -3983   -373    294    314     75    596   -185   -795     91   -691     88   -423     39   -513      9      0 | -21805
      3 MTG  | -3677   2411 -26564  -4848    453   -706    116    -46   -688    439  -3687    -11     29     29    133     75    325    155   -177    164    115      8      0 | -36165
      4 PG   |  1390   3830  -3734  -8394    292    782   1664   -517   -393    267    403    161  -1503  -4121    206    293   -183     95    179     48    130     22      0 |  -9080
      5 ARLCR|   242    599    103    331   4113   1006    184   -655    168   -326     37      8     47    121     14     10     54     30     52     10     34      3      0 |   6186
      6 ARNCR| -2367   1450   -816    878   -475   -832   -882  -7859    204   -126     77     14     97   -130     26     17    -43     73   -814     22     79      5      0 | -11402
      7 ALX  |  -294    480    438   1060    603    258  -2335   1720   -321    153     56     12  -1751   -520     38     30   -201     61   -165     17    101      8      0 |   -554
      8 FFX  | -8233  -3678  -6042  -1242    469  -4181   1872 -17685  -2331  -8055   -286     59    266    345   -158   -171  -1499   -204  -2209   -361   -912     23      0 | -54214
      9 LDN  | -1214   -101     88   -755    146   -317    -28  -1396   2526   -154    217     21     43     63      4      4     24    192   -212    170     36      1      0 |   -641
     10 PW   |   583    144   -191    313    311   -284    -35  -8167    127   1907     43      7     43    107     14     12     68    -52    257     48    334   -145      0 |  -4556
     11 FRD  |   323    313  -1477  -1114     39     81     60    383    261   -243  -6705   -134   -297    365     13      8     33     31     20    -95     16      1      0 |  -8119
     12 CAR  |    89     84   -171    184      9     17     14     80     29     11   -260   2862   -565   -759      6      3     13      6      5     51      4      0      0 |   1713
     13 HOW  |   -99    125    669   1110     51    107  -1276    174     54     52    143  -1174  -2654  -5244     45     26   -299     20     19     44     16      2      0 |  -8089
     14 AAR  |   304   1179  -1215    415    -65  -1029    252    540     84   -234    347   -723  -1464   1351   -402   -414    355     38     57     41     47      9      0 |   -527
     15 CAL  |  -621    167    148    118     16     29     42   -577      7     19     14      6   -188   -499   -521     71    100      5     10      2     11      9      0 |  -1631
     16 STM  |   132    110     94   -108     12     22     35   -442      7     17     10      4     33    139   -456  -1844   -403      6     19      2     33     39      0 |  -2539
     17 CHS  |   482    130    357   -727     55   -179   -488    385     28     74     32     11     98    -29    333   -745   -955     18     42      5     44     70      0 |   -959
     18 FAU  |   102     72    130     81     26     63     55      6   -161    437     25      4     16     31      4      4     16   4100    145     39    112      5      0 |   5314
     19 STA  |   176   -895    133    153     43     94    132   -233     47   -155     16      3     17     50      8     12     37    142   2244      5   -304    -63      0 |   1662
     20 CL/JF|    36     32    147     42      8     19     15    154   -245     50   -174     40     42     37      2      1      5     39      5   7142   -534      0      0 |   6865
     21 SP/FB|   120   -177     99    110   -530   -505     85     61     36    334     12      3     14     40      8     21     36    107   -709      5  -2058   -511      0 |  -3397
     22 KGEO |  -323   -165      7     19      2      4      7     22      1   -143      1      0      2      8      7     28   -536      5     57      0  -1557  -3396      0 |  -5951
     23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
     ================================================================================================================================================================================
      TOTAL | -6856         -48398          7691         -2732         -2152         -9043         -6463         -1304         -4398         -2000         -4627      0 |
                      774         -23372         -9206        -44668         -5251          1324         -9385         -2356          5077          7442         -4107        -164011
```

```
        Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
        Purpose: Internal NHW Trips    MODE: Ratio (Est/Obs) Auto Person

            DESTINATION
     ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
     ================================================================================================================================================================================
      1 DC CR|  1.29   0.82   0.55   0.80   4.90   0.46   0.44   0.47   0.25   1.21 324.47  76.06 613.73   0.81 166.03 111.03   0.49 121.15   0.34  42.43 138.36   0.06      0 |   0.83
      2 DC NC|  0.91   0.94   0.55   0.60   2.25   1.15   1.83   0.54   0.46   2.08 313.58  74.58   4.46   0.90   0.16  91.22   0.47  88.39   0.26  38.70   0.16   9.24      0 |   0.79
      3 MTG  |  0.54   1.35   0.85   0.68 452.65   0.70   1.13   0.99   0.48   3.36   0.38   0.98   1.01   0.93 133.48  74.78 325.13 154.92   0.46 164.48 114.70   7.59      0 |   0.85
      4 PG   |  1.19   1.40   0.74   0.93   1.71   1.83   4.31   0.89   0.41   1.95 403.20 160.91   0.67   0.63   1.55 292.95   0.92  95.32 178.90  48.16 130.31  21.91      0 |   0.95
      5 ARLCR|  1.16   1.55   1.15   1.57   4.76   1.47   1.14   0.82 168.06   0.51  37.47   7.84  47.37 121.06  14.46   9.88  53.75  29.62  51.66   9.50  34.23   2.74      0 |   1.49
      6 ARNCR|  0.58   1.87   0.68   1.92   0.85   0.96   0.80   0.54   1.84   0.87  76.62  13.84  97.33   0.66  25.89  17.39   0.73  73.17   0.12  22.33  78.91   5.02      0 |   0.81
      7 ALX  |  0.89   1.28   1.74   2.01   1.75   1.08   0.89   1.24   0.48   1.18  55.76  11.64   0.04   0.31  37.68  29.82   0.49  61.01   0.49  17.47 101.07   7.86      0 |   0.99
      8 FFX  |  0.33   0.56   0.50   0.76   1.20   0.68   1.27   0.93   0.78   0.50   0.53  59.42   5.96   2.23   0.34   0.27   0.20   0.78   0.23   0.31   0.32  23.00      0 |   0.84
      9 LDN  |  0.19   0.72   1.19   0.23 146.35   0.56   0.91   0.86   1.07   0.87 216.01  21.04  43.31  62.84   4.44   3.97  23.68 191.98   0.18   3.17  36.36   1.39      0 |   0.99
     10 PW   | 583.15  1.39   0.75   2.54 311.25   0.74   0.96   0.50   1.16   1.04  42.89   7.03  43.29 107.02  14.16  12.00  68.11   0.93   1.32  47.68   3.60   0.11      0 |   0.94
     11 FRD  | 323.43 313.44  0.62   0.27  38.50  80.60  59.80 382.96 261.22   0.19   0.87   0.88   0.66 365.00  13.23   8.32  32.85  30.60  19.66   0.82  16.21   0.84      0 |   0.86
     12 CAR  | 89.21  84.24   0.75 183.59   9.17  17.23  14.37  80.28  29.36  10.83   0.80   1.12   0.47   0.26   5.70   3.27  12.74   5.67   4.77  50.76   4.05   0.17      0 |   1.06
     13 HOW  |  0.87   1.18   1.36   1.51  51.31 107.31   0.07   1.83  53.87  52.26   1.37   0.28   0.93   0.48  45.29  25.89   0.24  19.56  19.37  44.21  15.96   2.12      0 |   0.85
     14 AAR  |  1.25   2.96   0.68   1.06   0.65   0.20 252.38   3.82  83.99   0.35 346.82   0.25   0.77   1.02   0.47   0.22 355.31  37.52  57.21  41.41  47.06   8.52      0 |   1.00
     15 CAL  |  0.22 167.37 148.28   1.23  15.71  28.85  42.40   0.14   6.67  18.87  14.17   5.61   0.21   0.44   0.96   1.09   1.40   4.76  10.41   2.22  10.63   9.13      0 |   0.91
     16 STM  | 131.75 109.86  93.74   0.77  11.96  21.95  34.94   0.16   6.60  17.18  10.21   3.73  33.25 139.19   0.66   0.95   0.65   5.97  19.47   1.92  32.91  38.52      0 |   0.94
     17 CHS  |  4.39   1.26 356.99   0.76  54.60   0.39   0.39 384.55  27.74  73.85  32.06  11.33  98.24   0.93 333.00   0.47   0.96  17.93  42.29   5.42  44.24  70.37      0 |   0.97
     18 FAU  | 102.35  72.18 130.07  81.31  26.05  62.91  55.41   1.01   0.54   2.52  24.79   3.94  16.40  31.16   3.79   4.16  16.42   2.04 145.02  38.70 111.77   5.19      0 |   1.11
     19 STA  | 175.75  0.12 132.94 153.01  42.55  94.15 132.06   0.73  47.33   0.87  15.79   3.42  16.85  49.50   7.88  12.39  37.41 142.34   1.22   5.20   0.88   0.46      0 |   1.11
     20 CL/JF| 36.15  32.33 147.44  41.51   8.27  19.22  15.45 153.30   0.50  49.77   0.68  40.42  41.87  36.97   1.63   1.13   4.61  39.47   5.37   3.44   0.01   0.17      0 |   2.53
     21 SP/FB| 120.15  0.33  98.62 109.56   0.05   0.11  85.09   1.18  35.80   3.55  12.49   2.66  14.04  40.17   7.73  21.26  36.48 107.03   0.75   4.94   0.91   0.14      0 |   0.88
     22 KGEO |  0.03   0.04   6.67  19.18   2.31   4.38   6.89  21.72   1.46   0.12   0.65   0.10   1.94   7.64   6.86  27.59   0.10   5.37  57.18   0.17   0.05   0.37      0 |   0.28
     23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
     ================================================================================================================================================================================
      TOTAL |  0.91          0.80          1.82          0.94          0.96          0.85          0.88          0.93          0.88          0.90          0.84      0 |
                     1.01           0.88          0.84          0.87          0.93          1.05          0.92          0.94          1.91          2.83          0.36         0.90
```

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips   MODE: Est Auto Driver

```
        DESTINATION
ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=======================================================================================================================================================================
 1 DC CR|25737  11711   4311   9415   1345   2508   1793   5048    305    653    175     44    519   1286    122     54    536     66    133     15     62      4     0 |  65841
 2 DC NC| 9469  27416   6655  12048    748   1741   1345   4022    235    479    181     47    660   1406    118     46    529     46     90     13     39      3     0 |  67335
 3 MTG  | 3707   8326 132254   8331    323   1347    619   3576    261    260   1343    247   1725   1274     45     22    122     48     47     51     33      2     0 | 163965
 4 PG   | 7988  12303   7901 100030    537   1412   1557   2155     87    222    128     59   2276   4990    346    121   1588     28     56     14     38      6     0 | 143840
 5 ARLCR| 1225   1498    666    858   3885   2657   1237   2722    118    294     19      4     39     90     10      4     44     16     34      3     14      1     0 |  15437
 6 ARNCR| 2218   2744   1476   1723   2079  18556   3046   8252    322    740     37      6     75    181     18      7     95     40     76      7     32      2     0 |  41732
 7 ALX  | 1716   1919    755   1901   1136   3151  17013   7705    181    826     20      4     50    142     23     14    159     26     96      5     41      2     0 |  36885
 8 FFX  | 3805   4143   3803   2555   2701   8371   6736 182743   6886   6435    105     18    115    211     25     19    167    352    319     54    139      7     0 | 229709
 9 LDN  |  195    167    222     79    124    275    126   5672  36881    681    116      6     13     18      1      1      7    100     15    155     11      0     0 |  44867
10 PW   |  473    391    240    223    284    658    585   5385    637  51984     12      2     13     31      4      3     22    523    818     15    234      6     0 |  62544
11 FRD  |  129    157   1261    139     19     35     19    114    141     16  40956    740    268    112      4      2      9      9      6    262      5      0     0 |  44404
12 CAR  |   34     39    239     65      4      6      4     23      9      3    704  24978    327    100      2      1      4      2      1     16      1      0     0 |  26563
13 HOW  |  487    664   1732   2449     32     67     40    122     16     15    239    324  30289   3880     14      7     28      6      6     13      5      1     0 |  40436
14 AAR  | 1073   1329   1345   5173     75    154    114    228     24     37    108    101   3971  79986    214     34    134     11     16     12     14      2     0 |  94156
15 CAL  |   97    103     51    355      9     14     18     29      2      5      4      2     16    218  12898    631    217      1      3      1      3      3     0 |  14679
16 STM  |   49     47     28    140      6      8     12     23      2      5      3      1     10     41    682  34388    484      2      6      1      9     13     0 |  35959
17 CHS  |  444    471    138   1653     34     74    114    145      8     23      9      3     30    141    210    448  24171      5     12      2     13     31     0 |  28179
18 FAU  |   41     32     42     25     19     34     20    287     99    527      7      1      5      9      1      1      5   7539     94     17     56      2     0 |   8863
19 STA  |   86     61     43     49     33     58     59    255     14    812      5      1      5     14      2      4     11     93  11733      2   1899     41     0 |  15279
20 CL/JF|   10     10     45     12      4      6      5     47    143     15    201     13     12     11      0      0      1     17      2   9583      2      0     0 |  10140
21 SP/FB|   40     33     29     32     19     30     30    126     10    242      4      1      4     12      2      6     11     56   1863      1  18911     62     0 |  21524
22 KGEO |    3      2      2      6      1      2      2      6      0      7      0      0      1      2      2      9     27      2     42      0     61   1883     0 |   2060
23 EXTL |    0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |      0
=======================================================================================================================================================================
 TOTAL  59028         163238         13419          34493          46383          44378          40419          14745          28369          15466          21619           0 |
             73568         147259          41165          228685          64283          26602          94155          35822           8987          10240           2072    1214396
```

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips   MODE: Obs Auto Driver

```
        DESTINATION
ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=======================================================================================================================================================================
 1 DC CR|19851  14593   8320  10799    233   5905   4449  11035   1623    635      0      0      0   1974      0      0   1289      0    174      0      0    218     0 |  81097
 2 DC NC|10542  28622  12019  16741    282   2117   1074   8167    691    271      0      0    172   1917    634      0   1302      0    162      0    174      0     0 |  84889
 3 MTG  | 7015   5983 150732  13752      0   2390    810   5993   1134    186   5065    455   2368   2535      0      0    330      0      0      0      0      0     0 | 198749
 4 PG   | 6267   7687  12943  95292    263    941    503   4380    661    281      0      0   3916  10171    376      0   2018      0      0      0      0      0     0 | 145700
 5 ARLCR|  881   1095    674    578   1093   1635   1275   3740      0    666      0      0      0      0      0      0      0      0      0      0      0      0     0 |  11638
 6 ARNCR| 4111   1559   1646    958   1794  18589   3968  15419    243    687      0      0      0    191      0      0    156      0    929      0      0      0     0 |  50249
 7 ALX  | 2170   1544    589   1054    799   3100  17996   6967    618    857      0      0    730    399      0      0    394      0    320      0      0      0     0 |  37537
 8 FFX  |10339   7554  10939   3611   2100  11508   6809 196505   9379  14473    610      0     54    280    238    235   1387    699   1036    327   1344      0     0 | 279426
 9 LDN  | 1491    356    460    984      0    719    300   8107  32101   1147      0      0      0      0      0      0      0      0    260     78      0      0     0 |  46003
10 PW   |    0    367    770    203      0   1102   1002  14113    804  45994      0      0      0      0      0      0      0    592    797      0    129    164     0 |  66035
11 FRD  |    0      0   2664    952      0      0      0      0      0    298  44564    976    883      0      0      0      0      0      0    539      0      0     0 |  50876
12 CAR  |    0      0    679      0      0      0      0      0      0      0   1136  19012   1072   1026      0      0      0      0      0      0      0      0     0 |  22925
13 HOW  |  211    707   1568   1765      0      0    540    210      0      0    387   1630  31827   8293      0      0    392      0      0      0      0      0     0 |  47530
14 AAR  |  859    602   2042   6812    188    646      0    191      0    363      0    969   5944  80970    765    264    249      0      0      0      0      0     0 | 100614
15 CAL  |  801      0      0    510      0      0      0    674      0      0      0      0    239    626  12393    760    249      0      0      0      0      0     0 |  16252
16 STM  |    0      0      0    460      0      0      0    523      0      0      0      0      0      0   1343  34619   1136      0      0      0      0      0     0 |  38059
17 CHS  |  142    491      0   2971      0    295    680      0      0      0      0      0      0    401      0   1403  19913      0      0      0      0      0     0 |  26298
18 FAU  |    0      0      0      0      0      0      0    685    351    286      0      0      0      0      0      0      0   3389      0      0      0      0     0 |   4711
19 STA  |    0    404      0      0      0      0      0    856      0   1228      0      0      0      0      0      0      0      0   6941      0   2156    118     0 |  11703
20 CL/JF|    0      0      0      0      0      0      0      0    488      0    545      0      0      0      0      0      0      0      0   2266    539      0     0 |   3839
21 SP/FB|    0    266      0      0    558    568      0    337      0    131      0      0      0      0      0      0      0      0   2488      0  18863    593     0 |  23803
22 KGEO |  335    173      0      0      0      0      0      0      0    164      0      0      0      0      0      0    596      0      0      0    900   3257     0 |   5425
23 EXTL |    0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |      0
=======================================================================================================================================================================
 TOTAL  65015         206044          7312          39405          48094          52306          47206          15749          28832          13438          24105           0 |
             72002         157441          49515          277902          67668          23043          108783         37280           4680           3210           4350    1353382
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips   MODE: Difference (Est-Obs) Auto Driver

        DESTINATION
ORIGIN |  1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
==================================================================================================================================================================================
 1 DC CR|  5887  -2882  -4009  -1385   1112  -3396  -2656  -5986  -1317     17    175     44    519   -688    122     54   -753     66    -41     15     62   -214     0 | -15257
 2 DC NC| -1073  -1206  -5364  -4694    465   -376    271  -4146   -456    207    181     47    488   -511   -516     46   -773     46    -73     13   -135      3     0 | -17554
 3 MTG  | -3308   2343 -18478  -5421    323  -1043   -191  -2417   -873     74  -3721   -208   -643  -1261     45     22    122     48   -283     51     33      2     0 | -34784
 4 PG   |  1721   4616  -5042   4737    274    471   1053  -2225   -574    -59    128     59  -1640  -5182    -30    121   -430     28     56     14     38      6     0 |  -1860
 5 ARLCR|   343    403     -8    280   2792   1022    -39  -1019    118   -372     19      4     39     90     10      4     44     16     34      3     14      1     0 |   3799
 6 ARNCR| -1893   1185   -170    765    286    -33   -922  -7167     80     53     37      6     75    -10     18      7    -61     40   -853      7     32      2     0 |  -8518
 7 ALX  |  -454    375    166    847    337     51   -982    738   -437    -31     20      4   -681   -257     23     14   -235     26   -224      5     41      2     0 |   -652
 8 FFX  | -6534  -3411  -7136  -1056    600  -3137    -72 -13761  -2493  -8038   -505     18     61    -69   -213   -216  -1220   -347   -717   -273  -1205      7     0 | -49717
 9 LDN  | -1296   -189   -238   -904    124   -444   -173  -2435   4780   -465    116      6     13     18      1      1      7    100   -245     77     11      0     0 |  -1136
10 PW   |   473     24   -529     20    284   -444   -418  -8728   -167   5991     12      2     13     31      4      3     22    -69     21     15    105   -157     0 |  -3491
11 FRD  |   129    157  -1403   -813     19     35     19    114    141   -282  -3607   -236   -616    112      4      2      9      9      6   -277      5      0     0 |  -6473
12 CAR  |    34     39   -440     65      4      6      4     23      9      3   -432   5966   -746   -926      2      1      4      2      1     16      1      0     0 |   3638
13 HOW  |   276    -43    164    684     32     67   -499    -89     16     15   -148  -1306  -1538  -4413     14      7   -363      6      6     13      5      1     0 |  -7094
14 AAR  |   214    726   -697  -1638   -113   -492    114     37     24   -325    108   -868  -1972   -984   -551   -230    134     11     16     12     14      2     0 |  -6458
15 CAL  |  -704    103     51   -155      9     14     18   -645      2      5      4      2   -224   -407    506   -129    -32      1      3      1      3      3     0 |  -1573
16 STM  |    49     47     28   -320      6      8     12   -499      2      5      3      1     10     41   -661   -230   -653      2      6      1      9     13     0 |  -2121
17 CHS  |   302    -20    138  -1318     34   -221   -566    145      8     23      9      3     30   -260    210   -956   4257      5     12      2     13     31     0 |   1881
18 FAU  |    41     32     42     25     19     34     20   -398   -252    241      7      1      5      9      1      1      5   4150     94     17     56      2     0 |   4151
19 STA  |    86   -342     43     49     33     58     59   -601     14   -416      5      1      5     14      2      4     11     93   4792      2   -256    -76     0 |   3576
20 CL/JF|    10     10     45     12      4      6      5     47   -345     15   -344     13     12     11      0      0      1     17      2   7317   -538      0     0 |   6301
21 SP/FB|    40   -233     29     32   -539   -539     30   -210     10    112      4      1      4     12      2      6     11     56   -625      1     48   -531     0 |  -2279
22 KGEO |  -331   -170      2      6      1      2      2      6      0   -157      0      0      1      2      2      9   -569      2     42      0   -840  -1374     0 |  -3365
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |      0
==================================================================================================================================================================================
 TOTAL  | -5987         -42806          6108         -4912         -1711         -7928         -6787         -1004          -463          2028         -2486          0 |
              1565         -10182         -8350        -49217         -3385          3560        -14628         -1458          4307          7030         -2278              -138985
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips   MODE: Ratio (Est/Obs) Auto Driver

        DESTINATION
ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
==================================================================================================================================================================================
 1 DC CR|  1.30   0.80   0.52   0.87   5.77   0.42   0.40   0.46   0.19   1.03 175.41  44.22 518.77   0.65 121.87  53.59   0.42  66.07   0.76  14.68  61.67   0.02    0 |  0.81
 2 DC NC|  0.90   0.96   0.55   0.72   2.65   0.82   1.25   0.49   0.34   1.76 181.10  46.53   3.83   0.73   0.19  46.06   0.41  45.79   0.55  13.22   0.23   3.04    0 |  0.79
 3 MTG  |  0.53   1.39   0.88   0.61 323.47   0.56   0.76   0.60   0.23   1.40   0.27   0.54   0.73   0.50  45.07  21.76 122.09  48.21   0.14  51.31  33.00   2.19    0 |  0.82
 4 PG   |  1.27   1.60   0.61   1.05   2.04   1.50   3.09   0.49   0.13   0.79 127.58  58.60   0.58   0.49   0.92 120.59   0.79  27.69  55.77  13.84  37.54   6.40    0 |  0.99
 5 ARLCR|  1.39   1.37   0.99   1.48   3.55   1.63   0.97   0.73 118.14   0.44  18.98   4.01  38.57  89.94   9.91   4.16  44.10  16.29  33.54   3.02  14.44   0.87    0 |  1.33
 6 ARNCR|  0.54   1.76   0.90   1.80   1.16   1.00   0.77   0.54   1.33   1.08  37.10   6.36  74.72   0.95  17.53   7.00   0.61  40.33   0.08   6.94  32.15   1.52    0 |  0.83
 7 ALX  |  0.79   1.24   1.28   1.80   1.42   1.02   0.95   1.11   0.29   0.96  20.01   4.16   0.07   0.36  23.05  13.56   0.40  25.79   0.30   5.16  40.91   2.45    0 |  0.98
 8 FFX  |  0.37   0.55   0.35   0.71   1.29   0.73   0.99   0.93   0.73   0.44   0.17  18.18   2.14   0.75   0.11   0.08   0.12   0.50   0.31   0.16   0.10   6.65    0 |  0.82
 9 LDN  |  0.13   0.47   0.48   0.08 124.13   0.38   0.42   0.70   1.15   0.59 116.39   6.28  12.72  18.27   1.28   1.15   6.89 100.12   0.06   1.98  10.52   0.40    0 |  0.98
10 PW   |473.25   1.06   0.31   1.10 284.32   0.60   0.58   0.38   0.79   1.13  12.37   2.03  12.55  31.21   4.11   3.46  21.80   0.88   1.03  14.83   1.82   0.04    0 |  0.95
11 FRD  |128.77 157.21   0.47   0.15  19.15  34.98  19.15 113.81 140.78   0.05   0.92   0.76   0.30 112.15   3.81   2.40   9.44   8.95   5.65   0.49   4.66   0.24    0 |  0.87
12 CAR  | 34.16  39.06   0.35  65.24   4.31   6.45   4.35  23.23   8.58   3.12   0.62   1.31   0.30   0.10   1.64   0.94   3.67   1.63   1.37  15.94   1.17   0.05    0 |  1.16
13 HOW  |  2.31   0.94   1.10   1.39  32.18  67.11   0.08   0.58  15.85  15.12   0.62   0.20   0.95   0.47  14.45   7.45   0.07   5.62   5.57  12.87   4.59   0.61    0 |  0.85
14 AAR  |  1.25   2.21   0.66   0.76   0.40   0.24 114.05   1.19  24.44   0.10 107.81   0.10   0.67   0.99   0.28   0.13 133.53  10.77  16.45  11.87  13.51   2.45    0 |  0.94
15 CAL  |  0.12 103.00  50.57   0.70   8.70  13.81  17.84   0.04   1.93   5.45   4.08   1.62   0.07   0.35   1.04   0.83   0.87   1.37   3.00   0.64   3.06   2.68    0 |  0.90
16 STM  | 49.00  47.09  27.97   0.31   5.66   8.17  11.87   0.04   1.90   4.95   2.94   1.08   9.55  41.40   0.51   0.99   0.43   1.72   5.60   0.56   9.44  12.90    0 |  0.94
17 CHS  |  3.12   0.96 137.63   0.56  34.06   0.25   0.17 145.25   8.02  23.01   9.21   3.26  29.79   0.35 210.01   0.32   1.21   5.15  12.31   1.56  12.74  31.01    0 |  1.07
18 FAU  | 41.18  32.40  41.97  24.56  18.92  34.27  19.71   0.42   0.28   1.84   7.27   1.13   4.71   8.95   1.09   1.20   4.72   2.22  93.91  16.89  55.59   1.74    0 |  1.88
19 STA  | 86.07   0.15  42.99  49.28  33.09  57.57  58.54   0.30  14.39   0.66   4.54   0.99   4.84  14.24   2.27   3.57  10.92  92.78   1.69   1.50   0.88   0.35    0 |  1.31
20 CL/JF| 10.38  10.14  45.39  12.06   4.07   6.48   4.52  46.50   0.29  15.17   0.37  12.95  12.20  10.60   0.47   0.33   1.33  16.65   1.54   4.23   0.00   0.05    0 |  2.64
21 SP/FB| 40.33   0.12  29.46  32.23   0.03   0.05  30.16   0.38  10.35   1.85   3.59   0.77   4.04  11.53   2.23   6.11  10.56  55.65   0.75   1.42   1.00   0.10    0 |  0.90
22 KGEO |  0.01   0.01   1.93   5.64   1.20   1.56   2.07   6.27   0.42   0.04   0.19   0.03   0.56   2.20   2.02   9.32   0.04   1.78  42.03   0.05   0.07   0.58    0 |  0.38
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |     0
==================================================================================================================================================================================
 TOTAL  |  0.91          0.79           1.84           0.88           0.96           0.85           0.86           0.94           0.98           1.15           0.90          0 |
               1.02           0.94           0.83           0.82           0.95           1.15           0.87           0.96           1.92           3.19           0.48                0.90
```

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips   MODE: Est Motr Psn

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	49927	23728	7546	11526	3827	6242	3613	6680	404	786	324	76	615	1606	167	111	634	121	207	42	139	12	0	118335
2 DC NC	23751	41378	10205	13968	2080	3698	2418	5025	318	575	314	75	769	1732	157	91	611	88	145	39	97	9	0	107544
3 MTG	7565	10329	163683	10716	914	1981	1106	6513	628	640	2282	444	2399	2350	133	75	325	155	153	164	115	8	0	212678
4 PG	11824	14096	10768	110495	977	1924	2217	4054	268	563	403	161	3073	6988	582	293	2143	95	179	48	130	22	0	171678
5 ARLCR	3682	2056	900	942	5531	3963	1776	3254	168	344	37	8	47	121	14	10	54	30	52	10	34	3	0	23036
6 ARNCR	6123	3639	1940	1877	3934	23420	4177	9901	447	857	77	14	97	253	26	17	113	73	115	22	79	5	0	57207
7 ALX	3579	2377	1090	2132	1714	4182	21045	9214	297	1018	56	12	81	237	38	30	193	61	155	17	101	8	0	47636
8 FFX	6302	4792	6046	3912	3178	9713	9090	229094	8298	8254	324	59	321	625	80	64	369	706	675	160	432	23	0	292516
9 LDN	338	255	548	229	155	408	272	8284	39473	998	217	21	43	63	4	4	24	192	48	248	36	1	0	51862
10 PW	727	522	596	529	331	838	987	8071	933	55554	45	7	46	108	15	13	70	707	1053	48	463	19	0	71680
11 FRD	325	313	2360	419	39	81	60	383	261	56	45281	1008	586	365	13	8	33	31	20	444	16	1	0	52102
12 CAR	89	84	508	184	9	17	14	80	29	11	1041	26207	507	267	6	3	13	6	5	51	4	0	0	29136
13 HOW	691	836	2549	3296	54	109	92	386	54	55	530	456	33014	4815	45	26	92	20	19	44	16	2	0	47202
14 AAR	1692	1793	2532	7229	128	266	254	735	84	132	347	246	5009	88151	363	113	355	38	57	41	47	9	0	109622
15 CAL	181	167	148	628	16	29	42	97	7	19	14	6	51	391	13611	830	350	5	10	2	11	9	0	16624
16 STM	132	110	94	352	12	22	35	81	7	17	10	4	33	139	887	36722	735	6	19	2	33	39	0	39490
17 CHS	662	624	358	2244	56	117	193	385	28	76	32	11	98	372	333	659	25775	18	42	5	44	70	0	32203
18 FAU	102	72	130	81	26	63	55	691	191	723	25	4	16	31	4	4	16	8037	145	39	112	5	0	10574
19 STA	176	119	133	153	43	94	132	625	47	1073	16	3	17	50	8	12	37	142	12374	5	2148	55	0	17462
20 CL/JF	36	32	147	42	8	19	15	154	243	50	371	40	42	37	2	1	5	39	48	10065	5	0	0	11360
21 SP/FB	121	89	99	110	29	64	85	400	36	465	12	3	14	40	8	21	36	107	2075	5	20034	82	0	23936
22 KGEO	11	7	7	19	2	4	7	22	1	20	1	0	2	8	7	28	60	5	57	0	86	1961	0	2316
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	118037	107422	212386	171083	23064	57253	47687	294129	52222	72284	51759	28865	46881	108749	16503	39138	32042	10681	17614	11502	24182	2343	0	1545825

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips   MODE: Obs Motr Psn

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	44004	27699	11942	14362	1302	11773	5942	13501	1671	695	0	0	79	2063	0	0	1289	12	610	0	0	218	0	137163
2 DC NC	23807	43475	15493	22320	838	4109	1597	9221	691	294	0	0	172	1917	951	0	1302	0	568	18	610	0	0	127383
3 MTG	12618	9011	187371	16051	118	2767	989	6579	1316	186	5969	455	2393	2535	0	0	330	0	0	0	0	0	0	248868
4 PG	9548	10928	15334	119349	462	1314	628	4597	661	281	0	0	4576	11140	376	0	2326	0	0	0	0	0	0	181518
5 ARLCR	2312	1455	717	636	1093	2717	1350	3851	0	681	0	0	0	28	0	0	0	0	0	0	0	0	0	14841
6 ARNCR	9670	2854	2743	1376	3485	25410	4177	17901	279	976	0	0	0	418	0	0	156	0	946	0	0	0	0	71060
7 ALX	3726	2062	639	1152	936	3994	22888	7521	618	883	0	0	1832	757	0	0	394	0	320	0	0	0	0	47722
8 FFX	14265	8846	12094	5164	2436	14082	7225	246492	10638	16271	610	0	54	280	238	235	1866	909	2885	521	1344	0	0	346453
9 LDN	1573	356	460	984	0	766	300	9689	36901	1147	0	0	0	0	0	0	0	0	260	78	0	0	0	52514
10 PW	115	381	780	203	0	1200	1002	16259	804	53727	0	0	0	0	0	0	0	759	797	0	129	164	0	76318
11 FRD	48	0	3837	1533	0	0	0	0	0	298	52013	1142	883	0	0	0	0	0	0	539	0	0	0	60293
12 CAR	0	0	679	0	0	0	0	0	0	0	1302	23345	1072	1026	0	0	0	0	0	0	0	0	0	27424
13 HOW	849	707	1876	2185	0	48	1392	210	0	0	387	1630	35690	10060	0	0	392	0	0	0	0	0	0	55425
14 AAR	1354	632	3742	6812	188	1366	31	191	0	363	0	969	6472	86800	765	527	0	0	0	0	0	0	0	110213
15 CAL	801	0	0	510	0	0	0	674	0	0	0	0	239	889	14131	760	249	0	0	0	0	0	0	18254
16 STM	0	0	0	460	0	0	0	523	0	0	0	0	0	0	1343	38555	1136	0	0	0	0	0	0	42017
17 CHS	184	491	0	2971	0	295	680	0	0	0	0	0	0	401	0	1403	26668	0	0	0	0	0	0	33095
18 FAU	0	0	33	0	0	0	0	685	351	286	0	0	0	0	0	0	0	3937	0	0	0	0	0	5292
19 STA	10	1014	0	0	0	0	0	856	0	1228	0	0	0	0	0	0	0	0	10130	0	2452	118	0	15809
20 CL/JF	0	0	0	0	0	0	0	0	488	0	545	0	0	0	0	0	0	0	0	2923	539	0	0	4495
21 SP/FB	0	266	0	0	558	568	0	337	0	131	0	0	0	0	0	0	0	0	2784	0	22091	593	0	27328
22 KGEO	335	173	0	0	0	0	0	0	164	0	0	0	0	0	0	0	596	0	0	0	1643	5357	0	8267
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	125219	110349	257740	196066	11416	70411	48871	339084	54418	77611	60825	27541	53464	118313	17805	41480	36374	5617	19631	4078	28807	6450	0	1711572

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips   MODE: Difference (Est-Obs) Motorized Person

```
          DESTINATION
ORIGIN |    1      2       3       4      5      6      7       8      9     10     11    12     13     14     15    16    17     18     19    20    21    22   23 |  TOTAL
=======================================================================================================================================================================
 1 DC CR|  5924  -3971   -4396  -2836   2525  -5532  -2329  -6821  -1267    90    324    76    536   -457    167   111  -655    109   -403    42   139  -206    0 | -18827
 2 DC NC|   -57  -2097   -5288  -8351   1243   -411    822  -4196   -373   281    314    75    597   -185   -795    91  -691     88   -423    21  -513     9    0 | -19839
 3 MTG  | -5053   1318  -23688  -5335    796   -787    117    -66   -688   454  -3687   -11     5    133     75   325   155   -177    164   115     8    0 | -36011
 4 PG   |  2275   3167   -4566  -8854    515    610   1589   -543   -393   282    403   161  -1503  -4152    206   293  -183     95    179    48   130    22    0 | -10216
 5 ARLCR|  1370    601     183    306   4438   1246    425   -597    168  -337     37     8     47     93     14    10    54     30     52    10    34     3    0 |   8194
 6 ARNCR| -3546    786    -803    501    450  -1990    450  -7999    168  -119     77    14     97   -165     26    17   -43     73   -831    22    79     5    0 | -13853
 7 ALX  |  -146    316     450    980    778    187  -1843   1693   -321   135     56    12  -1751   -520     38    30  -201     61   -165    17   101     8    0 |    -86
 8 FFX  | -7964  -4054   -6048  -1252    742  -4370   1865 -17398  -2339 -8017   -286    59    267    345   -158  -171 -1498   -204  -2209  -361  -912    23    0 | -53937
 9 LDN  | -1234   -101      88   -755    155   -358    -27  -1405   2572  -149    217    21     43     63      4     4    24    192   -212   170    36     1    0 |   -651
10 PW   |   612    141    -184    327    331   -362    -15  -8187    129  1827     45     7     46    108     15    13    70    -52    257    48   335  -145    0 |  -4638
11 FRD  |   277    313   -1477  -1114     39     81     60    383    261  -243  -6731  -134   -297    365     13     8    33     31     20   -95    16     1    0 |  -8191
12 CAR  |    89     84    -171    184      9     17     14     80     29    11   -260  2862   -565   -759      6     3    13     6      5    51     4     0    0 |   1713
13 HOW  |  -157    129     673   1111     54     61  -1300    175     54    55    143 -1174  -2676  -5244     45    26  -299    20     19    44    16     2    0 |  -8223
14 AAR  |   338   1161   -1210    418    -60  -1100    223    544     84  -231    347  -723  -1464   1351   -402  -414   355    38     57    41    47     9    0 |   -591
15 CAL  |  -620    167     148    118     16     29     42   -577      7    19     14     6   -188   -499   -520    71   100     5     10     2    11     9    0 |  -1629
16 STM  |   132    110      94   -108     12     22     35   -442      7    17     10     4     33    139   -456 -1833  -402     6     19     2    33    39    0 |  -2527
17 CHS  |   478    133     358   -727     56   -178   -487    385     28    76     32    11     98    -29    333  -744  -894    18     42     5    44    70    0 |   -891
18 FAU  |   102     72      97     81     26     63     55      7   -161   437     25     4     16     31      4     4    16  4100    145    39   112     5    0 |   5282
19 STA  |   166   -895     133    153     43     94    132   -232     47  -155     16     3     17     50      8    12    37   142   2244     5  -304   -63    0 |   1654
20 CL/JF|    36     32     147     42      8     19     15    154   -245    50   -174    40     42     37      2     1     5    39      5  7142  -534     0    0 |   6865
21 SP/FB|   121   -177      99    110   -530   -504     85     64     36   334     12     3     14     40      8    21    36   107   -709     5 -2058  -511    0 |  -3392
22 KGEO |  -323   -165       7     19      2      4      7     22      1  -143      1     0      2      8      7    28  -536     5     57     0 -1557 -3396    0 |  -5951
23 EXTL |     0      0       0      0      0      0      0      0      0     0      0     0      0      0      0     0     0     0      0     0     0     0    0 |      0
=======================================================================================================================================================================
 TOTAL |  -7181        -45355         11648        -1184         -2196        -9066         -6583        -1302        -4333        -2017        -4625          0 |
             -2928         -24983        -13158        -44955        -5327         1324         -9564        -2343         5065         7424        -4107     -165746
```

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips   MODE: Ratio (Est/Obs) Motorized Person

```
          DESTINATION
ORIGIN |    1      2       3       4      5      6      7       8      9     10     11    12     13     14     15    16    17     18     19    20    21    22   23 |  TOTAL
=======================================================================================================================================================================
 1 DC CR|  1.13   0.86    0.63   0.80   2.94   0.53   0.61   0.49   0.24  1.13 324.47 76.06   7.79   0.78 166.66 111.04  0.49  10.10   0.34 42.43 139.01  0.06   0 |  0.86
 2 DC NC|  1.00   0.95    0.66   0.63   2.48   0.90   1.51   0.54   0.46  1.96 313.58 74.58   4.46   0.90   0.16  91.22  0.47  88.39   0.26  2.15   0.16  9.24   0 |  0.84
 3 MTG  |  0.60   1.15    0.87   0.67   7.75   0.72   1.12   0.99   0.48  3.44   0.38  0.38   1.00   0.93 133.49  74.78 325.13 154.92  0.46 164.48 114.70  7.59   0 |  0.86
 4 PG   |  1.24   1.29    0.70   0.93   2.12   1.46   3.53   0.88   0.41  2.00 403.20 160.91  0.67   0.63   1.55 292.95  0.92  95.32 178.90 48.16 130.31 21.91   0 |  0.94
 5 ARLCR|  1.59   1.41    1.25   1.48   5.06   1.46   1.31   0.85 168.06  0.50  37.47  7.84  47.37   4.32  14.46   9.88  53.75 29.62  51.66  9.50  34.23  2.74   0 |  1.55
 6 ARNCR|  0.63   1.28    0.71   1.36   1.13   0.92   0.86   0.55   1.60  0.88  76.62 13.84  97.33   0.61  25.89  17.39  0.73  73.17   0.12 22.33  78.91  5.02   0 |  0.81
 7 ALX  |  0.96   1.15    1.70   1.85   1.83   1.05   0.92   1.23   0.48  1.15  55.76 11.64   0.04   0.31  37.68  29.82  0.49  61.01   0.49 17.47 101.07  7.86   0 |  1.00
 8 FFX  |  0.44   0.54    0.50   0.76   1.30   0.69   1.26   0.93   0.78  0.51   0.53 59.42   5.98   2.23   0.34   0.27  0.20   0.78   0.23  0.31   0.32 23.00   0 |  0.84
 9 LDN  |  0.22   0.72    1.19   0.23 154.74  0.53   0.91   0.85   1.07  0.87 216.01 21.04  43.31  62.84   4.44   3.97 23.68 191.98  0.18  3.17  36.36  1.39   0 |  0.99
10 PW   |  6.32   1.37    0.76   2.61 330.51  0.70   0.98   0.50   1.16  1.03  44.82  7.03  45.77 108.31 14.85  12.91 70.11   0.93   1.32 47.68   3.60  0.11   0 |  0.94
11 FRD  |  6.77 313.48    0.62   0.27  38.61  80.64  59.80 383.00 261.22 0.19   0.87  0.88   0.66 365.00 13.23   8.32 32.85  30.60  19.66  0.82  16.21  0.84   0 |  0.86
12 CAR  | 89.21  84.24    0.75 183.59  9.17  17.23  14.37  80.28  29.36 10.83   0.80  1.12   0.47   0.26   5.70   3.27 12.74   5.67   4.77 50.76   4.05  0.17   0 |  1.06
13 HOW  |  0.81   1.18    1.36   1.51  54.01   2.27   0.07   1.83  53.87 55.29   1.37  0.28   0.93   0.48  45.29  25.89  0.24  19.56  19.37 44.21  15.96  2.12   0 |  0.85
14 AAR  |  1.25   2.84    0.68   1.06   0.68   0.19   8.20   3.84  83.99  0.36 346.82  0.25   0.77   1.02   0.47   0.22 355.31 37.52  57.21 41.41  47.06  8.52   0 |  0.99
15 CAL  |  0.23 167.46  148.30   1.23  15.76  28.87  42.40   0.14   6.67 18.95  14.17  5.61   0.21   0.44   0.96   1.09  1.40   4.76  10.41  2.22  10.63  9.13   0 |  0.91
16 STM  |131.75 109.86   93.74   0.77  11.96  21.95  34.94   0.16   6.60 17.18  10.21  3.73  33.25 139.19   0.66   0.95  0.65   5.97  19.47  1.92  32.91 38.52   0 |  0.94
17 CHS  |  3.59   1.27  357.93   0.76  56.45   0.40   0.28 385.13  27.74 75.54  32.06 11.33  98.24   0.93 333.00   0.47  0.97  17.93  42.29  5.42  44.24 70.37   0 |  0.97
18 FAU  |102.40  72.18    3.94  81.31  26.05  62.91  55.41   1.01   0.54  2.52  24.79  3.94  16.40  31.16   3.79   4.16 16.42   2.04 145.02 38.70 111.77  5.19   0 |  2.00
19 STA  | 17.59   0.12  132.94 153.01  42.55  94.15 132.06   0.73  47.33 0.87  15.79  3.42  16.85  49.50   7.88  12.39 37.41 142.93   1.22  5.20   0.88  0.46   0 |  1.10
20 CL/JF| 36.15  32.33  147.44  41.90   8.27  19.22  15.45 153.90   0.50 49.77   0.68 40.42  41.87  36.97   1.63   1.13  4.61  39.47   5.37  3.44   0.01  0.17   0 |  2.53
21 SP/FB|120.93   0.34   99.18 109.83   0.05   0.11  85.27   1.19  35.80 3.55  12.49  2.66  14.04  40.17   7.73  21.26 36.48 107.03   0.75  4.94   0.91  0.14   0 |  0.88
22 KGEO |  0.03   0.04    6.67  19.18   2.31   4.38   6.89  21.77   1.46 0.12   0.65  0.10   1.94   7.64   6.86  27.59  0.10   5.37  57.18  0.17   0.05  0.37   0 |  0.28
23 EXTL |     0      0       0      0      0      0      0      0      0     0      0     0      0      0      0     0     0     0      0     0     0     0    0 |     0
=======================================================================================================================================================================
 TOTAL |  0.94          0.82          2.02          0.98          0.96          0.85          0.88          0.93          0.88          0.90          0.84          0 |
              0.97          0.87          0.81          0.87          0.93          1.05          0.92          0.94          1.90          2.82          0.36       0.90
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips    MODE: Est Auto Occ.

         DESTINATION
ORIGIN |   1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 | TOTAL
=====================================================================================================================================================
 1 DC CR| 1.23  1.24  1.18  1.06  1.39  1.33  1.36  1.15  1.32  1.18  1.85  1.72  1.18  1.25  1.36  2.07  1.18  1.83  1.56  2.89  2.24  3.00    0 | 1.21
 2 DC NC| 1.29  1.20  1.17  1.06  1.50  1.40  1.46  1.17  1.35  1.18  1.73  1.60  1.16  1.23  1.32  1.98  1.16  1.93  1.62  2.93  2.47  3.04    0 | 1.20
 3 MTG  | 1.16  1.12  1.18  1.27  1.40  1.25  1.68  1.81  2.40  2.40  1.70  1.80  1.39  1.85  2.96  3.44  2.66  3.21  3.24  3.21  3.48  3.47    0 | 1.22
 4 PG   | 1.09  1.08  1.33  1.09  1.31  1.22  1.39  1.88  3.09  2.47  3.16  2.75  1.35  1.40  1.68  2.43  1.35  3.44  3.21  3.48  3.47  3.42    0 | 1.15
 5 ARLCR| 1.42  1.13  1.17  1.06  1.34  1.18  1.18  1.13  1.42  1.16  1.97  1.96  1.23  1.35  1.46  2.38  1.22  1.82  1.54  3.15  2.37  3.15    0 | 1.23
 6 ARNCR| 1.45  1.14  1.19  1.07  1.30  1.14  1.16  1.14  1.38  1.15  2.07  2.18  1.30  1.39  1.48  2.48  1.19  1.81  1.51  3.22  2.45  3.30    0 | 1.17
 7 ALX  | 1.41  1.15  1.36  1.11  1.23  1.14  1.17  1.17  1.64  1.22  2.79  2.80  1.62  1.67  1.63  2.20  1.22  2.37  1.62  3.39  2.47  3.21    0 | 1.19
 8 FFX  | 1.05  1.12  1.57  1.53  1.03  1.08  1.29  1.24  1.20  1.28  3.07  3.27  2.79  2.96  3.17  3.41  2.20  2.01  2.12  2.97  3.11  3.46    0 | 1.25
 9 LDN  | 1.42  1.53  2.47  2.89  1.18  1.46  2.15  1.46  1.07  1.46  1.86  3.35  3.40  3.44  3.47  3.45  3.44  1.92  3.20  1.60  3.46  3.47    0 | 1.15
10 PW   | 1.23  1.31  2.41  2.31  1.09  1.24  1.65  1.49  1.46  1.07  3.47  3.46  3.45  3.43  3.45  3.47  3.12  1.35  1.29  3.22  1.98  2.94    0 | 1.14
11 FRD  | 2.51  1.99  1.87  3.01  2.01  2.30  3.12  3.36  1.86  3.48  1.10  1.36  2.19  3.25  3.47  3.47  3.48  3.42  3.48  1.69  3.48  3.50    0 | 1.17
12 CAR  | 2.61  2.16  2.12  2.81  2.13  2.67  3.30  3.46  3.42  3.47  1.48  1.05  1.55  2.67  3.48  3.48  3.47  3.48  3.48  3.18  3.46  3.40    0 | 1.10
13 HOW  | 1.31  1.25  1.47  1.35  1.59  1.60  2.26  3.16  3.40  3.46  2.22  1.41  1.09  1.24  3.13  3.48  3.25  3.48  3.48  3.44  3.48  3.48    0 | 1.17
14 AAR  | 1.42  1.34  1.88  1.40  1.63  1.71  2.21  3.21  3.44  3.44  3.22  2.43  1.26  1.10  1.70  3.36  2.66  3.48  3.48  3.49  3.48  3.48    0 | 1.16
15 CAL  | 1.86  1.62  2.93  1.77  1.81  2.09  2.38  3.37  3.46  3.46  3.47  3.46  3.28  1.79  1.06  1.32  1.61  3.47  3.47  3.47  3.47  3.41    0 | 1.13
16 STM  | 2.69  2.33  3.35  2.51  2.11  2.69  2.94  3.46  3.47  3.47  3.47  3.45  3.48  3.36  1.30  1.07  1.52  3.47  3.48  3.43  3.49  2.99    0 | 1.10
17 CHS  | 1.41  1.32  2.59  1.36  1.60  1.57  1.69  2.65  3.46  3.21  3.48  3.48  3.30  2.64  1.58  1.47  1.06  3.48  3.44  3.47  3.47  2.27    0 | 1.14
18 FAU  | 2.49  2.23  3.10  3.31  1.38  1.84  2.81  2.41  1.92  1.37  3.41  3.49  3.48  3.48  3.48  3.47  3.48  1.07  1.54  2.29  2.01  2.98    0 | 1.19
19 STA  | 2.04  1.94  3.09  3.10  1.29  1.64  2.26  2.45  3.29  1.32  3.48  3.45  3.48  3.48  3.47  3.47  3.43  1.53  1.05  3.47  1.13  1.32    0 | 1.14
20 CL/JF| 3.48  3.19  3.25  3.44  2.03  2.97  3.42  3.31  1.70  3.28  1.84  3.12  3.43  3.49  3.47  3.42  3.47  2.37  3.49  1.05  3.47  3.40    0 | 1.12
21 SP/FB| 2.98  2.70  3.35  3.40  1.51  2.15  2.82  3.15  3.46  1.92  3.48  3.45  3.48  3.47  3.48  3.45  1.92  1.11  3.48  1.06  1.33         0 | 1.11
22 KGEO | 3.47  3.20  3.46  3.40  1.93  2.81  3.33  3.46  3.48  3.06  3.42  3.33  3.46  3.47  3.40  2.96  2.26  3.02  1.36  3.40  1.42  1.04    0 | 1.12
23 EXTL |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0    0 |    0
=====================================================================================================================================================
TOTAL    1.24        1.22        1.27        1.26        1.12        1.16        1.16        1.12        1.13        1.14        1.12          0 |
               1.18        1.13        1.17        1.27        1.12        1.09        1.15        1.09        1.19        1.12        1.13        1.18
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips    MODE: Obs Auto Occ.

         DESTINATION
ORIGIN |   1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 | TOTAL
=====================================================================================================================================================
 1 DC CR| 1.23  1.21  1.12  1.17  1.64  1.24  1.25  1.13  1.00  1.00                       1.00              1.00        3.50              1.00    0 | 1.18
 2 DC NC| 1.27  1.23  1.18  1.26  1.77  1.00  1.00  1.06  1.00  1.00              1.00  1.00  1.50        1.00        3.50        3.50          0 | 1.21
 3 MTG  | 1.14  1.15  1.21  1.12        1.00  1.14  1.09  1.16  1.00  1.18  1.00  1.00  1.00                          1.00                      0 | 1.19
 4 PG   | 1.16  1.23  1.10  1.24  1.56  1.00  1.00  1.04  1.00  1.00              1.17  1.09  1.00        1.15                                 0 | 1.20
 5 ARLCR| 1.70  1.00  1.00  1.00  1.00  1.30  1.00  1.00        1.00                                                                          0 | 1.10
 6 ARNCR| 1.36  1.07  1.57  1.00  1.77  1.19  1.11  1.12  1.00  1.42                    2.00              1.00        1.00                      0 | 1.20
 7 ALX  | 1.25  1.12  1.00  1.00  1.00  1.07  1.23  1.05  1.00  1.00              2.51  1.90              1.00        1.00                      0 | 1.19
 8 FFX  | 1.18  1.10  1.10  1.42  1.10  1.15  1.00  1.25  1.13  1.12  1.00        1.00  1.00  1.00  1.00  1.35  1.30  2.78  1.59  1.00          0 | 1.22
 9 LDN  | 1.00  1.00  1.00  1.00        1.00  1.00  1.19  1.15  1.00                                            1.00  1.00                      0 | 1.14
10 PW   |       1.00  1.00  1.00        1.00  1.00  1.15  1.00  1.16                                      1.28  1.00        1.00  1.00          0 | 1.15
11 FRD  |             1.44  1.61                          1.00  1.16  1.17  1.00                          1.00                      0 | 1.18
12 CAR  |             1.00                                      1.15  1.23  1.00  1.00                                                        0 | 1.20
13 HOW  | 3.50  1.00  1.20  1.24              2.53  1.00              1.00  1.00  1.12  1.21              1.00                                 0 | 1.16
14 AAR  | 1.42  1.00  1.83  1.00  1.00  2.00        1.00        1.00        1.00  1.09  1.07  1.00  2.00        1.00                          0 | 1.09
15 CAL  | 1.00              1.00                    1.00                    1.00  1.42  1.14  1.00  1.00                                      0 | 1.12
16 STM  |                   1.00                    1.00                                1.00  1.11  1.00                                      0 | 1.10
17 CHS  | 1.00  1.00        1.00        1.00  1.00                                      1.00        1.00  1.34                                0 | 1.26
18 FAU  |                                                 1.00  1.00  1.00                                1.16                                0 | 1.12
19 STA  |       2.51                          1.00        1.00                                      1.46        1.14  1.00          0 | 1.35
20 CL/JF|                                           1.00        1.00                                            1.29  1.00              0 | 1.17
21 SP/FB|       1.00              1.00  1.00              1.00                                      1.12        1.17  1.00          0 | 1.15
22 KGEO | 1.00  1.00                                      1.00                          1.00                          1.82  1.64    0 | 1.52
23 EXTL |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0    0 |    0
=====================================================================================================================================================
TOTAL    1.23        1.20        1.29        1.17        1.13        1.16        1.13        1.13        1.26        1.46        1.20          0 |
               1.19        1.21        1.16        1.20        1.14        1.20        1.09        1.11        1.20        1.26        1.48        1.18
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips    MODE: Est Pct. Tran

        DESTINATION
ORIGIN |   1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 | TOTAL
=================================================================================================================================================
 1 DC CR| 36.6  38.9  32.3  13.0  51.0  46.7  32.6  13.0     0   2.3     0     0   0.3   0.1   0.4   0.0   0.1     0     0     0   0.5     0     0 | 32.5
 2 DC NC| 48.5  20.4  23.9   8.7  46.0  33.9  18.9   6.3     0   1.8     0     0   0.1   0.0   0.1     0   0.0     0     0     0   0.0     0     0 | 24.7
 3 MTG  | 43.0  10.0   4.9   1.6  50.5  14.9   6.1   0.7     0   2.3   0.0     0   0.0     0   0.0     0     0     0     0     0     0     0     0 |  6.3
 4 PG   | 26.5   5.5   2.4   0.9  28.2  10.4   2.2   0.2     0   2.6     0     0   0.0   0.0     0     0   0.0     0     0     0     0     0     0 |  3.3
 5 ARLCR| 52.6  17.6  13.6   3.5   5.9  20.8  17.8   5.2     0   0.9     0     0     0     0     0     0     0     0     0     0     0     0     0 | 17.8
 6 ARNCR| 47.7  14.3   9.1   2.2  31.5   9.4  15.2   5.0     0   0.9     0     0     0     0     0     0     0     0     0     0     0     0     0 | 14.4
 7 ALX  | 32.6   6.9   5.7   0.9  18.2  14.2   5.5   2.0     0   0.8     0     0     0     0     0     0     0     0     0     0     0     0     0 |  7.7
 8 FFX  | 36.3   3.3   1.4   0.3  12.6   6.5   4.5   0.9   0.0   0.5   0.2     0   0.3   0.1   0.3   0.5   0.2     0     0     0   0.0     0     0 |  2.0
 9 LDN  | 18.2   0.2   0.1     0   5.4   1.3   0.1   0.0   0.1   0.5     0     0     0     0     0     0     0     0     0     0     0     0     0 |  0.3
10 PW   | 19.8   2.1   2.8   2.6   5.8   2.3   2.1   0.5   0.2   0.1   4.3     0   5.4   1.2   4.6   7.0   2.9     0     0     0   0.1     0     0 |  0.5
11 FRD  |  0.5   0.0   0.0     0   0.3   0.0     0   0.0     0   0.2   0.3     0     0     0     0     0     0     0     0     0     0     0     0 |  0.3
12 CAR  |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |    0
13 HOW  |  7.3   0.5   0.2   0.0   5.0   1.4   0.4   0.3     0   5.5     0     0   0.0     0     0     0     0     0     0     0     0     0     0 |  0.2
14 AAR  | 10.1   0.7   0.2   0.0   3.9   1.2   0.8   0.5     0   2.5     0     0     0   0.0     0     0     0     0     0     0     0     0     0 |  0.2
15 CAL  |  0.6   0.1   0.0     0   0.3   0.1     0   0.0     0   0.4     0     0     0     0   0.0     0     0     0     0     0     0     0     0 |  0.0
16 STM  |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0   0.0   0.1     0     0     0     0     0     0 |  0.0
17 CHS  |  5.7   0.6   0.3     0   3.3   0.9   0.1   0.2     0   2.2     0     0     0     0     0   0.1   0.2     0     0     0     0     0     0 |  0.3
18 FAU  |  0.0     0     0     0     0     0     0   0.1     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  0.0
19 STA  |  0.1     0     0     0     0     0     0   0.2     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  0.0
20 CL/JF|    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |    0
21 SP/FB|  0.6   0.3   0.6   0.2   0.3   0.3   0.2   0.6     0   0.0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  0.0
22 KGEO |    0     0     0     0     0     0     0   0.2     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  0.0
23 EXTL |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |    0
=================================================================================================================================================
 TOTAL   38.1         6.4        25.9         9.0         0.1         0.3         0.0         0.0         0.2         0         0.0         0 |
              19.3         2.4        15.6         1.4         0.3         0         0.0         0.0         0           0           0           0 |  6.9
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHW Trips    MODE: Obs Pct. Tran

        DESTINATION
ORIGIN |   1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 | TOTAL
=================================================================================================================================================
 1 DC CR| 44.3  36.3  22.3  12.3  70.6  37.9   6.6   7.8   2.9   8.6     0     0 100.0   4.3     0     0     0 100.0     0     0     0     0     0 | 30.0
 2 DC NC| 43.8  19.1   8.4   5.1  40.3  48.5  32.8   5.7     0   7.8     0     0     0     0     0     0     0     0     0 100.0     0     0     0 | 19.3
 3 MTG  | 36.7  23.6   2.7   4.1 100.0  13.6   6.8   1.0     0     0     0     0   1.0     0     0     0     0     0     0     0     0     0     0 |  5.3
 4 PG   | 23.6  13.1   7.1   1.2  11.3  28.4  19.9   0.8     0     0     0     0     0   0.3     0     0     0     0     0     0     0     0     0 |  3.8
 5 ARLCR| 35.1  24.7   6.0   9.1     0  21.5   5.6   2.9     0   2.2     0     0     0 100.0     0     0     0     0     0     0     0     0     0 | 14.1
 6 ARNCR| 42.4  41.5   6.0  30.4   9.0  13.2   8.7   3.5  12.9     0     0     0     0   8.4     0     0     0     0   1.8     0     0     0     0 | 15.0
 7 ALX  | 27.4  16.0   7.8   8.5  14.6  16.6   2.9   2.9     0   2.9     0     0     0     0     0     0     0     0     0     0     0     0     0 |  6.7
 8 FFX  | 14.2   6.0   0.7   0.4   5.3   5.8   5.8   0.7   0.1     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  1.6
 9 LDN  |  5.2     0     0     0     0   6.1     0   0.1     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  0.3
10 PW   |100.0   3.7   1.3     0     0   8.2     0   0.4     0   0.3     0     0     0     0     0     0     0     0     0     0     0     0     0 |  0.6
11 FRD  |100.0     0     0     0     0     0     0     0     0     0   0.3     0     0     0     0     0     0     0     0     0     0     0     0 |  0.4
12 CAR  |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |    0
13 HOW  | 12.8     0     0     0     0 100.0   1.7     0     0     0     0     0   0.1     0     0     0     0     0     0     0     0     0     0 |  0.4
14 AAR  | 10.1   4.7     0     0     0   5.4 100.0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  0.2
15 CAL  |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |    0
16 STM  |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |    0
17 CHS  | 22.8     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  0.1
18 FAU  |    0     0 100.0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  0.6
19 STA  |100.0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |  0.1
20 CL/JF|    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |    0
21 SP/FB|    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |    0
22 KGEO |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |    0
23 EXTL |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |    0
=================================================================================================================================================
 TOTAL   36.2         4.1        17.6         5.6         0.2         0.3         0.2         0           0           0.1         0           0 |
              22.1         2.9        18.3         1.3         0.3         0           0.2         0           0.2         0.4         0           0 |  6.4
```

Appendix B Year 2007 mode choice summary

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	4799	2972	757	425	620	734	212	151	0	15	0	0	1	2	0	0	0	0	0	0	0	0	0	10687
2 DC NC	4608	6608	1290	647	463	437	102	46	0	17	0	0	0	1	0	0	0	0	0	0	0	0	0	14218
3 MTG	637	512	4810	190	247	146	11	18	0	57	0	0	0	0	0	0	0	0	0	0	0	0	0	6628
4 PG	586	358	181	955	227	190	7	12	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	2559
5 ARLCR	482	51	7	1	43	218	90	12	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	908
6 ARNCR	1463	98	12	1	243	1080	320	86	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	3327
7 ALX	721	24	3	0	71	278	792	74	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	1996
8 FFX	433	12	17	9	43	241	249	773	3	165	3	0	4	2	1	1	3	0	0	0	1	0	0	1960
9 LDN	2	0	0	0	0	0	0	10	50	26	0	0	0	0	0	0	0	0	0	0	0	0	0	87
10 PW	17	14	38	26	5	30	42	179	11	238	7	0	11	6	3	3	9	0	0	0	2	0	0	641
11 FRD	0	0	0	0	0	0	0	0	0	1	152	0	0	0	0	0	0	0	0	0	0	0	0	153
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	17	0	0	0	7	4	0	7	0	16	0	0	5	0	0	0	0	0	0	0	0	0	0	56
14 AAR	31	0	0	1	18	14	0	15	0	18	0	0	0	1	0	0	0	0	0	0	0	0	0	98
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	19
17 CHS	0	0	0	0	4	4	0	3	0	10	0	0	0	0	0	0	167	0	0	0	0	0	0	189
18 FAU	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
19 STA	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	1	1	0	0	1	10	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	14
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	13796	10650	7118	2255	1991	3378	1825	1402	64	665	161	0	21	11	5	23	180	0	0	0	3	0	0	43547

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	4161	3557	734	502	151	1894	226	114	25	46	29	0	0	430	0	0	0	0	0	0	0	0	0	11869
2 DC NC	5257	5669	644	619	60	1040	180	114	31	0	0	0	0	67	0	0	0	0	0	0	0	0	0	13681
3 MTG	762	696	3264	416	23	250	0	0	0	3	0	0	0	61	0	0	0	0	0	0	0	0	0	5475
4 PG	465	681	252	2242	35	213	0	0	0	0	0	0	0	68	0	0	0	0	0	0	0	0	0	3956
5 ARLCR	497	71	0	0	39	211	34	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	859
6 ARNCR	1724	916	119	14	96	968	116	106	9	0	0	0	0	21	0	0	0	0	0	0	0	0	0	4089
7 ALX	387	154	18	0	42	279	269	83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1232
8 FFX	501	129	13	0	11	363	186	1524	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	2738
9 LDN	19	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43
10 PW	67	27	0	0	21	0	0	0	0	91	0	0	0	0	0	0	0	0	0	0	0	0	0	206
11 FRD	20	0	0	0	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	0	0	0	0	170
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79
14 AAR	194	13	16	0	35	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	332
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	24	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52
18 FAU	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	14187	11941	5060	3793	537	5292	1011	1941	65	155	182	0	0	647	0	0	0	0	0	0	0	0	0	44811

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips   MODE: Difference (Est-Obs) Transit

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	638	-585	23	-77	469	-1160	-14	37	-25	-31	-29	0	1	-428	0	0	0	0	0	0	0	0	0	-1182
2 DC NC	-649	939	646	28	403	-603	-78	-68	-31	17	0	0	0	-66	0	0	0	0	0	0	0	0	0	537
3 MTG	-125	-184	1546	-226	224	-104	11	18	0	57	-3	0	0	-61	0	0	0	0	0	0	0	0	0	1153
4 PG	121	-323	-71	-1287	192	-23	7	12	0	41	0	0	0	-68	0	0	0	0	0	0	0	0	0	-1397
5 ARLCR	-15	-20	7	1	4	7	56	12	0	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	49
6 ARNCR	-261	-818	-107	-13	147	112	204	-20	-9	24	0	0	0	-21	0	0	0	0	0	0	0	0	0	-763
7 ALX	334	-130	-15	0	29	-1	523	-9	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	764
8 FFX	-68	-117	4	9	32	-122	63	-751	3	154	3	0	4	2	1	1	3	0	0	0	1	0	0	-778
9 LDN	-17	0	0	0	-24	0	0	10	50	26	0	0	0	0	0	0	0	0	0	0	0	0	0	44
10 PW	-50	-13	38	26	-16	30	42	179	11	147	7	0	11	6	3	3	9	0	0	0	2	0	0	435
11 FRD	-20	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	-17
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	-62	0	0	0	7	4	0	7	0	16	0	0	5	0	0	0	0	0	0	0	0	0	0	-23
14 AAR	-163	-13	-16	1	-17	-60	0	15	0	18	0	0	0	1	0	0	0	0	0	0	0	0	0	-234
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	19
17 CHS	-24	-28	0	0	4	4	0	3	0	10	0	0	0	0	0	0	167	0	0	0	0	0	0	137
18 FAU	-30	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-27
19 STA	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	1	1	0	0	1	10	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	14
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	-391	-1291	2058	-1538	1454	-1914	814	-539	-1	510	-21	0	0	-636	0	0	0	0	0	0	0	0	0	-1264

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips   MODE: Ratio (Est/Obs) Transit

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1.15	0.84	1.03	0.85	4.11	0.39	0.94	1.32	0	0.33	0	0	0.55	0.00	0	0	0	0	0	0	0.02	0	0	0.90
2 DC NC	0.88	1.17	2.00	1.05	7.71	0.42	0.57	0.40	0	16.87	0	0	0.03	0.01	0	0	0	0	0	0	0	0	0	1.04
3 MTG	0.84	0.74	1.47	0.46	10.73	0.58	10.92	18.39	0	56.90	0	0	0.18	0	0	0	0	0	0	0	0	0	0	1.21
4 PG	1.26	0.53	0.72	0.43	6.50	0.89	6.94	12.06	0	41.21	0	0	0.12	0.01	0	0	0.03	0	0	0	0	0	0	0.65
5 ARLCR	0.97	0.72	7.42	0.68	1.10	1.03	2.65	11.66	0	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	1.06
6 ARNCR	0.85	0.11	0.10	0.05	2.53	1.12	2.76	0.81	0	24.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.81
7 ALX	1.86	0.16	0.16	0.05	1.69	1.00	2.94	0.89	0	32.16	0	0	0	0	0	0	0	0	0	0	0	0	0	1.62
8 FFX	0.86	0.10	1.32	9.40	3.88	0.66	1.34	0.51	3.34	14.98	2.52	0	4.07	1.79	1.06	1.04	3.38	0	0	0	0.91	0	0	0.72
9 LDN	0.11	0	0	0	0.13	0	0	9.66	49.63	25.57	0	0	0	0	0	0	0	0	0	0	0	0	0	2.02
10 PW	0.25	0.52	38.28	26.25	0.23	30.23	41.75	179.32	11.16	2.61	6.78	0	10.77	5.82	2.76	2.83	9.06	0	0.03	0	2.47	0	0	3.11
11 FRD	0	0	0	0	0.20	0.08	0	0.18	0	0.60	1.01	0	0	0	0	0	0	0	0	0	0	0	0	0.90
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	0.21	0	0.27	0.22	6.52	4.34	0	6.67	0	16.26	0	0	4.91	0	0	0	0	0	0	0	0	0	0	0.71
14 AAR	0.16	0.01	0.01	0.92	0.51	0.19	0.01	15.32	0	18.11	0	0	0	0.75	0	0	0	0	0	0	0	0	0	0.30
15 CAL	0	0	0	0	0.13	0.12	0	0.13	0	0.43	0	0	0	0	0.76	0	0	0	0	0	0	0	0	1.57
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19.18	0.19	0	0	0	0	0	0	19.37
17 CHS	0.01	0	0	0	4.26	4.06	0	2.92	0	9.90	0	0	0	0	0	0.33	166.94	0	0	0	0	0	0	3.63
18 FAU	0	0	0	0	0	0	0	2.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09
19 STA	0	0	0	0	0	0	0	2.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.90
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0.28	0.15	1.45	0.61	0.07	0.22	0.50	9.84	0	0.54	0	0	0.01	0	0	0	0	0	0	0	0.03	0	0	13.70
22 KGEO	0	0	0	0	0	0	0	0.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.24
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0.97	0.89	1.41	0.59	3.71	0.64	1.80	0.72	0.99	4.29	0.89	0	0	0.02	0	0	0	0	0	0	0	0	0	0.97

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips   MODE: Est Auto Person

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	19306	12764	5148	7322	64	1584	1550	2316	54	175	32	2	163	450	25	1	179	14	32	0	13	0	0	51194
2 DC NC	11610	69630	13880	20061	54	1425	1522	2424	48	144	53	5	438	992	49	3	336	10	22	0	7	0	0	122714
3 MTG	5691	15364	404714	22114	27	1233	788	4908	325	273	3721	586	5086	2535	35	1	117	49	36	81	10	0	0	467692
4 PG	7815	21237	22205	241673	22	756	1829	2491	31	210	78	36	5117	10133	527	90	3603	9	45	1	13	4	0	317927
5 ARLCR	41	340	189	177	1084	1827	1211	1824	41	139	3	0	6	18	1	0	9	3	8	0	3	0	0	6925
6 ARNCR	292	1272	913	641	1753	24781	6819	14374	302	828	11	1	22	67	3	0	34	20	38	0	13	0	0	52183
7 ALX	658	1179	551	1214	1170	6820	40234	19765	201	1596	8	0	23	91	11	2	124	19	94	0	35	0	0	73797
8 FFX	1149	1507	2846	1608	1540	12939	18667	428188	14430	16940	45	2	64	134	10	1	179	532	436	27	150	1	0	501393
9 LDN	15	17	135	10	29	211	147	13722	103714	1682	262	3	3	2	0	0	1	225	5	506	1	0	0	120691
10 PW	73	58	119	104	105	643	1278	15257	1510	187718	1	0	2	8	0	0	16	1597	1906	19	492	10	0	210915
11 FRD	34	57	3570	73	3	12	8	61	373	3	116820	2337	686	86	0	0	0	2	0	721	0	0	0	124847
12 CAR	4	7	613	38	0	1	0	3	6	0	2400	79582	1027	108	0	0	0	0	0	23	0	0	0	83812
13 HOW	189	525	5554	5603	2	27	33	107	7	5	672	1010	105446	10039	8	0	19	1	0	14	0	0	0	129259
14 AAR	500	1122	2760	10794	4	71	115	188	5	16	87	109	10292	239007	519	8	160	1	2	2	0	0	0	265762
15 CAL	32	59	40	571	2	5	15	15	0	1	0	0	9	550	37221	1100	464	0	0	0	0	3	0	40085
16 STM	3	3	1	94	0	0	2	1	0	0	0	0	0	9	1104	51222	931	0	0	0	0	25	0	53395
17 CHS	196	367	126	3846	6	39	141	190	1	23	23	0	19	172	452	927	76589	1	5	0	5	110	0	83216
18 FAU	5	3	14	2	2	11	11	406	193	1422	1	0	0	0	0	0	0	22820	220	46	97	2	0	25256
19 STA	15	10	12	16	4	23	59	311	4	1827	0	0	0	1	0	0	2	234	30556	0	4573	139	0	37788
20 CL/JF	0	0	30	0	0	0	0	17	413	14	321	9	5	0	0	0	0	42	5	22773	0	0	0	23623
21 SP/FB	4	1	2	3	2	7	21	100	1	451	0	0	0	0	0	0	1	100	4474	0	54013	166	0	59346
22 KGEO	0	0	0	1	0	0	0	0	0	7	0	0	0	0	0	7	37	2	120	0	138	4540	0	4853
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	47632	125521	463424	315963	5870	52414	74450	506669	121661	213475	124513	83682	128408	264402	39968	53362	82801	25680	38000	24213	59563	4999	0	2856672

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips   MODE: Obs Auto Person

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	17996	16087	2847	4627	119	1583	3054	2928	1103	322	0	0	0	85	0	474	469	0	0	0	0	0	0	51692
2 DC NC	17552	70403	19792	14483	956	2058	1674	3237	0	416	0	339	282	0	0	0	152	0	0	0	0	0	0	131343
3 MTG	2805	17491	371369	16760	0	759	317	4786	1391	304	4223	2354	2640	2161	310	0	146	0	0	0	0	0	0	427814
4 PG	3771	12224	17716	228100	0	206	182	2691	0	182	0	100	10260	7494	2565	0	7478	0	0	0	0	0	0	292968
5 ARLCR	181	732	0	113	341	1186	540	496	0	886	0	0	0	0	0	0	0	0	0	0	0	0	0	4476
6 ARNCR	700	2396	575	1031	3492	27541	4477	12659	664	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53535
7 ALX	340	777	563	527	240	4023	43645	18058	0	589	382	0	0	0	0	0	289	0	0	0	0	0	0	69433
8 FFX	1994	3485	3872	1616	816	14369	18038	428681	17407	22216	0	0	0	470	219	0	0	849	521	132	768	0	0	515454
9 LDN	214	0	341	256	0	295	0	13500	89488	1403	297	0	0	178	0	0	0	627	0	2540	0	0	0	109138
10 PW	0	949	0	0	0	519	421	14751	1432	177322	0	0	0	0	0	0	337	772	3352	0	976	0	0	200831
11 FRD	0	0	3722	0	0	0	0	215	0	0	114591	2463	1233	228	0	0	0	0	0	899	0	0	0	123351
12 CAR	0	0	264	0	0	0	0	0	0	0	2732	72213	741	934	0	0	0	0	0	0	0	0	0	76885
13 HOW	0	0	3767	5810	0	54	0	94	0	0	1137	1436	107477	6725	0	0	0	0	0	0	0	0	0	126500
14 AAR	116	93	4850	22819	0	178	163	440	0	0	395	414	3795	237390	2495	81	402	0	453	0	0	0	0	274084
15 CAL	0	185	0	1990	0	0	0	621	0	0	0	0	0	634	35938	1185	2561	0	0	0	0	0	0	43114
16 STM	0	0	0	695	0	394	0	0	0	0	0	0	0	0	803	54412	2828	0	0	0	0	0	0	59132
17 CHS	0	849	548	3603	0	0	290	264	0	0	0	363	0	315	1127	2794	77177	0	0	0	0	349	0	87681
18 FAU	290	0	0	0	0	0	0	0	211	608	0	0	0	0	0	0	0	25303	0	0	0	179	0	26591
19 STA	0	0	297	0	0	0	0	1945	0	2539	130	0	0	393	0	0	0	0	32479	0	3136	118	0	41035
20 CL/JF	0	0	0	0	0	0	0	0	0	0	589	0	0	0	0	0	0	0	0	19536	0	0	0	20125
21 SP/FB	0	0	0	0	0	0	0	349	0	1062	0	0	0	0	0	0	0	0	10298	616	73448	665	0	86439
22 KGEO	0	0	0	0	0	0	0	118	0	179	0	0	0	0	0	197	0	179	0	0	690	2909	0	4271
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	45959	125673	430523	302428	5964	53164	72801	505833	111695	208027	124476	79682	126426	257007	43457	59143	91839	27730	47102	23722	79017	4219	0	2825891

Appendix B Year 2007 mode choice summary

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Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips    MODE: Difference (Est-Obs) Auto Person
```

ORIGIN	DESTINATION 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1311	-3323	2302	2695	-55	1	-1504	-612	-1049	-148	32	2	163	365	25	-473	-290	14	32	0	13	0	0	-499
2 DC NC	-5942	-774	-5912	5578	-902	-633	-152	-813	48	-272	53	-333	156	992	49	3	184	10	22	0	7	0	0	-8629
3 MTG	2886	-2128	33345	5354	27	474	471	122	-1066	-31	-502	-1768	2446	374	-275	1	-29	49	36	81	10	0	0	39878
4 PG	4045	9013	4490	13573	22	549	1648	-199	31	29	78	-64	-5143	2639	-2038	90	-3875	9	45	1	13	4	0	24959
5 ARLCR	-140	-392	189	64	743	640	671	1328	41	-747	3	0	6	18	1	0	9	3	8	0	3	0	0	2449
6 ARNCR	-408	-1124	337	-391	-1739	-2760	2342	1715	-362	828	11	1	22	67	3	0	34	20	38	0	13	0	0	-1352
7 ALX	318	402	-12	688	930	2797	-3412	1707	201	1007	-374	0	23	91	11	2	-165	19	94	0	35	0	0	4364
8 FFX	-846	-1978	-1025	-9	723	-1431	629	-493	-2977	-5277	45	2	64	-336	-208	1	179	-317	-85	-104	-619	1	0	-14060
9 LDN	-199	17	-205	-246	29	-83	147	222	14226	279	-36	3	3	-176	0	0	1	-402	5	-2034	1	0	0	11553
10 PW	73	-891	119	104	105	124	856	506	78	10396	1	0	2	8	0	0	-321	825	-1447	19	-484	10	0	10083
11 FRD	34	57	-152	73	3	12	8	-154	373	3	2229	-126	-547	-143	0	0	0	2	0	-178	0	0	0	1495
12 CAR	4	7	348	38	0	1	0	3	6	0	-333	7369	286	-826	0	0	0	0	0	23	0	0	0	6928
13 HOW	189	525	1787	-207	2	-28	33	13	7	5	-465	-427	-2031	3314	8	0	19	1	0	14	0	0	0	2759
14 AAR	384	1028	-2091	-12025	4	-107	-49	-252	5	16	-308	-305	6498	1617	-1976	-73	-242	1	-450	2	0	0	0	-8322
15 CAL	32	-126	40	-1419	2	5	15	-607	0	1	0	0	9	-84	1283	-85	-2097	0	0	0	0	3	0	-3029
16 STM	3	3	1	-601	0	-394	2	1	0	0	0	0	0	9	301	-3191	-1897	0	0	0	0	25	0	-5737
17 CHS	196	-483	-422	243	6	39	-149	-74	1	23	0	-363	19	-143	-675	-1868	-588	1	5	0	5	-239	0	-4464
18 FAU	-285	3	14	2	2	11	11	406	-17	814	1	0	0	0	0	0	0	-2483	220	46	97	-177	0	-1335
19 STA	15	10	-285	16	4	23	59	-1633	4	-711	-130	0	0	-393	0	0	0	2	234	-1923	0	1438	21	0	-3247
20 CL/JF	0	0	30	0	0	0	0	17	413	14	-268	9	5	0	0	0	0	42	0	3237	0	0	0	3498
21 SP/FB	4	1	2	3	2	7	21	-249	1	-611	0	0	0	0	0	0	1	100	-5824	-616	-19434	-499	0	-27092
22 KGEO	0	0	0	1	0	0	0	-118	0	-171	0	0	0	0	0	-189	37	-177	120	0	-552	1630	0	582
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1674		32901		-94		1649		9966		37		1982		-3489		-9039		-9102		-19454		0	
		-152		13534		-751		836		5448		4000		7394		-5781		-2049		491		780		30781

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips    MODE: Ratio (Est/Obs) Auto Person
```

ORIGIN	DESTINATION 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1.07	0.79	1.81	1.58	0.53	1.00	0.51	0.79	0.05	0.54	32.44	1.68	163.00	5.32	25.14	0.00	0.38	13.66	31.96	0.42	12.95	0.01	0	0.99
2 DC NC	0.66	0.99	0.70	1.39	0.06	0.69	0.91	0.75	48.18	0.35	52.52	0.02	1.55	992.35	48.96	3.09	2.21	9.93	21.90	0.35	7.16	0.06	0	0.93
3 MTG	2.03	0.88	1.09	1.32	27.29	1.62	2.49	1.03	0.23	0.90	0.88	0.25	1.93	1.17	0.11	1.10	0.80	49.27	35.75	81.00	9.74	0.03	0	1.09
4 PG	2.07	1.74	1.25	1.06	22.31	3.66	10.07	0.93	31.37	1.16	78.23	0.36	0.50	1.35	0.21	90.44	0.48	9.22	45.47	0.50	12.76	3.77	0	1.09
5 ARLCR	0.23	0.46	189.35	1.57	3.18	1.54	2.24	3.68	41.08	0.16	2.72	0.20	5.89	17.92	1.28	0.06	8.61	3.32	7.74	0.15	2.85	0.02	0	1.55
6 ARNCR	0.42	0.53	1.59	0.62	0.50	0.90	1.52	1.14	0.46	827.97	11.05	0.54	21.73	66.64	3.27	0.20	34.35	20.19	38.19	0.34	12.97	0.02	0	0.97
7 ALX	1.93	1.52	0.98	2.31	4.88	1.70	0.92	1.09	201.34	2.71	0.02	0.37	23.13	91.16	11.19	1.65	0.43	19.43	93.92	0.20	35.03	0.44	0	1.06
8 FFX	0.58	0.43	0.74	0.99	1.89	0.90	1.03	1.00	0.83	0.76	44.74	2.00	63.78	0.28	0.05	1.16	178.92	0.63	0.84	0.21	0.19	1.01	0	0.97
9 LDN	0.07	17.34	0.40	0.04	28.85	0.72	147.11	1.02	1.16	1.20	0.88	3.16	2.78	0.01	0.02	0	0.74	0.36	5.47	0.20	1.19	0	0	1.11
10 PW	72.85	0.06	118.84	103.54	104.76	1.24	3.03	1.03	1.05	1.06	1.22	0.02	1.79	8.08	0.47	0.04	0.05	2.07	0.57	19.01	0.50	9.89	0	1.05
11 FRD	34.37	57.12	0.96	72.68	2.66	12.23	7.97	0.29	372.90	2.84	1.02	0.95	0.56	0.38	0	0	0.16	2.33	0.12	0.80	0.01	0	0	1.01
12 CAR	3.77	6.79	2.32	38.45	0.25	0.68	0.44	3.38	5.93	0.08	0.88	1.10	1.39	0.12	0	0	0.01	0.03	0	23.12	0	0	0	1.09
13 HOW	189.47	524.50	1.47	0.96	1.51	0.49	32.95	1.14	7.39	4.71	0.59	0.70	0.98	1.49	8.48	0.19	18.63	0.70	0.29	13.52	0.02	0	0	1.02
14 AAR	4.30	12.05	0.57	0.47	3.61	0.40	0.70	0.43	5.33	16.19	0.22	0.26	2.71	1.01	0.21	0.10	0.40	0.76	0.01	1.78	0.37	0.17	0	0.97
15 CAL	31.57	0.32	39.78	0.29	1.50	4.74	15.03	0.02	0.02	1.25	0	0	9.19	0.67	1.04	0.93	0.18	0	0.07	0	0	2.54	0	0.93
16 STM	2.55	3.37	1.05	0.13	0.08	0.00	1.79	0.94	0	0.07	0	0	0.18	8.56	1.37	0.94	0.33	0	0.08	0	0.45	25.11	0	0.90
17 CHS	196.30	0.43	0.23	1.07	5.93	39.01	0.49	0.72	1.32	22.99	0.23	0.00	19.24	0.55	0.40	0.33	0.99	0.53	5.33	0	4.51	0.31	0	0.95
18 FAU	0.02	3.31	14.14	2.36	1.98	11.41	11.42	405.51	0.92	2.34	0.67	0	0.12	0.20	0	0	0.17	0.90	219.53	46.28	96.70	0.01	0	0.95
19 STA	14.94	10.33	0.04	16.19	4.43	23.04	59.13	0.16	4.17	0.72	0	0	0.01	0.00	0	0	1.78	234.12	0.94	0	1.46	1.18	0	0.92
20 CL/JF	0	0	29.94	0	0.03	0.04	0	16.57	412.71	14.29	0.54	8.94	5.27	0.42	0	0	0	41.71	0	1.17	0	0	0	1.17
21 SP/FB	4.16	1.08	2.13	3.15	1.59	6.74	21.17	0.29	0.78	0.42	0	0	0	0.01	0	0.02	1.25	99.62	0.43	0	0.74	0.25	0	0.69
22 KGEO	0	0	0	0.71	0	0	0.07	0.00	0	0.04	0	0	0	0	0.47	0.04	37.12	0.01	119.82	0	0.20	1.56	0	1.14
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1.04		1.08		0.98		1.02		1.09		1.00		1.02		0.92		0.90		0.81		0.75		0	
		1.00		1.04		0.99		1.00		1.03		1.05		1.03		0.90		0.93		1.02		1.18		1.01

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips   MODE: Est Auto Driver

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	14590	9121	3734	5954	46	1096	964	1699	28	105	12	1	101	261	13	0	109	5	13	0	4	0	0	37856
2 DC NC	8267	51962	10439	16770	38	931	883	1752	25	81	20	3	281	597	29	2	220	3	8	0	2	0	0	92311
3 MTG	3775	10029	263164	13176	9	648	320	2077	111	89	1645	277	2654	1093	11	0	39	15	11	24	3	0	0	299170
4 PG	4957	14688	13119	168363	7	377	822	1041	9	68	23	11	2923	5342	228	35	1980	3	13	0	4	1	0	214017
5 ARLCR	34	260	123	129	897	1430	798	1223	17	73	1	0	3	7	0	0	4	1	3	0	1	0	0	5003
6 ARNCR	255	959	550	452	1350	19968	4586	9639	125	433	3	0	8	25	1	0	15	6	13	0	4	0	0	38393
7 ALX	571	851	284	806	829	5258	26106	12871	73	809	2	0	8	32	4	0	61	6	33	0	10	0	0	48613
8 FFX	1036	1103	1271	745	793	9572	10288	262994	8645	8980	13	1	19	40	3	0	61	191	151	8	44	0	0	305956
9 LDN	10	7	44	3	9	88	48	6992	75321	767	128	1	1	1	0	0	0	96	2	246	0	0	0	83763
10 PW	53	27	37	33	41	317	516	7554	715	136478	0	0	1	2	0	0	5	829	1021	6	171	3	0	147810
11 FRD	10	17	1514	21	1	4	2	18	182	1	82876	1356	274	25	0	0	0	1	0	310	0	0	0	86612
12 CAR	1	2	269	12	0	0	0	1	2	0	1349	62728	556	34	0	0	0	0	0	7	0	0	0	64962
13 HOW	70	223	2821	3057	0	8	10	31	2	1	265	565	74850	5740	2	0	5	0	0	4	0	0	0	87656
14 AAR	176	469	1139	5538	1	22	35	55	2	5	26	36	5867	170329	291	2	52	0	1	1	0	0	0	184047
15 CAL	10	22	12	236	0	1	4	4	0	0	0	0	3	307	28740	619	227	0	0	0	0	1	0	30187
16 STM	1	1	0	36	0	0	1	0	0	0	0	0	0	3	642	38170	504	0	0	0	0	8	0	39366
17 CHS	69	164	38	2188	2	12	49	61	0	7	0	0	6	58	218	512	57210	0	2	0	1	38	0	60635
18 FAU	2	1	4	1	1	4	3	136	85	739	0	0	0	0	0	0	0	16842	117	21	37	1	0	17995
19 STA	8	3	3	5	1	8	19	103	1	949	0	0	0	0	0	0	1	126	23393	0	2863	80	0	27563
20 CL/JF	0	0	9	0	0	0	0	5	201	4	133	3	2	0	0	0	0	19	0	17612	0	0	0	17987
21 SP/FB	2	0	1	1	0	2	6	29	0	162	0	0	0	0	0	0	0	40	2936	0	40064	83	0	43328
22 KGEO	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	13	1	68	0	65	3559	0	3711
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

```
TOTAL    33896    298574     4026    45459    85544    86498    87553    30183    60504    27784    43274       0 |
              89909    217525    39747   308288   149755    64982   183897    39345    18185    18239     3774    1936941
```

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips   MODE: Obs Auto Driver

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	14940	11964	2503	3438	119	1361	1784	2282	834	322	0	0	0	85	0	474	134	0	0	0	0	0	0	40241
2 DC NC	11339	51778	15011	9627	604	1848	1528	3059	0	416	0	339	282	0	0	0	152	0	0	0	0	0	0	95981
3 MTG	1306	13156	263445	10695	0	534	317	3916	919	304	3285	1653	2074	1669	310	0	146	0	0	0	0	0	0	303729
4 PG	3038	7748	11660	158091	0	206	182	2691	0	182	0	100	4818	5772	1865	0	5667	0	0	0	0	0	0	202019
5 ARLCR	181	209	0	113	341	832	331	496	0	253	0	0	0	0	0	0	0	0	0	0	0	0	0	2757
6 ARNCR	464	2095	390	803	1910	20969	3736	8929	332	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39628
7 ALX	340	613	451	527	240	3091	32566	13129	0	378	382	0	0	0	0	0	145	0	0	0	0	0	0	51861
8 FFX	1703	2185	3569	1616	816	9751	12897	289617	11926	12194	0	0	0	470	109	0	0	849	521	132	768	0	0	349125
9 LDN	214	0	341	256	0	295	0	7920	62368	1403	297	0	0	178	0	0	0	353	0	1001	0	0	0	74625
10 PW	0	633	0	0	0	519	211	8209	1114	107170	0	0	0	0	0	0	169	772	1727	0	363	0	0	120884
11 FRD	0	0	2584	0	0	0	0	215	0	0	77043	1672	1024	228	0	0	0	0	0	570	0	0	0	83337
12 CAR	0	0	264	0	0	0	0	0	0	0	1757	45496	575	652	0	0	0	0	0	0	0	0	0	48745
13 HOW	0	0	1994	3110	0	54	0	94	0	0	999	860	68529	4500	0	0	0	0	0	0	0	0	0	80140
14 AAR	116	93	2503	13054	0	178	163	440	0	0	395	414	2177	155087	2110	81	402	0	453	0	0	0	0	177664
15 CAL	0	185	0	1392	0	0	0	511	0	0	0	0	0	634	26550	981	1426	0	0	0	0	0	0	31679
16 STM	0	0	0	491	0	394	0	0	0	0	0	0	0	0	803	38533	1379	0	0	0	0	0	0	41600
17 CHS	0	528	548	3179	0	0	145	264	0	0	0	182	0	315	812	1663	55718	0	0	0	0	349	0	63703
18 FAU	290	0	0	0	0	0	0	0	211	441	0	0	0	0	0	0	0	17801	0	0	0	179	0	18922
19 STA	0	0	297	0	0	0	0	904	0	1979	130	0	0	393	0	0	0	0	20400	0	1928	118	0	26149
20 CL/JF	0	0	0	0	0	0	0	0	0	0	395	0	0	0	0	0	0	0	0	13025	0	0	0	13420
21 SP/FB	0	0	0	0	0	0	0	349	0	1062	0	0	0	0	0	0	0	0	6073	308	41473	391	0	49657
22 KGEO	0	0	0	0	0	0	0	118	0	179	0	0	0	0	98	0	179	0	0	0	404	2304	0	3282
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

```
TOTAL    33931    305558     4030    53859    77705    84683    79479    32559    65337    29173    44936       0 |
              91189    206389    40033   343143   126283    50715   169982    41830    19953    15037     3341    1919147
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips    MODE: Difference (Est-Obs) Auto Driver
```

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	-350	-2844	1231	2516	-73	-265	-820	-583	-806	-217	12	1	101	176	13	-474	-25	5	13	0	4	0	0	-2384
2 DC NC	-3072	184	-4572	7143	-566	-917	-645	-1307	25	-334	20	-336	-1	597	29	2	68	3	8	0	2	0	0	-3670
3 MTG	2468	-3127	-280	2480	9	114	4	-1838	-808	-215	-1640	-1376	580	-576	-299	0	-107	15	11	24	3	0	0	-4559
4 PG	1920	6940	1459	10272	7	171	640	-1649	9	-114	23	-88	-1895	-430	-1636	35	-3687	3	13	0	4	1	0	11998
5 ARLCR	-146	51	123	16	556	598	467	727	17	-180	1	0	3	7	0	0	4	1	3	0	1	0	0	2246
6 ARNCR	-209	-1136	160	-351	-560	-1001	849	710	-207	433	3	8	25	1	0	15	6	13	0	4	0	0		-1235
7 ALX	231	237	-167	280	589	2167	-6460	-258	73	431	-380	0	8	32	4	0	-83	6	33	0	10	0	0	-3248
8 FFX	-667	-1083	-2298	-872	-23	-179	-2610	-26623	-3282	-3215	13	1	19	-430	-106	0	61	-657	-370	-124	-725	0	0	-43169
9 LDN	-204	7	-297	-253	9	-207	48	-928	12952	-636	-169	1	1	-177	0	0	0	-257	2	-755	0	0	0	9138
10 PW	53	-606	37	33	41	-202	306	-654	-399	29309	0	0	1	2	0	0	-164	58	-706	6	-192	3	0	26926
11 FRD	10	17	-1070	21	1	4	2	-198	182	1	5834	-317	-750	-203	0	0	0	1	0	-260	0	0	0	3275
12 CAR	1	2	5	12	0	0	0	1	2	0	-408	17232	-19	-618	0	0	0	0	0	7	0	0	0	16217
13 HOW	70	223	827	-53	0	-46	10	-63	2	1	-734	-294	6320	1240	2	0	5	0	0	4	0	0	0	7517
14 AAR	60	376	-1364	-7516	1	-156	-128	-385	2	5	-369	-377	3690	15243	-1819	-79	-350	0	-452	1	0	0	0	6382
15 CAL	10	-163	12	-1155	0	1	4	-507	0	0	0	0	3	-328	2189	-362	-1199	0	0	0	0	1	0	-1493
16 STM	1	1	0	-454	0	-394	1	0	0	0	0	0	3	-161	-363	-875	0	0	0	0	0	8	0	-2235
17 CHS	69	-365	-510	-990	2	12	-97	-203	0	7	0	-182	6	-257	-594	-1151	1492	0	2	0	1	-311	0	-3068
18 FAU	-288	1	4	1	1	4	3	136	-126	298	0	0	0	0	0	0	0	-959	117	21	37	-178	0	-927
19 STA	8	3	-293	5	1	8	19	-801	1	-1029	-130	0	0	-393	0	0	1	126	2993	0	935	-38	0	1415
20 CL/JF	0	0	9	0	0	0	0	5	201	4	-261	3	2	0	0	0	19		0	4586	0	0	0	4567
21 SP/FB	2	0	1	1	0	2	6	-320	0	-900	0	0	0	0	0	0	0	40	-3137	-308	-1408	-308	0	-6329
22 KGEO	0	0	0	0	0	0	0	-118	0	-176	0	0	0	0	0	-96	13	-178	68	0	-339	1254	0	428
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	-35	-1280	-6984	11135	-4	-286	-8400	-34855	7839	23472	1816	14266	8074	13914	-2376	-2486	-4833	-1768	-1389	3202	-1663	433	0	17794

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips    MODE: Ratio (Est/Obs) Auto Driver
```

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	0.98	0.76	1.49	1.73	0.39	0.81	0.54	0.74	0.03	0.33	11.60	0.67	100.89	3.08	13.37	0.00	0.81	4.75	13.35	0.12	3.84	0	0	0.94
2 DC NC	0.73	1.00	0.70	1.74	0.06	0.50	0.58	0.57	24.57	0.20	20.43	0.01	0.99	597.21	28.58	1.50	1.44	3.36	8.12	0.10	2.09	0.02	0	0.96
3 MTG	2.89	0.76	1.00	1.23	8.70	1.21	1.01	0.53	0.12	0.29	0.50	0.17	1.28	0.65	0.04	0.32	0.27	14.69	10.66	23.91	2.82	0.01	0	0.98
4 PG	1.63	1.90	1.13	1.06	7.34	1.83	4.52	0.39	9.46	0.37	23.45	0.12	0.61	0.93	0.12	35.47	0.35	2.66	13.31	0.15	3.68	1.09	0	1.06
5 ARLCR	0.19	1.24	122.50	1.14	2.63	1.72	2.41	2.46	16.85	0.29	0.81	0.06	2.62	7.34	0.46	0.02	3.88	1.04	2.72	0.04	0.83	0.01	0	1.81
6 ARNCR	0.55	0.46	1.41	0.56	0.71	0.95	1.23	1.08	0.38	433.41	3.25	0.16	7.82	24.72	1.09	0.06	15.04	6.30	13.21	0.10	3.76	0.01	0	0.97
7 ALX	1.68	1.39	0.63	1.53	3.46	1.70	0.80	0.98	72.53	2.14	0.01	0.11	7.54	31.92	3.70	0.49	0.42	5.76	32.76	0.06	10.16	0.13	0	0.94
8 FFX	0.61	0.50	0.36	0.46	0.97	0.98	0.80	0.91	0.72	0.74	13.00	0.58	18.68	0.08	0.03	0.34	60.64	0.23	0.29	0.06	0.06	0.29	0	0.88
9 LDN	0.05	7.24	0.13	0.01	9.26	0.30	48.20	0.88	1.21	0.55	0.43	0.93	0.80	0.00		0.01	0.21	0.27	1.59	0.25	0.34	0.00	0	1.12
10 PW	52.70	0.04	36.53	33.07	40.78	0.61	2.45	0.92	0.64	1.27	0.35	0.01	0.52	2.33	0.14	0.01	0.03	1.07	0.59	5.69	0.47	2.99	0	1.22
11 FRD	9.96	17.10	0.59	21.13	0.77	3.55	2.30	0.08	182.07	0.82	1.08	0.81	0.27	0.11	0	0	0.05	0.68	0.03	0.54	0	0	0	1.04
12 CAR	1.09	1.97	1.02	11.64	0.07	0.20	0.13	0.98	1.75	0.02	0.77	1.38	0.97	0.05	0	0	0	0.01	0	6.89	0	0	0	1.33
13 HOW	69.57	223.15	1.41	0.98	0.43	0.15	9.77	0.33	2.13	1.36	0.27	0.66	1.09	1.28	2.49	0.06	5.40	0.20	0.08	3.90	0.01	0	0	1.09
14 AAR	1.52	5.04	0.46	0.42	1.04	0.12	0.21	0.13	1.54	4.67	0.07	0.09	2.70	1.10	0.14	0.03	0.13	0.22	0.00	0.51	0.11	0.05	0	1.04
15 CAL	9.59	0.12	11.75	0.17	0.43	1.38	4.43	0.01	0.01	0.36	0	0	2.67	0.48	1.08	0.63	0.16	0	0.02	0	0	0.73	0	0.95
16 STM	0.74	1.02	0.30	0.07	0.02	0.00	0.52	0.27	0	0.02	0	0	0.05	2.53	0.80	0.99	0.37	0	0.02	0	0.13	7.70	0	0.95
17 CHS	68.91	0.31	0.07	0.69	1.72	12.36	0.33	0.23	0.38	6.71	0.07	0	5.60	0.18	0.27	0.31	1.03	0.15	1.54	0	1.30	0.11	0	0.95
18 FAU	0.01	0.99	4.11	0.68	0.58	3.68	3.34	136.33	0.40	1.68	0.19	0	0.03	0.06	0	0	0.05	0.95	117.31	21.29	36.93	0.00	0	1.05
19 STA	7.95	3.11	0.01	4.69	1.39	7.56	18.66	0.11	1.21	0.48	0	0	0	0.00	0	0	0.51	126.27	1.15	0	1.48	0.68	0	1.05
20 CL/JF	0	0	8.74	0	0.01	0.01	0	4.80	200.85	4.21	0.34	2.65	1.53	0.12	0	0	0	18.89	0	1.35	0	0	0	1.34
21 SP/FB	2.01	0.31	0.62	0.91	0.46	1.96	6.13	0.08	0.23	0.15	0	0	0	0	0	0.01	0.36	40.25	0.48	0	0.97	0.21	0	0.87
22 KGEO	0	0	0	0.21	0	0	0.02	0.00	0	0.01	0	0	0	0	0.14	0.02	12.77	0.00	68.46	0	0.16	1.54	0	1.13
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1.00	0.99	0.98	1.05	1.00	0.99	0.84	0.90	1.10	1.19	1.02	1.28	1.10	1.08	0.93	0.94	0.93	0.91	0.95	1.21	0.96	1.13	0	1.01

Appendix B Year 2007 mode choice summary

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	24105	15736	5905	7747	684	2318	1762	2467	54	190	32	2	164	452	25	1	179	14	32	0	13	0	0	61880
2 DC NC	16218	76238	15171	20708	516	1862	1624	2469	48	161	53	5	438	993	49	3	336	10	22	0	7	0	0	136931
3 MTG	6328	15875	409524	22304	274	1379	799	4926	325	330	3721	586	5086	2535	35	1	117	49	36	81	10	0	0	474320
4 PG	8402	21595	22387	242627	250	946	1836	2503	31	252	78	36	5117	10133	527	90	3603	9	45	1	13	4	0	320486
5 ARLCR	523	391	197	178	1127	2044	1301	1836	41	143	3	0	6	18	1	0	9	3	8	0	3	0	0	7833
6 ARNCR	1756	1369	925	641	1995	25860	7139	14460	302	852	11	1	22	67	3	0	34	20	38	0	13	0	0	55509
7 ALX	1380	1203	554	1214	1241	7098	41025	19839	201	1628	8	0	23	91	11	2	124	19	94	0	35	0	0	75793
8 FFX	1581	1520	2864	1617	1582	13180	18916	428962	14434	17104	47	2	68	136	12	2	182	532	436	27	151	1	0	503354
9 LDN	17	17	135	10	29	212	147	13732	103764	1707	262	3	3	2	0	0	1	225	5	506	1	0	0	120778
10 PW	90	72	157	130	110	673	1319	15436	1521	187956	8	0	13	14	3	3	25	1597	1906	19	494	10	0	211556
11 FRD	34	57	3570	73	3	12	8	62	373	3	116972	2337	686	86	0	0	0	2	0	721	0	0	0	125000
12 CAR	4	7	613	38	0	1	0	3	6	0	2400	79582	1027	108	0	0	0	0	0	23	0	0	0	83812
13 HOW	206	525	5555	5603	8	31	33	113	7	21	672	1010	105451	10039	8	0	19	1	0	14	0	0	0	129315
14 AAR	531	1122	2760	10795	22	85	115	204	5	34	87	109	10292	239008	519	8	160	1	2	2	0	0	0	265860
15 CAL	32	59	40	571	2	5	15	15	0	2	0	0	9	550	37221	1100	464	0	0	0	0	3	0	40087
16 STM	3	3	1	94	0	0	2	1	0	0	0	0	9	1104	51241	931	0	0	0	0	0	25	0	53414
17 CHS	197	367	126	3846	10	43	141	193	1	33	0	0	19	172	452	927	76756	1	5	0	5	110	0	83405
18 FAU	5	3	14	2	2	11	11	408	193	1422	1	0	0	0	0	0	0	22820	220	46	97	2	0	25259
19 STA	15	10	12	16	4	23	59	314	4	1827	0	0	0	1	0	0	2	234	30556	0	4573	139	0	37791
20 CL/JF	0	0	30	0	0	0	0	17	413	14	321	9	5	0	0	0	0	42	5	22773	0	0	0	23623
21 SP/FB	4	1	4	4	2	7	22	110	1	452	0	0	0	0	0	0	1	100	4474	0	54013	166	0	59360
22 KGEO	0	0	0	1	0	0	0	0	0	7	0	0	0	0	0	7	37	2	120	0	138	4540	0	4853
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	61429	136172	470542	318218	7861	55791	76275	508070	121726	214140	124675	83682	128429	264413	39972	53385	82980	25680	38000	24213	59567	4999	0	2900219

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	22157	19644	3581	5129	270	3477	3280	3042	1128	368	29	0	0	515	0	474	469	0	0	0	0	0	0	63561
2 DC NC	22809	76072	20436	15102	1016	3098	1854	3351	31	416	0	339	282	67	0	0	152	0	0	0	0	0	0	145024
3 MTG	3567	18187	374633	17176	23	1009	317	4786	1391	304	4226	2354	2640	2222	310	0	146	0	0	0	0	0	0	433289
4 PG	4236	12905	17968	230342	35	419	182	2691	0	182	0	100	10260	7562	2565	0	7478	0	0	0	0	0	0	296924
5 ARLCR	678	803	0	113	380	1397	574	496	0	893	0	0	0	0	0	0	0	0	0	0	0	0	0	5335
6 ARNCR	2424	3312	694	1045	3588	28509	4593	12765	673	0	0	0	0	21	0	0	0	0	0	0	0	0	0	57624
7 ALX	727	931	581	527	282	4302	43914	18141	0	589	382	0	0	0	0	0	289	0	0	0	0	0	0	70665
8 FFX	2495	3614	3885	1616	827	14732	18224	430205	17407	22227	0	0	0	470	219	0	0	849	521	132	768	0	0	518192
9 LDN	233	0	341	256	24	295	0	13500	89488	1403	297	0	0	178	0	0	0	627	0	2540	0	0	0	109181
10 PW	67	976	0	0	21	519	421	14751	1432	177413	0	0	0	0	0	0	337	772	3352	0	976	0	0	201037
11 FRD	20	0	3722	0	0	0	0	215	0	0	114741	2463	1233	228	0	0	0	0	0	899	0	0	0	123521
12 CAR	0	0	264	0	0	0	0	0	0	0	2732	72213	741	934	0	0	0	0	0	0	0	0	0	76885
13 HOW	79	0	3767	5810	0	54	0	94	0	0	1137	1436	107477	6725	0	0	0	0	0	0	0	0	0	126579
14 AAR	310	106	4866	22819	35	252	163	440	0	0	395	414	3795	237390	2495	81	402	0	453	0	0	0	0	274416
15 CAL	0	185	0	1990	0	0	0	621	0	0	0	0	0	634	35938	1185	2561	0	0	0	0	0	0	43114
16 STM	0	0	0	695	0	394	0	0	0	0	0	0	0	0	803	54412	2828	0	0	0	0	0	0	59132
17 CHS	24	877	548	3603	0	0	290	264	0	0	0	363	315	1127	2794	77177	0	0	0	0	0	349	0	87733
18 FAU	320	0	0	0	0	0	0	0	211	608	0	0	0	0	0	0	0	25303	0	0	0	179	0	26621
19 STA	0	0	297	0	0	0	0	1945	0	2539	130	0	0	393	0	0	0	0	32479	0	3136	118	0	41035
20 CL/JF	0	0	0	0	0	0	0	0	0	0	589	0	0	0	0	0	0	0	0	19536	0	0	0	20125
21 SP/FB	0	0	0	0	0	0	0	349	0	1062	0	0	0	0	0	0	0	0	10298	616	73448	665	0	86439
22 KGEO	0	0	0	0	0	0	0	118	0	179	0	0	0	0	197	0	179	0	0	690	2909	0	0	4271
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	60146	137614	435583	306221	6501	58456	73812	507774	111760	208182	124658	79682	126426	257654	43457	59143	91839	27730	47102	23722	79017	4219	0	2870702

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips   MODE: Difference (Est-Obs) Motorized Person

```
          DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=========================================================================================================================================================================
 1 DC CR|  1948  -3908   2324   2618    414  -1159  -1518   -575  -1074   -179      3      2    164    -63     25   -473   -290     14     32      0     13      0     0 |  -1681
 2 DC NC| -6591    166  -5266   5606   -500  -1236   -230   -881     17   -255     53   -333    156    926     49      3    184     10     22      0      7      0     0 |  -8092
 3 MTG  |  2761  -2312  34891   5128    251    370    482    140  -1066     26   -505  -1768   2446    313   -275      1    -29     49     36     81     10      0     0 |  41031
 4 PG   |  4166   8690   4419  12286    215    527   1655   -187     31     70     78    -64  -5143   2571  -2038     90  -3875      9     45      1     13      4     0 |  23562
 5 ARLCR|  -155   -412    197     65    747    647    728   1340     41   -750      3      0      6     18      1      0      9      3      8      0      3      0     0 |   2498
 6 ARNCR|  -669  -1942    231   -404  -1592  -2648   2546   1695   -371    852     11      1     22     46      3      0     34     20     38      0     13      0     0 |  -2115
 7 ALX  |   652    272    -27    688    959   2797  -2889   1698    201   1039   -374      0     23     91     11      2   -165     19     94      0     35      0     0 |   5128
 8 FFX  |  -914  -2094  -1021      1    755  -1552    692  -1244  -2974  -5123     47      2     68   -335   -207      2    182   -317    -85   -104   -618      1     0 | -14838
 9 LDN  |  -216     17   -205   -246      5    -83    147    232  14276    304    -36      3      3   -176      0      0      1   -402      5  -2034      1      0     0 |  11597
10 PW   |    23   -904    157    130     89    154    898    685     89  10543      8      0     13     14      3      3   -312    825  -1447     19   -481     10     0 |  10518
11 FRD  |    14     57   -152     73      3     12      8   -154    373      3   2231   -126   -547   -143      0      0      0      2      0   -178      0      0     0 |   1479
12 CAR  |     4      7    348     38      0      1      0      3      6      0   -333  -1768    286   -826      0      0      0      0      0     23      0      0     0 |   6928
13 HOW  |   127    525   1787   -207      8    -23     33     19      7     21   -465   -427  -2026   3314      8      0     19      1      0     14      0      0     0 |   2736
14 AAR  |   220   1016  -2106 -12024    -13   -167    -49   -236      5     34   -308   -305   6498   1618  -1976    -73   -242      1   -450      2      0      0     0 |  -8556
15 CAL  |    32   -126     40  -1419      2      5     15   -606      0      2      0      0      9    -84   1283    -85  -2097      0      0      0      0      3     0 |  -3028
16 STM  |     3      3      1   -601      0   -394      2      1      0      0      0      0      0      9    301  -3171  -1897      0      0      0      0     25     0 |  -5718
17 CHS  |   173   -511   -422    243     10     43   -149    -71      1     33      0   -363     19   -143   -675  -1867   -421      1      5      0      5   -239     0 |  -4328
18 FAU  |  -315      3     14      2      2     11     11    408    -17    814      1      0      0      0      0      0      0  -2483    220     46     97   -177     0 |  -1362
19 STA  |    15     10   -285     16      4     23     59  -1630      4   -711   -130      0      0   -393      0      0      2    234  -1923      0   1438     21     0 |  -3245
20 CL/JF|     0      0     30      0      0      0      0     17    413     14   -268      9      5      0      0      0      0     42      0   3237      0      0     0 |   3498
21 SP/FB|     4      1      4      4      2      7     22   -239      1   -611      0      0      0      0      0      0      1    100   -5824   -616 -19434   -499     0 | -27079
22 KGEO |     0      0      0      1      0      0      0   -117      0   -171      0      0      0      0      0   -189     37   -177    120      0   -552   1630     0 |    582
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |      0
=========================================================================================================================================================================
 TOTAL    1283          34959          1360          2463          9965            16          2002         -3485         -8859         -9102        -19451            0 |
               -1442          11996         -2665           296          5957          4000          6759         -5758         -2049           491           780         29517
```

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips   MODE: Ratio (Est/Obs) Motorized Person

```
          DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=========================================================================================================================================================================
 1 DC CR|  1.09   0.80   1.65   1.51   2.53   0.67   0.54   0.81   0.05   0.51   1.12   1.68 163.55   0.88  25.14   0.00   0.38  13.66  31.96   0.42  12.97   0.01     0 |   0.97
 2 DC NC|  0.71   1.00   0.74   1.37   0.51   0.60   0.88   0.74   1.55   0.39  52.52   0.02   1.55  14.82  48.96   3.09   2.21   9.93  21.90   0.35   7.16   0.06     0 |   0.94
 3 MTG  |  1.77   0.87   1.09   1.30  11.92   1.37   2.52   1.03   0.23   1.09   0.88   0.25   1.93   1.14   0.11   1.10   0.80  49.27  35.75  81.00   9.74   0.03     0 |   1.09
 4 PG   |  1.98   1.67   1.25   1.05   7.14   2.26  10.11   0.93  31.37   1.38  78.23   0.36   0.50   1.34   0.21  90.44   0.48   9.22  45.47   0.50  12.76   3.77     0 |   1.08
 5 ARLCR|  0.77   0.49 196.77   1.58   2.96   1.46   2.27   3.70  41.08   0.16   2.72   0.20   5.89  17.92   1.28   0.06   8.61   3.32   7.74   0.15   2.85   0.02     0 |   1.47
 6 ARNCR|  0.72   0.41   1.33   0.61   0.56   0.91   1.55   1.13   0.45 852.12  11.05   0.54  21.73   3.17   3.27   0.20  34.35  20.19  38.19   0.34  12.97   0.02     0 |   0.96
 7 ALX  |  1.90   1.29   0.95   2.31   4.40   1.65   0.93   1.09 201.34   2.77   0.02   0.37  23.13  91.16  11.19   1.65   0.43  19.43  93.92   0.20  35.03   0.44     0 |   1.07
 8 FFX  |  0.63   0.42   0.74   1.00   1.91   0.89   1.04   1.00   0.83   0.77  47.26   2.00  67.85   0.29   0.05   2.20 182.30   0.63   0.84   0.21   0.20   1.01     0 |   0.97
 9 LDN  |  0.07  17.34   0.40   0.04   1.20   0.72 147.11   1.02   1.16   1.22   0.88   3.16   2.78   0.01   0.02      0   0.74   0.36   5.47   0.20   1.19      0 |   1.11
10 PW   |  1.34   0.07 157.12 129.79   5.22   1.30   3.13   1.05   1.06   1.06   8.00   0.02  12.56  13.90   3.23   2.87   0.07   2.07   0.57  19.01   0.51   9.89     0 |   1.05
11 FRD  |  1.72  57.12   0.96  72.68   2.86  12.31   7.97   0.29 372.90   3.44   1.02   0.95   0.56   0.38      0      0   0.16   2.33   0.12   0.80   0.01      0 |   1.01
12 CAR  |  3.77   6.79   2.32  38.45   0.25   0.68   0.44   3.38   5.93   0.08   0.88   1.10   1.39   0.12      0      0   0.01   0.03      0  23.12      0      0 |   1.09
13 HOW  |  2.61 524.50   1.47   0.96   8.03   0.57  32.95   1.21   7.39  20.97   0.59   0.70   0.98   1.49   8.48   0.19  18.63   0.70   0.29  13.52   0.02      0 |   1.02
14 AAR  |  1.71  10.58   0.57   0.47   0.62   0.34   0.70   0.46   5.33  34.30   0.22   0.26   2.71   1.01   0.21   0.10   0.40   0.76   0.01   1.78   0.37   0.17     0 |   0.97
15 CAL  | 31.57   0.32  39.78   0.29   1.63   4.86  15.03   0.02   0.02   1.68      0      0   9.19   0.87   1.04   0.93   0.18      0   0.07      0      0   2.54     0 |   0.93
16 STM  |  2.55   3.37   1.05   0.13   0.08   0.00   1.79   0.94      0   0.07      0      0   0.18   8.56   1.37   0.94   0.33      0   0.08      0   0.45  25.11     0 |   0.90
17 CHS  |  8.19   0.42   0.23   1.07  10.19  43.07   0.49   0.73   1.32  32.89   0.23   0.00  19.24   0.55   0.40   0.33   0.99   0.53   5.33      0   4.51   0.31     0 |   0.95
18 FAU  |  0.01   3.31  14.14   2.36   1.98  11.41  11.42 408.32   0.92   2.34   0.67      0   0.12   0.20      0      0   0.17   0.90 219.53  46.28  96.70   0.05     0 |   0.95
19 STA  | 14.94  10.33   0.04  16.19   4.43  23.04  59.13   0.16   4.17   0.72      0      0   0.01   0.00      0      0   1.78 234.12   0.94      0   1.46   1.18     0 |   0.92
20 CL/JF|     0      0  29.94      0   0.03   0.04   0.01  16.57 412.71  14.29   0.54   8.94   5.27   0.42      0      0      0  41.71      0   1.17      0      0 |   1.17
21 SP/FB|  4.44   1.23   3.58   3.76   1.66   6.96  21.67   0.31   0.78   0.43      0      0   0.01   0.01      0   0.02   1.25  99.62   0.43      0   0.74   0.25     0 |   0.69
22 KGEO |     0      0      0   0.71      0      0   0.07   0.00      0   0.04      0      0      0      0   0.47   0.04  37.12   0.01 119.82      0   0.20   1.56     0 |   1.14
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |      0
=========================================================================================================================================================================
 TOTAL    1.02           1.08           1.21           1.03           1.09          1.00          1.02          0.92          0.90          0.81          0.75            0 |
                0.99           1.04           0.95          1.00           1.03          1.05          1.03          0.90          0.93          1.02          1.18          1.01
```

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips   MODE: Est Auto Occ.

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1.32	1.40	1.38	1.23	1.37	1.45	1.61	1.36	1.91	1.66	2.80	2.51	1.62	1.73	1.88	2.84	1.64	2.88	2.39	3.50	3.37	0.01	0	1.35
2 DC NC	1.40	1.34	1.33	1.20	1.42	1.53	1.72	1.38	1.96	1.77	2.57	2.10	1.56	1.66	1.71	2.06	1.53	2.96	2.70	3.50	3.43	3.00	0	1.33
3 MTG	1.51	1.53	1.54	1.68	3.14	1.90	2.46	2.36	2.92	3.06	2.26	2.11	1.92	2.32	3.14	3.44	2.99	3.35	3.35	3.39	3.45	3.00	0	1.56
4 PG	1.58	1.45	1.69	1.44	3.04	2.00	2.23	2.39	3.32	3.09	3.34	3.12	1.75	1.90	2.31	2.55	1.82	3.47	3.42	3.33	3.47	3.46	0	1.49
5 ARLCR	1.19	1.31	1.55	1.38	1.21	1.28	1.52	1.49	2.44	1.92	3.36	3.33	2.25	2.44	2.78	3.00	2.22	3.19	2.85	3.75	3.43	2.00	0	1.38
6 ARNCR	1.15	1.33	1.66	1.42	1.30	1.24	1.49	1.49	2.42	1.91	3.40	3.38	2.78	2.70	3.00	3.33	2.28	3.20	2.89	3.40	3.45	2.00	0	1.36
7 ALX	1.15	1.39	1.94	1.51	1.41	1.30	1.54	1.54	2.78	1.97	3.47	3.36	3.07	2.86	3.02	3.37	2.03	3.37	2.87	3.33	3.45	3.38	0	1.52
8 FFX	1.11	1.37	2.24	2.16	1.94	1.35	1.81	1.63	1.67	1.89	3.44	3.45	3.41	3.37	3.39	3.41	2.95	2.78	2.89	3.40	3.42	3.48	0	1.64
9 LDN	1.56	2.40	3.11	3.36	3.12	2.41	3.05	1.96	1.38	2.19	2.04	3.40	3.47	3.47	2.00	0	3.52	2.34	3.44	2.06	3.50	0	0	1.44
10 PW	1.38	2.14	3.25	3.13	2.57	2.03	2.47	2.02	2.11	1.38	3.49	2.00	3.44	3.47	3.36	4.00	3.43	1.93	1.87	3.34	2.87	3.31	0	1.43
11 FRD	3.45	3.34	2.36	3.44	3.45	3.45	3.47	3.46	2.05	3.46	1.41	1.72	2.50	3.41	0	0	3.20	3.43	4.00	2.32	0.01	0	0	1.44
12 CAR	3.46	3.45	2.28	3.30	3.57	3.40	3.38	3.45	3.39	4.00	1.78	1.27	1.85	3.12	0	0.01	3.00	0	3.36	0	0	0	0	1.29
13 HOW	2.72	2.35	1.97	1.83	3.51	3.29	3.37	3.44	3.47	3.46	2.54	1.79	1.41	1.75	3.41	3.17	3.45	3.50	3.62	3.47	2.00	0	0	1.47
14 AAR	2.84	2.39	2.42	1.95	3.47	3.24	3.31	3.41	3.46	3.47	3.39	2.98	1.75	1.40	1.78	3.39	3.08	3.45	3.44	3.49	3.36	3.40	0	1.44
15 CAL	3.29	2.72	3.39	2.41	3.43	3.43	3.39	3.43	2.00	3.47	0	0	3.44	1.79	1.30	1.78	2.04	0	3.50	0	0	3.48	0	1.33
16 STM	3.45	3.30	3.50	2.58	4.00	3.50	3.44	3.48	0	3.50	0	0	3.60	3.38	1.72	1.34	1.85	0	4.00	0	3.46	3.26	0	1.36
17 CHS	2.85	2.24	3.33	1.76	3.45	3.16	2.90	3.10	3.47	3.43	3.29	0.01	3.44	2.97	2.07	1.81	1.34	3.53	3.46	0	3.47	2.88	0	1.37
18 FAU	2.04	3.34	3.44	3.47	3.41	3.10	3.42	2.97	2.28	1.92	3.53	0	4.00	3.33	0	0	3.40	1.35	1.87	2.17	2.62	3.12	0	1.40
19 STA	1.88	3.32	3.45	3.45	3.19	3.05	3.17	3.01	3.45	1.92	0	0	0.01	3.50	0	0	3.49	1.85	1.31	0	1.60	1.75	0	1.37
20 CL/JF	0	0	3.43	0	3.00	4.00	0.01	3.45	2.05	3.39	2.40	3.37	3.44	3.50	0	0	0	2.21	0	1.29	0	0	0	1.31
21 SP/FB	2.07	3.48	3.44	3.46	3.46	3.44	3.45	3.41	3.39	2.78	0	0	0	0.01	0	2.00	3.47	2.48	1.52	0	1.35	1.99	0	1.37
22 KGEO	0	0	0	3.38	0	0	3.50	3.57	0	3.32	0	0	0	0	3.36	3.28	2.91	3.10	1.75	0	2.13	1.28	0	1.31
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1.41	1.40	1.55	1.45	1.46	1.32	1.64	1.64	1.42	1.43	1.44	1.29	1.47	1.44	1.32	1.36	1.37	1.41	1.37	1.33	1.38	1.32	0	1.47

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Internal NHO Trips   MODE: Obs Auto Occ.

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	1.20	1.34	1.14	1.35	1.00	1.16	1.71	1.28	1.32	1.00	0	0	0	1.00	0	1.00	3.50	0	0	0	0	0	0	1.28
2 DC NC	1.55	1.36	1.32	1.50	1.58	1.11	1.10	1.06	0	1.00	0	1.00	1.00	0	0	0	1.00	0	0	0	0	0	0	1.37
3 MTG	2.15	1.33	1.41	1.57	0	1.42	1.00	1.22	1.51	1.00	1.29	1.42	1.27	1.29	1.00	0	1.00	0	0	0	0	0	0	1.41
4 PG	1.24	1.58	1.52	1.44	0	1.00	1.00	1.00	0	1.00	0	1.00	2.13	1.30	1.38	0	1.32	0	0	0	0	0	0	1.45
5 ARLCR	1.00	3.50	0	1.00	1.00	1.43	1.63	1.00	0	3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	1.62
6 ARNCR	1.51	1.14	1.48	1.28	1.83	1.31	1.20	1.42	2.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.35
7 ALX	1.00	1.27	1.25	1.00	1.00	1.30	1.34	1.38	0	1.56	1.00	0	0	0	0	0	2.00	0	0	0	0	0	0	1.34
8 FFX	1.17	1.59	1.08	1.00	1.00	1.47	1.40	1.48	1.46	1.82	0	0	0	1.00	2.00	0	0	1.00	1.00	1.00	1.00	0	0	1.48
9 LDN	1.00	0	1.00	1.00	0	1.00	0	1.70	1.43	1.00	1.00	0	0	1.00	0	0	0	1.78	0	2.54	0	0	0	1.46
10 PW	0	1.50	0	0	0	1.00	2.00	1.80	1.29	1.65	0	0	0	0	0	0	2.00	1.00	1.94	0	2.69	0	0	1.66
11 FRD	0	0	1.44	0	0	0	0	1.00	0	0	1.49	1.47	1.20	1.00	0	0	0	0	0	1.58	0	0	0	1.48
12 CAR	0	0	1.00	0	0	0	0	0	0	0	1.55	1.59	1.29	1.43	0	0	0	0	0	0	0	0	0	1.58
13 HOW	0	0	1.89	1.87	0	1.00	0	1.00	0	0	1.14	1.67	1.57	1.49	0	0	0	0	0	0	0	0	0	1.58
14 AAR	1.00	1.00	1.94	1.75	0	1.00	1.00	1.00	0	0	1.00	1.00	1.74	1.53	1.18	1.00	1.00	0	1.00	0	0	0	0	1.54
15 CAL	0	1.00	0	1.43	0	0	0	1.21	0	0	0	0	0	1.00	1.35	1.21	1.80	0	0	0	0	0	0	1.36
16 STM	0	0	0	1.42	0	1.00	0	0	0	0	0	0	0	0	1.00	1.41	2.05	0	0	0	0	0	0	1.42
17 CHS	0	1.61	1.00	1.13	0	0	2.00	1.00	0	0	0	2.00	0	1.00	1.39	1.68	1.39	0	0	0	0	1.00	0	1.38
18 FAU	1.00	0	0	0	0	0	0	0	0	1.00	1.38	0	0	0	0	0	0	1.42	0	0	0	1.00	0	1.41
19 STA	0	0	1.00	0	0	0	0	2.15	0	1.28	1.00	0	0	1.00	0	0	0	0	1.59	0	1.63	1.00	0	1.57
20 CL/JF	0	0	0	0	0	0	0	0	0	0	1.49	0	0	0	0	0	0	0	0	1.50	0	0	0	1.50
21 SP/FB	0	0	0	0	0	0	1.00	0	1.00	0	0	0	0	0	0	0	0	0	1.70	2.00	1.77	1.70	0	1.74
22 KGEO	0	0	0	0	0	0	1.00	0	1.00	0	0	0	0	0	2.00	0	1.00	0	0	0	1.71	1.26	0	1.30
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1.35	1.38	1.41	1.47	1.48	1.33	1.35	1.47	1.44	1.65	1.47	1.57	1.59	1.51	1.33	1.41	1.41	1.39	1.61	1.58	1.76	1.26	0	1.47

Appendix B Year 2007 mode choice summary

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	19.9	18.9	12.8	5.5	90.7	31.7	12.1	6.1	0	7.9	0	0	0.3	0.4	0	0	0	0	0	0	0.2	0	0	17.3
2 DC NC	28.4	8.7	8.5	3.1	89.6	23.5	6.3	1.8	0	10.5	0	0	0.0	0.1	0	0	0	0	0	0	0	0	0	10.4
3 MTG	10.1	3.2	1.2	0.9	90.0	10.6	1.4	0.4	0	17.2	0	0	0.0	0	0	0	0	0	0	0	0	0	0	1.4
4 PG	7.0	1.7	0.8	0.4	91.1	20.1	0.4	0.5	0	16.4	0	0	0.0	0.0	0	0.0	0	0	0	0	0	0	0	0.8
5 ARLCR	92.2	13.1	3.8	0.4	3.8	10.6	6.9	0.6	0	2.9	0	0	0	0	0	0	0	0	0	0	0	0	0	11.6
6 ARNCR	83.3	7.1	1.3	0.1	12.2	4.2	4.5	0.6	0	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0	6.0
7 ALX	52.3	2.0	0.5	0.0	5.7	3.9	1.9	0.4	0	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.6
8 FFX	27.4	0.8	0.6	0.6	2.7	1.8	1.3	0.2	0.0	1.0	5.3	0	6.0	1.3	9.2	47.3	1.9	0	0	0	0.6	0	0	0.4
9 LDN	11.8	0	0	0	0	0.1	0	0.1	0.0	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
10 PW	18.6	19.6	24.4	20.2	4.5	4.5	3.2	1.2	0.7	0.1	84.8	0	85.7	41.9	85.4	98.6	35.9	0	0.0	0	0.5	0	0	0.3
11 FRD	0	0	0	0	7.0	0.6	0	0.3	0	17.4	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0.1
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	8.2	0	0.0	0.0	81.2	14.0	0	5.9	0	77.5	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0.0
14 AAR	5.8	0.0	0.0	0.0	83.3	16.7	0.0	7.5	0	52.8	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0.0
15 CAL	0	0	0	0	8.0	2.5	0	0.9	0	25.6	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0.0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0	0	0.0
17 CHS	0.2	0	0	0	41.8	9.4	0	1.5	0	30.1	0	0	0	0	0	0.0	0.2	0	0	0	0	0	0	0.2
18 FAU	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
19 STA	0	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	6.3	12.2	40.5	16.2	4.2	3.2	2.3	8.9	0	0.1	0	0	100.0	0	0	0	0	0	0	0	0.0	0	0	0.0
22 KGEO	0	0	0	0	0	0	0	49.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	22.5		1.5		25.3		2.4		0.1		0.1		0.0		0.0		0.2		0.0		0.0		0	
		7.8		0.7		6.1		0.3		0.3		0		0.0		0.0		0		0		0		1.5

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	18.8	18.1	20.5	9.8	55.9	54.5	6.9	3.7	2.2	12.5	100.0	0	0	83.6	0	0	0	0	0	0	0	0	0	18.7
2 DC NC	23.0	7.5	3.2	4.1	5.9	33.6	9.7	3.4	100.0	0	0	0	100.0	0	0	0	0	0	0	0	0	0	0	9.4
3 MTG	21.4	3.8	0.9	2.4	100.0	24.8	0	0	0	0.1	0	0	2.7	0	0	0	0	0	0	0	0	0	0	1.3
4 PG	11.0	5.3	1.4	1.0	100.0	50.8	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0	0	0	0	1.3
5 ARLCR	73.3	8.8	0	0	10.3	15.1	5.9	0	0	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	16.1
6 ARNCR	71.1	27.7	17.1	1.3	2.7	3.4	2.5	0.8	1.3	0	0	0	100.0	0	0	0	0	0	0	0	0	0	0	7.1
7 ALX	53.2	16.5	3.1	0	14.9	6.5	0.6	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7
8 FFX	20.1	3.6	0.3	0	1.3	2.5	1.0	0.4	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5
9 LDN	8.2	0	0	0	100.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
10 PW	100.0	2.8	0	0	100.0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
11 FRD	100.0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0.1
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	100.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
14 AAR	62.5	12.3	0.3	0	100.0	29.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
15 CAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 STM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 CHS	100.0	3.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
18 FAU	9.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
19 STA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 CL/JF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 SP/FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 KGEO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	23.6		1.2		8.3		1.4		0.1		0.1		0		0		0		0		0		0	
		8.7		1.2		9.1		0.4		0.1		0		0.3		0		0		0		0		1.6

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips   MODE: Est Transit

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	39587	20388	6006	2734	4615	6961	2276	2279	1	37	0	0	4	5	1	0	0	0	0	0	1	0	0	84895
2 DC NC	154634	87320	28288	11920	8677	14439	4512	5551	3	51	0	0	23	18	0	0	0	0	0	0	0	0	0	315435
3 MTG	80781	17807	82478	3945	5148	5352	1000	1390	0	131	0	0	31	4	0	0	0	0	0	0	0	0	0	198067
4 PG	59929	26115	13337	27534	6392	7350	1791	1492	0	105	0	0	115	69	0	0	4	0	0	0	0	0	0	144234
5 ARLCR	6171	772	281	59	589	2033	607	426	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	10945
6 ARNCR	46294	4903	1864	338	6168	17869	4274	4283	1	59	0	0	0	0	0	0	0	0	0	0	0	0	0	86052
7 ALX	21963	2290	804	173	2715	6574	7183	2752	0	62	0	0	0	0	0	0	0	0	0	0	0	0	0	44516
8 FFX	57980	7548	3672	537	9896	17498	7808	23685	107	637	10	0	25	19	10	56	34	0	0	0	15	0	0	129537
9 LDN	2470	455	250	20	633	745	113	313	921	124	0	0	0	0	0	0	0	0	0	0	0	0	0	6046
10 PW	5976	1776	1148	383	1553	2374	1115	3664	161	2981	24	0	59	49	20	109	75	0	0	0	32	0	0	21498
11 FRD	1215	187	481	15	82	82	13	19	0	5	1871	0	0	0	0	0	0	0	0	0	0	0	0	3971
12 CAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 HOW	4445	1197	938	353	421	434	84	85	0	68	0	0	667	25	0	0	0	0	0	0	0	0	0	8717
14 AAR	6784	1442	688	380	636	625	118	184	0	90	0	0	38	95	0	0	0	0	0	0	0	0	0	11080
15 CAL	652	283	89	39	108	115	27	11	0	3	0	0	0	1	45	1	0	0	0	0	0	0	0	1372
16 STM	331	118	43	13	50	52	12	7	0	0	0	0	0	0	2	154	17	0	0	0	0	0	0	797
17 CHS	2857	902	277	123	342	376	93	63	0	31	0	0	0	0	0	4	965	0	0	0	0	0	0	6031
18 FAU	67	23	9	1	31	38	16	14	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	203
19 STA	799	213	76	9	278	383	125	46	0	35	0	0	0	0	0	0	0	0	0	2	0	1	0	1968
20 CL/JF	94	42	56	4	35	35	7	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	284
21 SP/FB	618	193	83	13	226	322	149	103	0	68	0	0	0	0	0	0	0	0	0	2	0	11	0	1786
22 KGEO	15	6	2	0	7	9	5	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	51
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	493661	173980	140868	48593	48601	83664	31328	46385	1193	4501	1906	0	962	286	77	323	1095	0	5	0	59	0	0	1077487

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips   MODE: Obs Transit

DESTINATION

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	TOTAL
1 DC CR	46083	25885	7714	3838	1893	11802	1783	2866	105	170	51	0	113	777	28	0	0	84	0	0	0	0	0	103192
2 DC NC	148939	91714	21495	10810	3748	17143	5059	4268	301	158	0	0	112	280	0	0	17	17	0	18	22	0	0	304101
3 MTG	82960	31936	72290	6021	1836	6453	1534	726	45	19	72	0	143	333	32	15	5	0	53	0	0	0	0	204473
4 PG	74814	32511	14721	30489	3110	12013	2517	2939	170	0	3	0	166	341	0	0	7	0	0	0	0	0	0	173801
5 ARLCR	4878	1523	214	280	52	1872	446	473	40	22	0	0	0	28	0	0	0	0	0	0	0	0	0	9828
6 ARNCR	50768	12268	2248	1497	2745	15469	2780	3940	119	33	0	0	0	105	0	0	0	15	17	29	0	0	0	92033
7 ALX	21211	5500	1028	681	1560	6790	7673	2754	36	44	0	0	0	0	0	0	0	0	0	0	0	0	0	47277
8 FFX	54628	13963	1850	1267	5424	20211	6255	28838	249	114	0	0	10	32	0	0	0	29	0	0	0	0	0	132869
9 LDN	1376	505	13	27	166	685	133	166	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3083
10 PW	6883	2166	257	136	716	3302	772	886	70	2414	0	0	4	5	0	0	0	3	4	0	0	0	0	17620
11 FRD	3014	602	1844	135	22	252	31	0	0	0	1877	0	0	0	0	0	0	0	0	0	0	0	0	7777
12 CAR	236	18	0	0	0	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	318
13 HOW	4191	587	147	80	162	772	58	67	0	0	0	0	27	0	0	0	0	0	0	0	57	0	0	6148
14 AAR	6015	1729	243	102	442	1270	90	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9924
15 CAL	671	304	109	2	107	67	35	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1321
16 STM	31	77	41	0	4	112	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	282
17 CHS	2737	1094	120	258	258	1075	42	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5637
18 FAU	251	111	36	35	78	121	19	46	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	699
19 STA	868	269	44	6	83	473	182	208	0	43	0	0	0	0	0	0	0	0	0	0	3	0	0	2179
20 CL/JF	2	59	0	0	5	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75
21 SP/FB	222	306	11	46	59	264	184	163	0	59	0	0	0	0	0	0	0	9	0	0	3	0	0	1326
22 KGEO	89	16	3	0	7	25	8	13	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	166
23 EXTL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	510867	223143	124428	55710	22478	100238	29623	48465	1147	3084	2003	0	575	1901	60	15	29	148	83	47	85	0	0	1124129

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips    MODE: Difference (Est-Obs) Transit

        DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11   12    13     14    15    16    17    18    19    20    21   22   23 |  TOTAL
=================================================================================================================================================================
1 DC CR| -6496  -5497  -1708  -1104   2722  -4841    493   -587   -104   -133   -51    0  -109   -772   -27     0     0   -84     0     0     1    0    0 | -18297
2 DC NC|  5695  -4394   6793   1110   4929  -2704   -547   1283   -298   -107     0    0   -89   -262     0     0   -17   -17     0   -18   -22    0    0 |  11334
3 MTG  | -2179 -14129  10187  -2076   3312  -1101   -534    664    -45    112   -72    0  -112   -329   -32   -15    -5     0   -53     0     0    0    0 |  -6407
4 PG   |-14885  -6396  -1384  -2955   3282  -4663   -726  -1447   -170    105    -3    0   -51   -272     0     0    -3     0     0     0     0    0    0 | -29567
5 ARLCR|  1293   -751     67   -221    537    161    161    -47    -40    -13     0    0     0    -28     0     0     0     0     0     0     0    0    0 |   1117
6 ARNCR| -4474  -7365   -384  -1159   3423   2400   1494    343   -118     26     0    0     0   -105     0     0     0   -15   -17   -29     0    0    0 |  -5980
7 ALX  |   752  -3211   -224   -508   1155   -216   -490     -2    -36     18     0    0     0      0     0     0     0     0     0     0     0    0    0 |  -2762
8 FFX  |  3352  -6415   1822   -730   4472  -2713   1553  -5152   -142    523    10    0    15    -13    10    56    34   -29     0     0    15    0    0 |  -3332
9 LDN  |  1094    -50    237     -7    468     60    -20    147    909    124     0    0     0      0     0     0     0     0     0     0     0    0    0 |   2963
10 PW  |  -907   -389    890    246    837   -929    343   2778     91    567    24    0    56     44    20   109    75    -3    -4     0    32    0    0 |   3878
11 FRD | -1799   -415  -1363   -120     60   -170    -18     19      0      5    -6    0     0      0     0     0     0     0     0     0     0    0    0 |  -3806
12 CAR |  -236    -18      0      0      0    -64      0      0      0      0     0    0     0      0     0     0     0     0     0     0     0    0    0 |   -318
13 HOW |   254    610    791    273    259   -338     26     18      0     68     0    0   640     25     0     0     0     0     0     0     0  -57    0 |   2569
14 AAR |   769   -287    445    278    194   -645     28    151      0     90     0    0    38     95     0     0     0     0     0     0     0    0    0 |   1156
15 CAL |   -19    -21    -20     37      1     48     -8    -15      0      3     0    0     0      1    45     1     0     0     0     0     0    0    0 |     51
16 STM |   300     40      2     13     46    -60     -5      7      0      0     0    0     0      0     2   154    17     0     0     0     0    0    0 |    515
17 CHS |   120   -192    157   -135     84   -699     51     10      0     31     0    0     0      0     0     4   965     0     0     0     0    0    0 |    394
18 FAU |  -184    -89    -26    -34    -47    -83     -3    -32      0      2     0    0     0      0     0     0     0     0     0     0     0    0    0 |   -496
19 STA |   -69    -56     32      4    195    -91    -57   -162     -0     -8     0    0     0      0     0     0     0     0    -0     2     0   -2    0 |   -211
20 CL/JF|   92    -17     56      4     29     32      2     12      0      0     0    0     0      0     0     0     0     0     0     0     0    0    0 |    210
21 SP/FB|  396   -113     72    -33    167     58    -35    -60      0      8     0    0     0      0     0     0     0     0    -0    -7     0    8    0 |    460
22 KGEO|   -74    -10     -1      0     -1    -16     -4     -8      0     -2     0    0     0      0     0     0     0     0     0    -0     0    0    0 |   -115
23 EXTL|     0      0      0      0      0      0      0      0      0      0     0    0     0      0     0     0     0     0     0     0     0    0    0 |      0
=================================================================================================================================================================
TOTAL  -17206         16440         26123         1705          46           -97           388          17          1066         -78         -26       0 |
              -49163         -7117         -16574        -2080         1417           0          -1615         308         -148         -47        0       -46642
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips    MODE: Ratio (Est/Obs) Transit

        DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11   12    13     14    15     16     17    18    19   20    21   22   23 |  TOTAL
=================================================================================================================================================================
1 DC CR|  0.86   0.79   0.78   0.71   2.44   0.59   1.28   0.80   0.01   0.22    0    0   0.04   0.01  0.02   0.01   0.32    0     0    0   0.67   0    0 |   0.82
2 DC NC|  1.04   0.95   1.32   1.10   2.32   0.84   0.89   1.30   0.01   0.32    0    0   0.21   0.06  0.08      0   0.02    0     0    0   0.00   0    0 |   1.04
3 MTG  |  0.97   0.56   1.14   0.66   2.80   0.83   0.65   1.92   0.00   6.88  0.00   0   0.21   0.01  0.00      0      0     0     0    0     0    0    0 |   0.97
4 PG   |  0.80   0.80   0.91   0.90   2.06   0.61   0.71   0.51      0 105.12    0    0   0.69   0.20     0      0   0.57    0     0    0     0    0    0 |   0.83
5 ARLCR|  1.27   0.51   1.31   0.21  11.32   1.09   1.36   0.90   0.00   0.39    0    0     0    0.00     0      0      0     0     0    0     0    0    0 |   1.11
6 ARNCR|  0.91   0.40   0.83   0.23   2.25   1.16   1.54   1.09   0.01   1.77    0    0   0.03   0.00     0      0      0     0     0    0     0    0    0 |   0.94
7 ALX  |  1.04   0.42   0.78   0.25   1.74   0.97   0.94   1.00   0.00   1.40    0    0     0      0      0      0      0     0     0    0     0    0    0 |   0.94
8 FFX  |  1.06   0.54   1.99   0.42   1.82   0.87   1.25   0.82   0.43   5.59 10.43   0   2.49   0.60  9.94  55.96  33.91    0  0.14    0  15.24   0    0 |   0.97
9 LDN  |  1.80   0.90  19.24   0.74   3.83   1.09   0.85   1.89  76.78 124.31    0    0     0      0      0      0      0     0     0    0     0    0    0 |   1.96
10 PW  |  0.87   0.82   4.46   2.81   2.17   0.72   1.44   4.13   2.30   1.23 24.21   0  16.93   9.09 19.99 108.95  74.57    0  0.08    0  31.54   0    0 |   1.22
11 FRD |  0.40   0.31   0.26   0.11   3.73   0.33   0.43  19.28      0   5.12  1.00   0     0      0      0      0      0     0     0    0     0    0    0 |   0.51
12 CAR |     0      0      0      0      0      0      0      0      0      0     0    0     0      0      0      0      0     0     0    0     0    0    0 |      0
13 HOW |  1.06   2.04   6.38   4.41   2.60   0.56   1.46   1.27      0  67.75    0    0  24.71  24.69     0      0      0     0     0    0     0    0    0 |   1.42
14 AAR |  1.13   0.83   2.83   3.72   1.44   0.49   1.31   5.59      0  89.94    0    0  38.45  94.63  0.20      0      0     0     0    0     0    0    0 |   1.12
15 CAL |  0.97   0.93   0.81  19.70   1.01   1.71   0.76   0.41      0   3.16    0    0     0    1.33 44.57   0.54      0     0     0    0     0    0    0 |   1.04
16 STM | 10.83   1.53   1.04  12.95  12.54   0.46   0.70   6.68      0      0     0    0     0      0   1.60 153.88  16.76    0     0    0     0    0    0 |   2.83
17 CHS |  1.04   0.82   2.31   0.47   1.32   0.35   2.22   1.18      0  30.94    0    0   0.04   0.02     0   4.13 965.00    0     0    0     0    0    0 |   1.07
18 FAU |  0.27   0.20   0.26   0.03   0.39   0.31   0.84   0.31      0   1.86    0    0     0      0      0      0      0     0     0    0     0    0    0 |   0.29
19 STA |  0.92   0.79   1.71   1.68   3.35   0.81   0.69   0.22      0   0.82    0    0     0      0      0      0      0     0  9.33    0  0.35    0    0 |   0.90
20 CL/JF| 48.91  0.71  55.89   3.60   6.51  11.31   1.36 240.00      0      0     0    0     0      0      0      0      0     0     0    0     0    0    0 |   3.81
21 SP/FB|  2.78   0.63   7.55   0.28   3.81   1.22   0.81   0.63      0   1.14    0    0   0.06   0.05     0      0      0     0  0.23    0  3.55    0    0 |   1.35
22 KGEO|  0.17   0.40   0.75   0.25   0.91   0.35   0.57   0.36      0   0.56    0    0     0      0      0      0      0     0     0    0  0.01    0    0 |   0.31
23 EXTL|     0      0      0      0      0      0      0      0      0      0     0    0     0      0      0      0      0     0     0    0     0    0    0 |      0
=================================================================================================================================================================
TOTAL   0.97          1.13          2.16          1.06          1.04          0.95          1.67        1.28         37.75        0.06         0.70      0 |
               0.78          0.87          0.83          0.96          1.46           0           0.15        21.56          0           0         0         0.96
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips    MODE: Est Auto Person

          DESTINATION
ORIGIN |    1      2       3       4      5      6      7       8       9      10      11      12      13       14      15      16      17      18      19      20      21      22     23 |   TOTAL
==================================================================================================================================================================================================
1 DC CR|  71858   38104   15455   20492   2951    7840    5494   14369     684    1024     364      78     905     2268     196     116     880     143     252      43     156      13      0 |  183685
2 DC NC|  88136  376844   85048   85688   7023   19710   13175   45381    1749    1316     510      89    3310     5927     324     162    1945     155     273      42     155      13      0 |  736976
3 MTG  |  94179 1159182 2050887  121983   5298   15704    7037   51226    3297    1744   18653    3531   26777    19051     482     443    1475     346     423     770     442      36      0 | 2539701
4 PG   |  92312  166605 1447791 1290941   7677   21539   21138   55346    1691    1773     871     275   29427    52452    3655    2250   29288     189     500      63     291     203      0 | 1923264
5 ARLCR|   2405    2915    1370    1307   9044    8362    3741    8419     302     544      41       8      56      148      16      10      67      35      65      10      41       3      0 |   38911
6 ARNCR|  22560   20584   10053    7075  21409  208829   33844   96644    2364    2992     122      15     187      531      35      37     290     147     327      26     252      12      0 |  428334
7 ALX  |  17046   11974    5096    7173   9373   33887  159895   84605    1356    4155      80      12     151      480      59      59     559     115     454      20     302      19      0 |  336871
8 FFX  | 105579   65191   53065   34504  27978  112379 1130092  356631   70143   67735    1001     100    1069     2649     239     490    2827    3600    6046     578    6110     316      0 | 3031240
9 LDN  |  12633    8521   11777    4270   3035    9025    4689  117028  507132   10841    8918     477     478      739      27      92     347    2459     537   12618     760      36      0 |  716437
10 PW  |  14745    8786    8170    5036   3908   11894   12010  176551   13170  857365     288      18     205      565      45     133     464   12433   15908     408   10182     330      0 | 1152613
11 FRD |   5554    4203   52669    3747    867    2037     759   11405   12814     487  521804   20823   12604     5179      54      91     143     121      27    5134      25       1      0 |  660547
12 CAR |   3225    2092   15850    2349    361     730     271    2468    1052      96   16405  364993   12746     3628      37      50      90      21       6     305       7       1      0 |  426784
13 HOW |   9402   10023   39154   34249    867    1967    1005    4910     412     192    7387    8513  542959    64149     204     223     449      32      26     244      28       6      0 |  726398
14 AAR |  19655   21185   28837   67863   2305    5592    3899   12604     678     553    1642     852   66912  1171666    5565    1175    2687      55      96      87      75      29      0 | 1414013
15 CAL |   5435    4124    3014   10155    623    1548    1471    4335     134     168      70      16     553     6055  184623   14610    5581       9      21       4      29      44      0 |  242622
16 STM |   4039    2749    1750    5371    523    1199    1621    4078      97     155      42       7     265     1252   10877  258800   18965      17      74       2     123     397      0 |  312403
17 CHS |  10836    8470    4551   22060   1338    3326    4117   11552     345     469      99      20     599     2459    4532    8071  310480      30      99       7     129     972      0 |  394563
18 FAU |   1721     874    1212     497    485    1189     725   13353    3627   13640      86       7      37       75       8      28      48  103855    2945     422    2027      65      0 |  146925
19 STA |   2813    1483    1510    1040    783    2133    1977   15406    1145   24516      42       5      48      142      29     133     172    3056  195448      77   39553     910      0 |  292420
20 CL/JF|   751     454    4003     353    206     506     235    8531   18358    1538    4853     213     498      223       2       3       9    1127      34  107511      36       2      0 |  149447
21 SP/FB|  1553     821     953     628    442    1294    1189   11234     872   11519      30       3      31       92      34     148     197    2037   31199      63  246893     854      0 |  312084
22 KGEO|    739     417     286     571    167     364     291    2355     125    2437       3       0      15       60      55     308    2172     335    4721       9    4838   29237      0 |   49506
23 EXTL|      0       0       0       0      0       0       0       0       0       0       0       0       0        0       0       0       0       0       0       0       0       0      0 |       0
==================================================================================================================================================================================================
TOTAL   587175      2539490       106664       391591         641547          583314           699831            211100          379135           259479           312453             0 |
            872338       1727353        471052         3108432         1005257           400055           1339789           287432           130318           128442            33497        16215743
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips    MODE: Obs Auto Person

          DESTINATION
ORIGIN |    1      2       3       4      5      6      7       8       9      10      11      12      13       14      15      16      17      18      19      20      21      22     23 |   TOTAL
==================================================================================================================================================================================================
1 DC CR|  55830   43958   13491   18055    501   11845    9581   17408    2980     958       0       0     412     2882       0     474    1757       0     610       0       0     218      0 |  180960
2 DC NC| 116348  367456  112711   75824   2738   17312    7211   36998    5289    1386       0     339     892     6399    1266       0    2633       0     568       0     809       0      0 |  756179
3 MTG  |  82534 1148022 2082308   86034   4177   15480    5589   59419    9544    3391   18941    3286   22108    19432     310       0    1253       0     928     821    2174       0      0 | 2532530
4 PG   |  89121  127994 1553351 1289616   1706   17150    8899   38989    4741    1768     383    1703   33005    69023    8726     286   43306       0       0       0       0     198      0 | 1891949
5 ARLCR|   1682    2482    1178     690   2748    6676    2017    6435       0    1900       0       0     178      221       0       0       0       0       0       0       0       0      0 |   26207
6 ARNCR|  35759   16582   11640    3150  18994  231117   28387   97400    2929    1685      93       0     547     1374      91       0     675     102    1215       0       0       0      0 |  451740
7 ALX  |  22917   10004    4284    5399   4086   26911  184009   76897    1600    2746     382       0    1832     2330       0       0     683     262     320       0       0       0      0 |  344663
8 FFX  |  98677   43252   48778   17650  25854  110011  966962  463366   88928   89682    1587       0    2852     1370     881     235    2334    2574    6939    2063    2349     132      0 | 3106210
9 LDN  |  10388    3168    1239       0    607    8505    2134  143514  495169    7028    1611       0       0      852       0       0       0    3408     548    3735    4396     360      0 |  689790
10 PW  |  13740   11163    6489    4074   5821   16154   15071  180556   12313  864444       0       0       0        0       0     957     632    9523    8025       0    4396     360      0 | 1153717
11 FRD |   2071    3891   53221    4919    480     227     793    2830    4410     594  548527   22828   11119     4728       0       0       0       0       0    2298       0       0      0 |  662936
12 CAR |    553     756   12523    4645      0       0     164     264       0       0    8915  351125   21831     8858       0       0       0       0       0       0       0       0      0 |  409636
13 HOW |   7206    5005   32749   43823    165    1250    2220    4026     274       0    2107    7862  554444    60919       0       0     667     571       0     323       0       0      0 |  723613
14 AAR |  15221   14328   30935   99734   1222    3556    2027    8722       0     769     839    4349   66285  1167700    7216     688    1483       0     453     143       0       0      0 | 1425672
15 CAL |   5034    2465    2038   15138    152     888     255    7114       0     360       0       0    1550    14822  170369   14074    6977       0       0       0       0       0      0 |  241235
16 STM |   1963    3354     457    6710      0     785       0    1302       0       0       0       0    1096    13678  262953   20646       0     460       0       0       0       0      0 |  313403
17 CHS |   9029    8779    3551   38871   2481    3486    3975    6635     251       0       0     363     145     4276    4892   11778  297059       0       0       0     290     926      0 |  396787
18 FAU |    814     565     900       0    408     766     374   12556    6647   15808       0       0       0        0       0       0       0   93795     939    2418     214     179      0 |  136383
19 STA |   1561    2857    1285     279    124    3579    1186   13912       0   23843     130       0       0      393       0       0       0       0  174103     536   62287    1129      0 |  287206
20 CL/JF|   509       0     690       0      0       0       0    4890   13799      78    6236       0     236        0       0       0       0     393       0  100259     539     297      0 |  127926
21 SP/FB|  1865    2984    1084    1011   2153    1112       0    2035       0   10501       0       0       0        0       0     615       0     258   35083    3466  270364    6346      0 |  338876
22 KGEO|    608     333       0       0      0       0       0     564       0    1325       0       0       0      489       0     441    1597     423    4835       0    7935   33983      0 |   52533
23 EXTL|      0       0       0       0      0       0       0       0       0       0       0       0       0        0       0       0       0       0       0       0       0       0      0 |       0
==================================================================================================================================================================================================
TOTAL   573430      2583530        74417       370587         648875          589750           717435            207428          381702           235027           351359             0 |
            786178       1716860        476812         3185833         1028266           391856           1367164           292501           111309           116064            43767        16250149
```

Appendix B Year 2007 mode choice summary

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips   MODE: Difference (Est-Obs) Auto Person

```
           DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
=========================================================================================================================================================================
 1 DC CR| 16028  -5854   1964   2437   2450  -4005  -4087  -3039  -2296     66    364     78    493   -614    196   -358   -878    143   -358     43    156   -206      0 |   2725
 2 DC NC|-28211   9388 -27663   9865   4285   2398   5964   8383  -3540    -70    510   -250   2419   -472   -943    162   -688    155   -295     42   -654     13      0 | -19203
 3 MTG  | 11645   1116 -31421  35949   1121    224   1448  -8193  -6247  -1647   -287    245   4670   -382    172    443    222    346   -505    -51  -1732     36      0 |   7171
 4 PG   |  3191  38610 -10556   1325   5971   4389  12239  16357  -3050      5    488  -1428  -3578 -16571  -5071   1964 -14018    189    500     63    291      5      0 |  31315
 5 ARLCR|   723    433    192    617   6297   1687   1724   1984    302  -1356     41      8   -122    -74     16     10     67     35     65     10     41      3      0 |  12704
 6 ARNCR|-13198   4002  -1587   3925   2414 -22288   5457   -756   -565   1307     28     15   -360   -843    -56     37   -384     46   -889     26    252     12      0 | -23406
 7 ALX  | -5872   1970    812   1774   5288   6977 -24114   7707   -244   1408   -301     12  -1681  -1850     59     59   -124   -146    134     20    302     19      0 |  -7792
 8 FFX  |  6903  21938   4288  16855   2125   2367  16313-106735 -18785 -21948   -586    100  -1783   1279   -642    255    493   1026   -893  -1485   3761    184      0 | -74970
 9 LDN  |  2245   5353   3893   3031   2428    519   2555 -26486  11963   3813   7307    477    478   -112     27     92    347   -950    -11   8883    760     36      0 |  26647
10 PW   |  1005  -2377   1681    962  -1913  -4260  -3061  -4005    857  -7079    288     18    205    565     45   -824   -168   2910   7883    408   5786    -30      0 |  -1104
11 FRD  |  3483    312   -552  -1171    388   1809    -34   8575   8403   -107 -26722  -2005   1485    451     54     91    143    121     27   2836     25      1      0 |  -2389
12 CAR  |  2671   1336   3327  -2297    361    730    107   2204   1052     96   7490  13868  -5230   -382     37     50     90     21      6    305      7      1      0 |  17148
13 HOW  |  2196   5018   6405  -9574    701    716  -1215    884    138    192   5280    650 -11485   3230    204    223   -218   -539     26    -80     28      6      0 |   2786
14 AAR  |  4433   6857  -2098 -31872   1083   2036   1872   3882    678   -216    803  -3497    627   3967  -1651    487   1204     55   -357    -56     75     29      0 | -11658
15 CAL  |   400   1660    976  -4982    471    660   1216  -2779    134   -192     70     16   -997  -8766  14254    536  -1396      9     21      4     29     44      0 |   1387
16 STM  |  2076   -605   1293  -1338    523    413   1621   2776     97    155     42      7    265    156  -2801  -4153  -1681     17   -386      2    123    397      0 |  -1000
17 CHS  |  1807   -309   1000 -16811  -1143   -160    142   4917     94    469     99   -343    454  -1817   -359  -3707  13421     30     99      7   -161     45      0 |  -2224
18 FAU  |   908    309    312    497     77    423    351    798  -3020  -2168     86      7     37     75      8     28     48  10060   2006  -1996   1813   -114      0 |  10542
19 STA  |  1252  -1374    224    761    659  -1446    791   1494   1145    673    -88      5     48   -252     29    133    172   3056  21345   -459 -22735   -219      0 |   5215
20 CL/JF|   242    454   3314    353    206    506    235   3641   4559   1459  -1382    213    262    223      2      3      9    734     34   7251   -504   -295      0 |  21520
21 SP/FB|  -312  -2163   -131   -384  -1711    181   1189   9199    872   1018     30      3     31     92     34   -467    197   1779  -3885  -3403 -23471  -5492      0 | -26791
22 KGEO |   131     84    286    571    167    364    291   1791    125   1112      3      0     15   -429     55   -133    575    -88   -114      9  -3097  -4745      0 |  -3027
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
=========================================================================================================================================================================
 TOTAL  | 13745        -44040         32248         21004         -7328         -6436        -17604          3671         -2567         24452        -38906             0 |
               86160         10493         -5760        -77401        -23009          8199        -27375         -5069         19009         12379        -10270        -34406
```

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips   MODE: Ratio (Est/Obs) Auto Person

```
           DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22     23 |  TOTAL
=========================================================================================================================================================================
 1 DC CR|  1.29   0.87   1.15   1.14   5.89   0.66   0.57   0.83   0.23   1.07 364.34  77.76   2.19   0.79 196.07   0.25   0.50 142.85   0.41  42.86 156.28   0.06      0 |   1.02
 2 DC NC|  0.76   1.03   0.75   1.13   2.56   1.14   1.83   1.23   0.33   0.95 510.14   0.26   3.71   0.93   0.26 161.93   0.74 155.27   0.48  41.72   0.19  13.28      0 |   0.97
 3 MTG  |  1.14   1.01   0.98   1.42   1.27   1.01   1.26   0.86   0.35   0.51   0.98   1.07   1.21   0.98   1.56 442.98   1.18 345.67   0.46   0.94   0.20  35.64      0 |   1.00
 4 PG   |  1.04   1.30   0.93   1.00   4.50   1.26   2.38   1.42   0.36   1.00   2.28   0.16   0.89   0.76   0.42   7.86   0.68 189.36 499.68  63.36 291.01   1.02      0 |   1.02
 5 ARLCR|  1.43   1.17   1.16   1.89   3.29   1.25   1.85   1.31 301.91   0.29  40.87   8.04   0.31   0.67  15.89  10.30  67.36  35.09  65.43   9.67  41.35   2.89      0 |   1.48
 6 ARNCR|  0.63   1.24   0.86   2.25   1.13   0.90   1.19   0.99   0.81   1.78   1.30  14.66   0.34   0.39   0.39  36.63   0.43   1.45   0.27  25.86 251.71  11.89      0 |   0.95
 7 ALX  |  0.74   1.20   1.19   1.33   2.29   1.26   0.87   1.10   0.85   1.51   0.21  12.24   0.08   0.21  59.16  58.75   0.82   0.44   1.42  20.26 301.95  18.79      0 |   0.98
 8 FFX  |  1.07   1.51   1.09   1.95   1.08   1.02   1.17   0.96   0.79   0.76   0.63 100.09   0.37   1.93   0.27   2.09   1.21   1.40   0.87   0.28   2.60   2.40      0 |   0.98
 9 LDN  |  1.22   2.69   1.49   3.45   5.00   1.06   2.20   0.82   1.02   1.54   5.54 476.76 477.50   0.87  26.88  91.80 346.72   0.72   0.98   3.38 760.21  36.25      0 |   1.04
10 PW   |  1.07   0.79   1.26   1.24   0.67   0.74   0.80   0.98   1.07   0.99 287.65  18.41 204.62 564.79  45.41   0.14   0.73   1.31   1.98 408.31   2.32   0.92      0 |   1.00
11 FRD  |  2.68   1.08   0.99   0.76   1.81   8.96   0.96   4.03   2.91   0.82   0.95   0.91   1.13   1.10  54.00  90.84 142.59 121.29  26.58   2.23  24.85   1.38      0 |   1.00
12 CAR  |  5.83   2.77   1.27   0.51 361.35 730.02   1.65   9.341051.93  96.28   1.84   1.04   0.58   0.41  37.34  50.41  89.53  20.50   6.44 305.18   6.89   0.58      0 |   1.04
13 HOW  |  1.30   2.00   1.20   0.78   5.24   1.57   0.45   1.22   1.50 192.19   3.51   1.08   0.98   1.05 204.34 222.65   0.67   0.06  25.84   0.75  27.52   6.19      0 |   1.00
14 AAR  |  1.29   1.48   0.93   0.68   1.89   1.57   1.92   1.45 678.42   0.72   1.96   0.20   1.01   1.00   0.77   1.71   1.81  54.82   0.21   0.61  75.06  29.48      0 |   0.99
15 CAL  |  1.08   1.67   1.48   0.67   4.10   1.74   5.76   0.61 134.18   0.47  69.84  15.62   0.36   0.41   1.08   1.04   0.80   9.38  20.59   3.57  28.80  43.82      0 |   1.01
16 STM  |  2.06   0.82   3.83   0.80 522.51   1.531620.95   3.13  96.62 155.39  42.01   7.43 264.84   1.14   0.80   0.98   0.92  16.90   0.16   2.40 123.34 396.62      0 |   1.00
17 CHS  |  1.20   0.96   1.28   0.57   0.54   0.95   1.04   1.74   1.38 468.91  99.10   0.06   4.13   0.58   0.93   0.69   1.05  30.40  99.42   6.60   0.44   1.05      0 |   0.99
18 FAU  |  2.12   1.55   1.35 496.76   1.19   1.55   1.94   1.06   0.55   0.86  86.31   6.59  36.87  74.57   7.57  27.75  48.22   1.11   3.14   0.17   9.46   0.36      0 |   1.02
19 STA  |  1.80   0.52   1.17   3.72   6.31   0.60   1.67   1.111144.91   1.03   0.32   4.82  47.66   0.36  29.36 133.27 171.833056.08   1.12   0.14   0.64   0.81      0 |   1.02
20 CL/JF|  1.48 453.89   5.80 353.44 206.24 505.59 235.26   1.74   1.33  19.63   0.78 212.76   2.11 222.52   2.49   3.21   8.95   2.87  34.11   1.07   0.07   0.01      0 |   1.17
21 SP/FB|  0.83   0.28   0.88   0.62   0.21   1.161188.87   5.52 871.73   1.10  30.05   3.27  31.37  92.42  33.92   0.24 196.94   7.89   0.89   0.02   0.91   0.13      0 |   0.92
22 KGEO |  1.22   1.25 285.61 571.31 167.29 363.61 290.90   4.18 124.71   1.84   2.92   0.18  14.97   0.12  55.31   0.70   1.36   0.79   0.98   8.97   0.61   0.86      0 |   0.94
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0 |      0
=========================================================================================================================================================================
 TOTAL  |  1.02          0.98          1.43          1.06          0.99          0.99          0.98          1.02          0.99          1.10          0.89             0 |
                1.11          1.01          0.99          0.98          0.98          1.02          0.98          0.98          1.17          1.11          0.77          1.00
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips    MODE: Est Auto Driver

        DESTINATION
ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=============================================================================================================================================================================
 1 DC CR| 54907  28363  11716  17752   2142   5641   3801  11165    494    819    194     45    718   1718    140     58    699     76    155     15     69      4     0 |  140691
 2 DC NC| 62146 269549  62162  68103   5134  13610   8827  32560   1232   1003    328     57   2497   4479    248    104   1511     88    169     16     76      6     0 |  533905
 3 MTG  | 75481 869051423457  88893   4267  12483   5241  38164   2322   1115  12547   2232  18910  13349    311    333    976    175    212    463    243     21     0 | 1788009
 4 PG   | 70700 124829 101884 925057   5838  16208  14579  37982   1145   1090    512    138  20670  37321   2472   1580  20265     91    241     29    141    123     0 | 1382893
 5 ARLCR|  1709   2376   1089   1161   6631   6451   2782   6491    201    413     20      4     44    105     11      4     52     19     40      3     18      1     0 |   29625
 6 ARNCR| 17195  15571   7812   5791  15235 151846  24601  72335   1667   2175     71      7    144    385     24     23    221     87    203     10    140      6     0 |  315547
 7 ALX  | 13634   9352   3972   5768   6822  25769 111357  61331    911   2799     39      5    101    308     36     36    403     59    263      8    159      9     0 |  243140
 8 FFX  | 88092  52291  41995  25758  20978  87822 808921609606  52481  47763    640     50    722   1783    151    364   1804   2331   3645    370   3653    186     0 | 2123377
 9 LDN  | 10055   7011   9816   3353   2335   7157   3619  87605 360435   8012   6005    311    392    572     22     82    234   1729    346   8273    484     23     0 |  517869
10 PW   | 10078   7053   6510   3887   2712   9057   8669 133311   9906 603097    220     13    148    404     33    113    311   8627  10595    302   6442    209     0 |  821696
11 FRD  |  4321   3488  36306   3084    664   1546    570   7554   8041    373 380769  14943   9652   4293     42     78    111     82     12   3372     13      1     0 |  479315
12 CAR  |  2596   1804  11297   1988    293    597    225   1843    666     80  12642 270530   9049   2980     31     44     75     15      3    216      4      0     0 |  316979
13 HOW  |  7626   8175  28797  25129    705   1621    785   3720    302    140   5594   5782 385469  47325    149    187    328     16     11    161     14      4     0 |  522036
14 AAR  | 15221  16433  20859  48367   1702   4112   2639   8381    444    353   1221    552  47392 841047   3887    899   1874     24     40     52     34     17     0 | 1015551
15 CAL  |  4291   3316   2366   7474    456   1111    944   2784     96    115     55     11    424   4486 134093  11125   4033      5     12      2     20     29     0 |  177247
16 STM  |  3053   2202   1418   4036    368    834    935   2451     71    110     32      5    211    976   7977 198731  13108     11     46      1     79    249     0 |  236906
17 CHS  |  8550   6942   3638  16948    996   2445   2713   7388    225    298     71     12    459   1901   3321   6043 226610     15     52      3     78    582     0 |  289289
18 FAU  |  1160    692    966    371    351    936    587   9913   2789  10128     62      4     23     45      5     23     31  74008   2101    310   1431     49     0 |  105983
19 STA  |  1528   1077   1038    734    466   1529   1473  10961    940  17895     26      2     27     84     22    117    132   2397 139061     69  28751    688     0 |  209019
20 CL/JF|   556    382   2724    294    154    399    192   5761  11393   1146   3257    140    351    174      1      2      5    781     28  80125     29      1     0 |  107896
21 SP/FB|   779    558    616    430    245    869    830   7366    674   8206     19      1     16     50     27    124    159   1619  22677     55 178845    667     0 |  224832
22 KGEO |   504    356    225    487    106    257    207   1464    103   1594      2      0     12     50     45    224   1325    250   3145      8   3351  21223     0 |   34941
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |       0
=============================================================================================================================================================================
 TOTAL  454180    1780664       78600        276468        456536       424326        497431       153049         274267       183056        224073             0 |
             648727       1254862       352300       2160136        708725       294844        963834        220294         92505         93861         24098        11616836


Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips    MODE: Obs Auto Driver

        DESTINATION
ORIGIN |   1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=============================================================================================================================================================================
 1 DC CR| 44873  33514  12182  14831    352   9943   7107  15253   2711    958      0      0    412   2882      0    474   1423      0    174      0      0    218     0 |  147309
 2 DC NC| 80194 262158  77628  59666   2169  13931   6156  29284   3820   1204      0    339    892   5429    949      0   1910      0    162      0    374      0     0 |  546265
 3 MTG  | 66922 856331484401  70897   3110  13775   4393  51028   7671   1837  15255   2585  19056  14891    310      0    816      0    928    821    621      0     0 | 1844951
 4 PG   | 69535  93398 113981 909987   1559  12519   6636  34840   3430   1547    383   1521  22210  53459   6390    286  28190      0      0      0      0    198     0 | 1360071
 5 ARLCR|  1062   1959   1178    690   2499   5158   1808   6067      0   1267      0      0    178    221      0      0      0      0      0      0      0      0     0 |   22088
 6 ARNCR| 26649  14354   9098   2718  11786 165377  22605  75785   2382   1396     93      0    547    674     91      0    675    102   1215      0      0      0     0 |  335548
 7 ALX  | 17215   7651   3809   4365   3398  21778 132041  58359   1273   2536    382      0    730   1071      0      0    539    262    320      0      0      0     0 |  255729
 8 FFX  | 79846  35714  40837  16118  21073  85430 744671722390  63820  65823   1587      0   2852   1370    771    235   1854   2364   3713   1399   2231    132     0 | 2224024
 9 LDN  |  9132   3027   7884   1239    607   6062   2134 113257 333842   6030    881      0      0    852      0      0      0   2686    404   2196      0      0     0 |  490234
10 PW   |  7398   8774   4916   2501   4143  12063  10768 139594  10682 568226      0      0      0      0      0    491    463   6830   6301      0   1887    262     0 |  785300
11 FRD  |  1511   3444  41807   4207    480    227    793   2830   4087    594 393147  16497   8511   2912      0      0      0      0      0   1970      0      0     0 |  483018
12 CAR  |   553    278  10843   3677      0      0    164    264      0      0   6675 237554  17313   8173      0      0      0      0      0     28      0      0     0 |  285494
13 HOW  |  5738   4304  26593  35347    165    772   1392   3251    274      0   1969   5804 377715  48130      0      0    667    571      0    323      0      0     0 |  513016
14 AAR  | 11356  11164  18581  73498   1222   2910   2027   6285      0    769    767   3264  46485 827649   5811    425   1483      0    453    143      0      0     0 | 1014295
15 CAL  |  4415   1976   1098  11922    152    444    255   5190      0    360      0      0   1550  11445 119097  12674   4124      0      0      0      0      0     0 |  174702
16 STM  |  1963   2904    457   5978      0    785      0   1302      0      0      0      0      0    832   9891 200778  14504      0    460      0      0      0     0 |  239854
17 CHS  |  7614   7134   2568  32479   1477   2846   3352   5850    251      0      0    182    145   3884   4376   8683 210568      0      0      0    145    781     0 |  292335
18 FAU  |   814    565    900      0    204    766    374  12556   4689  13041      0      0      0      0      0      0      0  67249    577   1319    214    179     0 |  103445
19 STA  |  1561   2247   1285    140    124   1624   1186  10628      0  20930    130      0      0    393      0      0      0      0 112072    536  40373   1129     0 |  194359
20 CL/JF|   509      0    690      0      0      0      0   4117   9882     78   5695      0    236      0      0      0      0    393      0  71008    539    297     0 |   93445
21 SP/FB|  1865   1366   1084   1011   2153   1112      0   2035      0   7095      0      0      0      0    308      0    258  25537   2274 179949   5944     0     0 |  231989
22 KGEO |   608    333      0      0      0      0      0    564      0   1325      0      0      0    489      0    343   1597    423   3140      0   5506  24545     0 |   38873
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |       0
=============================================================================================================================================================================
 TOTAL  441333    1861819       56674        277658       448816       426964        498832       147687         268813       155457        231839             0 |
             581898       1251272       357525       2300730        695016       267747        984758        224696         81136         81990        33685        11676343
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips    MODE: Difference (Est-Obs) Auto Driver

         DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=======================================================================================================================================================================================
 1 DC CR| 10034  -5151   -466   2921   1790  -4302  -3306  -4088  -2217   -138    194     45    306  -1164    140   -416   -724     76    -19     15     69   -214     0 |  -6618
 2 DC NC|-18047   7391 -15466   8436   2965   -320   2671   3276  -2588   -201    328   -282   1605   -951   -702    104   -399     88      7     16   -298      6     0 | -12360
 3 MTG  |  8559   1271 -60944  17995   1157  -1292    848 -12864  -5348   -722  -2708   -353   -147  -1542      2    333    160    175   -717   -358   -379     21     0 | -56853
 4 PG   |  1165  31431 -12098  15070   4279   3689   7943   3142  -2286   -457    130  -1383  -1540 -16139  -3919   1293  -7925     91    241     29    141    -75     0 |  22822
 5 ARLCR|   647    418    -89    470   4133   1293    974    423    201   -854     20      4   -135   -116     11      4     52     19     40      3     18      1     0 |   7538
 6 ARNCR| -9454   1217  -1287   3072   3449 -13531   1996  -3451    779    -23      7   -403   -289    -67     23   -454    -14  -1012     10    140      6     0 | -20001
 7 ALX  | -3581   1701    163   1403   3424   3990 -20684   2973   -363    263   -343      5   -629   -763     36     36   -135   -202    -57      8    159      9     0 | -12589
 8 FFX  |  8246  16577   1159   9640    -95   2392   6426-112784 -11339 -18060   -947     50  -2129    413   -620    129    -50    -33    -68  -1029   1422     54     0 |-100647
 9 LDN  |   923   3984   1932   2114   1728   1094   1485 -25652  26592   1981   5124    311    392   -280     22     82    234   -957    -59   6076    484     23     0 |  27634
10 PW   |  2680  -1721   1594   1386  -1431  -3006  -2099  -6283   -776  34871    220     13    148    404     33   -379   -153   1797   4294    302   4555    -53     0 |  36397
11 FRD  |  2809     44  -5500  -1123    184   1318   -222   4724   3954   -221 -12378  -1554   1141   1381     42     78    111     82     12   1402     13      1     0 |  -3703
12 CAR  |  2042   1526    454  -1689    293    597     60   1579    666     80   5967  32976  -8264  -5192     31     44     75     15      3    216      4      0     0 |  31486
13 HOW  |  1888   3871   2204 -10218    539    850   -607    469     28    140   3625    -22   7754   -806    149    187   -339   -555     11   -162     14      4     0 |   9021
14 AAR  |  3865   5269   2278 -25132    480   1201    612   2095    444   -415    454  -2712    907  13398  -1925    474    391     24   -412    -91     34     17     0 |   1256
15 CAL  |  -124   1340   1268  -4448    303    667    688  -2405     96   -244     55     11  -1126  -6960  14996  -1549    -91      5     12      2     20     29     0 |   2545
16 STM  |  1090   -702    962  -1942    368     49    935   1149     71    110     32      5    211    144  -1913  -2047  -1396     11   -414      1     79    249     0 |  -2949
17 CHS  |   935   -192   1070 -15531   -481   -400   -639   1538    -26    298     71   -170    314  -1983  -1055  -2639  16041     15     52      3    -67   -200     0 |  -3045
18 FAU  |   346    127     67    371    147    170    214  -2643  -1901  -2913     62      4     23     45      5     23     31   6760   1525  -1009   1216   -130     0 |   2538
19 STA  |   -33  -1170   -247    595    342    -96    287    333    940  -3035   -103      2     27   -310     22    117    132   2397  26988   -468 -11622   -441     0 |  14659
20 CL/JF|    47    382   2035    294    154    399    192   1643   1511   1068  -2438    140    116    174      1      2      5    388     28   9117   -510   -296     0 |  14451
21 SP/FB| -1086   -808   -468   -581  -1908   -244    830   5331    674   1110     19      1     16     50     27   -183    159   1361  -2860  -2218  -1103  -5276     0 |  -7158
22 KGEO |  -103     23    225    487    106    257    207    900    103    269      2      0     12   -439     45   -118   -272   -173      6      8  -2155  -3322     0 |  -3932
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |      0
=======================================================================================================================================================================================
 TOTAL | 12847        -81155         21927         -1190         7721         -2638         -1400         5362         5454        27599         -7766            0 |
             66829          3590         -5225       -140594        13709        27098        -20924        -4402        11368        11871         -9587       -59507
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips    MODE: Ratio (Est/Obs) Auto Driver

         DESTINATION
ORIGIN |    1      2      3      4      5      6      7      8      9     10     11     12     13     14     15     16     17     18     19     20     21     22    23 |  TOTAL
=======================================================================================================================================================================================
 1 DC CR|  1.22   0.85   0.96   1.20   6.08   0.57   0.53   0.73   0.18   0.86 193.89  44.90   1.74   0.60 139.73   0.12   0.49  76.28   0.89  14.81  68.71   0.02     0 |   0.96
 2 DC NC|  0.77   1.03   0.80   1.14   2.37   0.98   1.43   1.11   0.32   0.83 327.62   0.17   2.80   0.82   0.26 104.07   0.79  87.66   1.04  15.87   0.20   5.90     0 |   0.98
 3 MTG  |  1.13   1.01   0.96   1.25   1.37   0.91   1.19   0.75   0.30   0.61   0.82   0.86   0.99   0.90   1.01 332.51   1.20 174.87   0.23   0.56   0.39  20.79     0 |   0.97
 4 PG   |  1.02   1.34   0.89   1.02   3.74   1.29   2.20   1.09   0.33   0.70   1.34   0.09   0.93   0.70   0.39   5.52   0.72  91.06 241.06  28.56 141.05   0.62     0 |   1.02
 5 ARLCR|  1.61   1.21   0.92   1.68   2.65   1.25   1.54   1.07 200.89   0.33  20.45   4.06   0.24   0.47  10.52   4.47  52.08  18.82  40.17   3.09  17.96   0.95     0 |   1.34
 6 ARNCR|  0.65   1.08   0.86   2.13   1.29   0.92   1.09   0.95   0.70   1.56   0.76   6.78   0.26   0.57   2.79   0.33   0.86   0.17  10.14 139.89   5.89     0 |   0.94
 7 ALX  |  0.79   1.22   1.04   1.32   2.01   1.18   0.84   1.05   0.71   1.10   0.10   4.50   0.14   0.29  35.94  36.44   0.75   0.23   0.82   7.78 159.28   9.29     0 |   0.95
 8 FFX  |  1.10   1.46   1.03   1.60   1.00   1.03   1.09   0.93   0.82   0.73   0.40  49.98   0.25   1.30   0.20   1.55   0.97   0.99   0.98   0.26   1.64   1.41     0 |   0.95
 9 LDN  |  1.10   2.32   1.25   2.71   3.85   1.18   1.70   0.77   1.08   1.33   6.81 311.27 391.95   0.67  21.52  82.40 233.86   0.64   0.86   3.77 483.60  23.08     0 |   1.06
10 PW   |  1.36   0.80   1.32   1.55   0.65   0.75   0.81   0.95   0.93   1.06 220.12  12.58 147.77 403.71  33.03   0.23   0.67   1.26   1.68 301.71   3.41   0.80     0 |   1.05
11 FRD  |  2.86   1.01   0.87   0.73   1.38   6.80   0.72   2.67   1.97   0.63   0.97   0.91   1.13   1.47  42.32  77.88 110.98  82.28  11.51   1.71  12.62   0.77     0 |   0.99
12 CAR  |  4.69   6.49   1.04   0.54 293.09 597.12   1.37   6.98 666.10  80.41   1.89   1.14   0.52   0.36  31.40  44.17  74.84  14.86   3.01 215.98   3.98   0.45     0 |   1.11
13 HOW  |  1.33   1.90   1.08   0.71   4.26   2.10   0.56   1.14   1.10 139.65   2.84   1.00   1.02   0.98 149.49 186.51   0.49   0.03  10.87   0.50  14.04   3.65     0 |   1.02
14 AAR  |  1.34   1.47   1.12   0.66   1.39   1.41   1.30   1.33 443.69   0.46   1.59   0.17   1.02   1.02   0.67   2.12   1.26  23.98   0.09   0.36  33.96  16.86     0 |   1.00
15 CAL  |  0.97   1.68   2.15   0.63   2.99   2.50   3.70   0.54  96.34   0.32  55.31  11.26   0.27   0.39   1.13   0.88   0.98   5.36  11.55   1.98  19.57  28.62     0 |   1.01
16 STM  |  1.55   0.76   3.11   0.68 368.22   1.06 935.38   1.88  70.60 110.39  32.11   4.67 210.80   1.17   0.81   0.99   0.90  11.05   0.10   1.03  78.93 249.31     0 |   0.99
17 CHS  |  1.12   0.97   1.42   0.52   0.67   0.86   0.81   1.26   0.90 298.50  71.07   0.07   3.17   0.49   0.76   0.70   1.08  14.77  51.78   2.74   0.54   0.74     0 |   0.99
18 FAU  |  1.43   1.23   1.07 370.77   1.72   1.22   1.57   0.79   0.59   0.78  62.12   3.69  22.75  45.36   4.66  23.21  31.00   1.10   3.64   0.23   6.67   0.27     0 |   1.02
19 STA  |  0.98   0.48   0.81   5.26   3.75   0.94   1.24   1.03 939.68   0.85   0.20   2.27  27.43   0.21  22.43 116.96 132.242397.10   1.24   0.13   0.71   0.61     0 |   1.08
20 CL/JF|  1.09 381.61   3.95 293.80 153.92 399.17 192.07   1.40   1.15  14.63   0.57 139.52   1.49 173.63   1.32   2.28   5.38   1.99  27.74   1.13   0.05   0.00     0 |   1.15
21 SP/FB|  0.42   0.41   0.57   0.43   0.11   0.78 829.67   3.62 674.23   1.16  18.52   1.29  16.20  49.58  26.97   0.40 159.29   6.27   0.89   0.02   0.99   0.11     0 |   0.97
22 KGEO |  0.83   1.07 225.42 486.73 105.89 256.96 206.79   2.60 103.34   1.20   2.15   0.11  12.34   0.10  44.66   0.65   0.83   0.59   1.00   8.28   0.61   0.86     0 |   0.90
23 EXTL |     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0     0 |      0
=======================================================================================================================================================================================
 TOTAL |  1.03          0.96          1.39          1.00          1.02          0.99          1.00          1.04          1.02          1.18          0.97            0 |
             1.11          1.00          0.99          0.94          1.02          1.10          0.98          0.98          1.14          1.14          0.72          0.99
```

Appendix B Year 2007 mode choice summary

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips    MODE: Est Motr Psn

          DESTINATION
ORIGIN |    1        2        3        4        5        6        7        8        9       10       11       12       13       14       15       16       17       18       19       20       21       22      23  |   TOTAL
========================================================================================================================================================================================================================================
 1 DC CR| 111444    58492    21461    23226     7566    14800     7771    16648      685     1061      364       78      909     2273      197      116      880      143      252       43      157       13       0 |  268580
 2 DC NC| 242770   464163   113336    97608    15700    34149    17687    50932     1752     1367      510       89     3334     5945      324      162     1945      155      273       42      155       13       0 | 1052411
 3 MTG  | 174959  1337262   133365   125928    10446    21056     8037    52617     3297     1875    18653     3531    26808    19055      482      443     1475      346      423      770      442       36       0 | 2737768
 4 PG   | 152241   192720   158117  1318476    14068    28889    22929    56838     1691     1878      871      275    29541    52521     3655     2250    29292      189      500       63      291      203       0 | 2067498
 5 ARLCR|   8576     3687     1651     1366     9633    10396     4347     8845      302      553       41        8       56      148       16       10       67       35       65       10       41        3       0 |   49856
 6 ARNCR|  68854    25487    11917     7413    27576   226694    38118   100928     2365     3050      122       15      187      531       35       37      290      147      327       26      252       12       0 |  514386
 7 ALX  |  39009    14264     5901     7345    12088    40461   167078    87357     1356     4216       80       12      151      480       59       59      559      115      454       20      302       19       0 |  381386
 8 FFX  | 163559    72739    56737    35042    37874   129877  1208172   380316    70250    68371     1012      100     1093     2668      249      546     2861     3600     6046      578     6125      316       0 | 3160777
 9 LDN  |  15103     8976    12028     4290     3668     9769     4802   117341   508053    10965     8918      477      478      739       27       92      347     1349      537    12618      760       36       0 |  722483
10 PW   |  20722    10562     9318     5419     5461    14267    13125   180215    13331   860345      312       18      264      614       65      242      539    12433    15908      408    10213      330       0 | 1174112
11 FRD  |   6769     4390    53150     3763      949     2118      772    11425    12814      492   523676    20823    12604     5179       54       91      143      121       27     5134       25        1       0 |  664518
12 CAR  |   3225     2092    15850     2349      361      730      271     2468     1052       96    16405   364993    12746     3628       37       50       90       21        6      305        7        1       0 |  426784
13 HOW  |  13847    11220    40092    34602     1288     2401     1089     4995      412      260     7387     8513   543626    64174      204      223      449       32       26      244       28        6       0 |  735115
14 AAR  |  26438    22627    29525    68242     2941     6218     4017    12788      678      643     1642      852   669511  1171761     5566     1175     2687       55       96       87       75       29       0 | 1425094
15 CAL  |   6086     4407     3102    10195      731     1663     1498     4345      134      171       70       16      553     6057   184668    14611     5581        9       21        4       29       44       0 |  243994
16 STM  |   4370     2867     1792     5384      573     1250     1633     4085       97      155       42        7      265     1252    10878   258954    18981       17       74        2      123      397       0 |  313199
17 CHS  |  13693     9373     4828    22183     1679     3701     4210    11614      345      500       99       20      599     2459     4532     8075   311445       30       99        7      129      972       0 |  400594
18 FAU  |   1789      897     1221      498      516     1227      740    13367     3627    13644       86        7       37       75        8       28       48   103855     2945      422     2027       65       0 |  147128
19 STA  |   3612     1696     1585     1050     1062     2516     2102    15452     1145    24551       42        5       48      142       29      133      172     3056   195450       77    39554      910       0 |  294388
20 CL/JF|    845      496     4059      357      241      541      242     8543    18358     1538     4853      213      498      223        2        3        9     1127       34   107511       36        2       0 |  149731
21 SP/FB|   2171     1014     1036      640      668     1616     1338    11336      872    11587       30        3       31       92       34      148      197     2037    31201       63   246903      854       0 |  313870
22 KGEO |    754      424      288      572      174      372      296     2360      125     2440        3        0       15       60       55      308     2172      335     4721        9     4838    29237       0 |   49557
23 EXTL |      0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0       0 |       0
========================================================================================================================================================================================================================================
 TOTAL  1080836          2680358          155265          422919          642741          585220          700793          211177          380229          259484          312512            0  |
              1046318          1775946          554716         3154817         1009758          400055         1340075          287755          130318          128442           33497    17293230
```

```
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips    MODE: Obs Motr Psn

          DESTINATION
ORIGIN |    1        2        3        4        5        6        7        8        9       10       11       12       13       14       15       16       17       18       19       20       21       22      23  |   TOTAL
========================================================================================================================================================================================================================================
 1 DC CR| 101913    69843    21205    21893     2394    23647    11364    20274     3085     1128       51        0      525     3659       28      474     1757       84      610        0        0      218       0 |  284152
 2 DC NC| 265287   459170   134206    86634     6486    34455    12270    41266     5590     1544        0      339     1004     6679     1266        0     2650       17      568       18      831        0       0 | 1060280
 3 MTG  | 165494  1467382   154598    92055     6013    21933     7123    60145     9589     3410    19013     3286    22251    19765      342       15     1258        0      981      821     2174        0       0 | 2737003
 4 PG   | 163935   160505  1700561  1320105     4816    29163    11416    41928     4911     1768      386     1703    33171    69364     8726      286    43313        0        0        0        0      198       0 | 2065750
 5 ARLCR|   6560     4005     1392      970     2800     8548     2463     6908       40     1922        0        0      178      249        0        0        0        0        0        0        0        0       0 |   36035
 6 ARNCR|  86527    28851    13888     4647    21739   246586    31167   101344     3048     1718       93        0      547     1479       91        0      675      117     1232       29        0        0       0 |  543773
 7 ALX  |  44128    15505     5312     6080     5646    33701   191682    79651     1636     2790      382        0     1832     2330        0        0      683      262      320        0        0        0       0 |  391940
 8 FFX  | 153305    57215    50627    18917    31278   130222  1029502   492204    89177    89796     1587        0     2862     1402      881      235     2334     2603     6939     2063     2349      132       0 | 3239079
 9 LDN  |  11764     3673     7897     1266      772     9190     2267   143680   495181     7028     1611        0        0      852        0        0        0     3408      548     3735        0     4396     360 |  692873
10 PW   |  20624    13329     6746     4210     6537    19456    15844   181442    12383   866858        0        0        4        5        0      957      632     9526     8029        0     4396      360       0 | 1171338
11 FRD  |   5085     4493    55065     5054      502      479      824     2830     4410      594   550404    22828    11119     4728        0        0        0        0        0     2298        0        0       0 |  670713
12 CAR  |    789      774    12523     4645        0       64      164      264        0        0     8915   351125    21831     8858        0        0        0        0        0        0        0        0       0 |  409954
13 HOW  |  11397     5592    32896    43903      327     2022     2278     4093      274        0     2107     7862   554471    60919        0        0      667      571        0      323       57        0       0 |  729761
14 AAR  |  21236    16057    31178    99836     1664     4826     2117     8755        0      769      839     4349   662851  1167700     7216      688     1483        0      453      143      760        0       0 | 1435596
15 CAL  |   5705     2769     2147    15140      259      955      290     7140        0      360        0        0     1550    14822   170369    14074     6977        0        0        0        0        0       0 |  242556
16 STM  |   1994     3431      498     6710        4      897       17     1302        0        0        0        0        0     1096    13678   262953    20646        0      460        0        0        0       0 |  313685
17 CHS  |  11766     9873     3671    39129     2739     4561     4017     6688      251        0        0      363      145     4276     4892    11778   297059        0        0        0      290      926       0 |  402424
18 FAU  |   1065      676      935       35      486      887      393    12602     6647    15811        0        0        0        0        0        0        0    93795      939     2418      214      179       0 |  137082
19 STA  |   2429     3126     1329      285      207     4052     1368    14120        0    23886      130        0        0      393        0        0        0        0   174103      536    62290     1129       0 |  289384
20 CL/JF|    511       59      690        0        5        3        5     4890    13799       78     6236        0      236        0        0        0        0      393        0   100259      539      297       0 |  128001
21 SP/FB|   2087     3289     1095     1057     2212     1376      184     2197        0    10560        0        0        0        0      615        0      258    35092     3466   270367     6346        0       0 |  340202
22 KGEO |    697      349        3        0        7       25        8      577        0     1330        0        0        0      489        0      441     1597      423     4835        0     7935    33983       0 |   52698
23 EXTL |      0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0       0 |       0
========================================================================================================================================================================================================================================
 TOTAL  1084297          2707958           96894          400210          650022          591753          718010          207488          381731          235110          351444            0  |
              1009321          1772570          577050         3234298         1031350          391856         1369065          292516          111457          116111           43767    17374278
```

Appendix B Year 2007 mode choice summary

<pre>
Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips   MODE: Difference (Est-Obs) Motorized Person

          DESTINATION
ORIGIN | 1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16   17   18   19   20   21   22   23 | TOTAL
===
 1 DC CR| 9531 -11350   256   1334   5171   -8846   -3593   -3626   -2400   -67   313   78   384   -1386   169   -358   -877   59   -358   43   157   -206   0 | -15572
 2 DC NC| -22517   4994 -20871   10975   9214   -306   5417   9665   -3839   -177   510   -250   2330   -734   -943   162   -704   138   -295   24   -676   13   0 | -7869
 3 MTG | 9466 -13012 -21233   33873   4433   -877   -914   -7529   -6292   -1535   -359   245   4557   -711   140   428   217   346   -558   -51   -1732   36   0 | 764
 4 PG | -11694   32215 -11940   -1630   9253   -274   11513   14910   -3220   110   485   -1428   -3630 -16843   -5071   1964 -14021   189   500   63   291   5   0 | 1748
 5 ARLCR| 2015   -318   259   395   6833   1848   1884   1937   262   -1369   41   8   -122   -102   16   10   67   35   65   10   41   3   0 | 13821
 6 ARNCR| -17672   -3364   -1971   2766   5837 -19888   6952   -412   -683   1332   28   15   -360   -948   -56   37   -384   31   -906   -3   252   12   0 | -29387
 7 ALX | -5119   -1241   588   1266   6443   6760 -24604   7706   -280   1426   -301   12   -1681   -1850   59   59   -124   -146   134   20   302   19   0 | -10554
 8 FFX | 10254   15524   6110   16125   6596   -346   17867 -111888 -18928 -21425   -575   100   -1768   1266   -632   311   527   997   -893   -1485   3776   184   0 | -78302
 9 LDN | 3339   5303   4131   3024   2896   579   2535 -26339   12872   3938   7307   477   478   -112   27   92   347   -950   -11   8883   760   36   0 | 29610
10 PW | 98   -2767   2571   1209   -1076   -5189   -2719   -1227   948   -6513   312   18   260   608   65   -715   -93   2906   7880   408   5818   -30   0 | 2774
11 FRD | 1684   -103   -1915   -1291   447   1639   -51   8594   8403   -102 -26728   -2005   1485   451   54   91   143   121   27   2836   25   1   0 | -6195
12 CAR | 2435   1318   3327   -2297   361   666   107   2204   1052   96   7490   13868   -9085   -5230   37   50   90   21   6   305   7   1   0 | 16830
13 HOW | 2450   5627   7196   -9301   960   379   -1189   902   138   260   5280   650 -10845   3255   204   223   -218   -539   26   -80   -29   6   0 | 5355
14 AAR | 5202   6570   -1653 -31594   1277   1391   1900   4033   678   -126   803   -3497   665   4061   -1651   487   1204   55   -357   -56   75   29   0 | -10502
15 CAL | 381   1638   956   -4945   472   708   1208   -2794   134   -189   70   16   -997   -8765   14299   537   -1396   9   21   4   29   44   0 | 1438
16 STM | 2376   -564   1295   -1325   569   353   1616   2783   97   155   42   7   265   156   -2799   -3999   -1664   17   -386   2   123   397   0 | -485
17 CHS | 1927   -501   1157 -16946   -1059   -860   193   4927   94   500   99   -343   454   -1817   -359   -3703   14386   30   99   7   -161   45   0 | -1830
18 FAU | 724   220   286   463   30   340   348   766   -3020   -2166   86   7   37   75   8   28   48   10060   2006   -1996   1813   -114   0 | 10046
19 STA | 1183   -1430   256   765   855   -1536   734   1333   1145   665   -88   5   48   -252   29   133   172   3056   21347   -459 -22737   -219   0 | 5004
20 CL/JF| 334   437   3369   357   236   538   237   3653   4559   1459   -1382   213   262   223   2   3   9   734   34   7251   -504   -295   0 | 21730
21 SP/FB| 84   -2275   -59   -417   -1544   239   1154   9139   872   1026   30   3   31   92   34   -467   197   1778   -3891   -3403 -23464   -5492   0 | -26332
22 KGEO | 57   74   285   572   167   348   287   1783   125   1109   3   0   15   -429   55   -133   575   -88   -114   9   -3097   -4745   0 | -3141
23 EXTL | 0   0 | 0
===
 TOTAL | -3461   -27600   58371   22709   -7282   -6533   -17216   3688   -1501   24374   -38932   0 |
             36997   3376   -22334   -79481   -21592   8199   -28990   -4761   18861   12332   -10270   -81048

Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
Purpose: Total Internal Trips   MODE: Ratio (Est/Obs) Motorized Person

          DESTINATION
ORIGIN | 1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16   17   18   19   20   21   22   23 | TOTAL
===
 1 DC CR| 1.09   0.84   1.01   1.06   3.16   0.63   0.68   0.82   0.22   0.94   7.14   77.76   1.73   0.62   7.02   0.25   0.50   1.70   0.41   42.86 156.95   0.06   0 | 0.95
 2 DC NC| 0.92   1.01   0.84   1.13   2.42   0.99   1.44   1.23   0.31   0.89 510.14   0.26   3.32   0.89   0.26 161.93   0.73   9.13   0.48   2.32   0.19   13.28   0 | 0.99
 3 MTG | 1.06   0.91   0.99   1.37   1.74   0.96   1.13   0.87   0.34   0.55   0.98   1.07   1.20   0.96   1.41   29.53   1.17 345.67   0.43   0.94   0.20   35.64   0 | 1.00
 4 PG | 0.93   1.20   0.93   1.00   2.92   0.99   2.01   1.36   0.34   1.06   2.26   0.16   0.89   0.76   0.42   7.86   0.68 189.36 499.68   63.36 291.01   1.02   0 | 1.00
 5 ARLCR| 1.31   0.92   1.19   1.41   3.44   1.22   1.77   1.28   7.55   0.29   40.87   8.04   0.31   0.59   15.89   10.30   67.36   35.09   65.43   9.67   41.35   2.89   0 | 1.38
 6 ARNCR| 0.80   0.88   0.86   1.60   1.27   0.92   1.22   1.00   0.78   1.78   1.30   14.66   0.34   0.36   0.39   36.63   0.43   1.26   0.26   0.89 251.71   11.89   0 | 0.95
 7 ALX | 0.88   0.92   1.11   1.21   2.14   1.20   0.87   1.10   0.83   1.51   0.21   12.24   0.08   0.21   59.16   58.75   0.82   0.44   1.42   20.26 301.95   18.79   0 | 0.97
 8 FFX | 1.07   1.27   1.12   1.85   1.21   1.00   1.17   0.96   0.79   0.76   0.64 100.09   0.38   1.90   0.28   2.32   1.23   1.38   0.87   0.28   2.61   2.40   0 | 0.98
 9 LDN | 1.28   2.44   1.52   3.39   4.75   1.06   2.12   0.82   1.03   1.56   5.54 476.76 477.50   0.87   26.88   91.80 346.72   0.72   0.98   3.38 760.21   36.25   0 | 1.04
10 PW | 1.00   0.79   1.38   1.29   0.84   0.73   0.83   0.99   1.08   0.99 311.86   18.41   75.39 113.68   65.40   0.25   0.85   1.31   1.98 408.31   2.32   0.92   0 | 1.00
11 FRD | 1.33   0.98   0.97   0.74   1.89   4.42   0.94   4.04   2.91   0.83   0.95   0.91   1.13   1.10   54.00   90.84 142.59 121.29   26.58   2.23   24.85   1.38   0 | 0.99
12 CAR | 4.08   2.70   1.27   0.51 361.35   11.41   1.65   9.34 1051.93   96.28   1.84   1.04   0.58   0.41   37.34   50.41   89.53   20.50   6.44 305.18   6.89   0.58   0 | 1.04
13 HOW | 1.21   2.01   1.22   0.79   3.93   1.19   0.48   1.22   1.50 259.94   3.51   1.08   0.98   1.05 204.34 222.65   0.67   0.06   25.84   0.75   0.48   6.19   0 | 1.01
14 AAR | 1.24   1.41   0.95   0.68   1.77   1.29   1.90   1.46 678.42   0.84   1.96   0.20   1.01   1.00   0.77   1.71   1.81   54.82   0.21   0.61   75.06   29.48   0 | 0.99
15 CAL | 1.07   1.59   1.45   0.67   2.82   1.74   5.16   0.61 134.18   0.47   69.84   15.62   0.36   0.41   1.08   1.04   0.80   9.38   20.59   3.57   28.80   43.82   0 | 1.01
16 STM | 2.19   0.84   3.60   0.80 143.17   1.39   96.05   3.14   96.62 155.39   42.01   7.43 264.84   1.14   0.80   0.98   0.92   16.90   0.16   2.40 123.34 396.62   0 | 1.00
17 CHS | 1.16   0.95   1.32   0.57   0.61   0.81   1.05   1.74   1.38 499.10   99.10   0.06   4.13   0.58   0.93   0.69   1.05   30.40   99.42   6.60   0.44   1.05   0 | 1.00
18 FAU | 1.68   1.33   1.31   14.22   1.06   1.38   1.89   1.06   0.55   0.86   86.31   6.59   36.87   74.57   7.57   27.75   48.22   1.11   3.14   0.17   9.46   0.36   0 | 1.07
19 STA | 1.49   0.54   1.19   3.68   5.13   0.62   1.54   1.09 114491   1.03   0.32   4.82   47.66   0.36   29.36 133.27 171.83 305608   1.12   0.14   0.63   0.81   0 | 1.02
20 CL/JF| 1.65   8.39   5.88 357.04   45.27 173.87   47.58   1.75   1.33   19.63   0.78 212.76   2.11 222.52   3.21   3.21   8.95   2.87   34.11   1.07   0.07   0.01   0 | 1.17
21 SP/FB| 1.04   0.31   0.95   0.61   0.30   1.17   7.26   5.16 871.73   1.10   30.05   3.27   31.43   92.47   33.92   0.24 196.94   7.89   0.89   0.02   0.91   0.13   0 | 0.92
22 KGEO | 1.08   1.21 104.99 571.56   24.24   15.17   35.87   4.09 124.71   1.83   2.92   0.18   14.97   0.12   55.31   0.70   1.36   0.79   0.98   8.97   0.61   0.86   0 | 0.94
23 EXTL | 0   0 | 0
===
 TOTAL | 1.00   0.99   1.60   1.06   0.99   0.99   0.98   1.02   1.00   1.10   0.89   0 |
             1.04   1.00   0.96   0.98   0.98   1.02   0.98   0.98   1.17   1.11   0.77   1.00
</pre>

Appendix B Year 2007 mode choice summary

```
          DESTINATION
ORIGIN |    1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 |  TOTAL
=========================================================================================================================================================
 1 DC CR| 1.31  1.34  1.32  1.15  1.38  1.39  1.45  1.29  1.39  1.25  1.88  1.73  1.26  1.32  1.40  2.02  1.26  1.87  1.62  2.89  2.27  2.96     0 |  1.31
 2 DC NC| 1.42  1.40  1.37  1.26  1.37  1.45  1.49  1.39  1.42  1.31  1.56  1.56  1.33  1.32  1.31  1.56  1.29  1.77  1.61  2.63  2.05  2.25     0 |  1.38
 3 MTG  | 1.25  1.33  1.44  1.37  1.24  1.26  1.34  1.34  1.42  1.56  1.49  1.58  1.42  1.43  1.55  1.33  1.51  1.98  2.00  1.66  1.82  1.71     0 |  1.42
 4 PG   | 1.31  1.33  1.42  1.40  1.31  1.33  1.45  1.46  1.48  1.63  1.70  1.99  1.42  1.41  1.48  1.42  1.45  2.08  2.07  2.22  2.06  1.65     0 |  1.39
 5 ARLCR| 1.41  1.23  1.26  1.13  1.36  1.30  1.34  1.30  1.50  1.32  2.00  1.98  1.28  1.41  1.51  2.30  1.29  1.86  1.63  3.13  2.30  3.04     0 |  1.31
 6 ARNCR| 1.31  1.32  1.29  1.22  1.41  1.38  1.38  1.34  1.42  1.38  1.72  2.16  1.30  1.38  1.45  1.61  1.31  1.69  1.61  2.55  1.80  2.02     0 |  1.36
 7 ALX  | 1.25  1.28  1.28  1.24  1.37  1.32  1.44  1.38  1.49  1.48  2.09  2.72  1.50  1.56  1.65  1.61  1.39  1.95  1.72  2.60  1.90  2.02     0 |  1.39
 8 FFX  | 1.20  1.25  1.26  1.34  1.33  1.28  1.40  1.46  1.34  1.42  1.57  2.00  1.48  1.49  1.58  1.35  1.57  1.54  1.66  1.56  1.67  1.70     0 |  1.43
 9 LDN  | 1.26  1.22  1.20  1.27  1.30  1.26  1.30  1.34  1.41  1.35  1.49  1.53  1.22  1.29  1.25  1.11  1.48  1.42  1.55  1.53  1.57  1.57     0 |  1.38
10 PW   | 1.46  1.25  1.26  1.30  1.44  1.31  1.39  1.32  1.33  1.42  1.31  1.46  1.38  1.40  1.37  1.18  1.49  1.44  1.50  1.35  1.58  1.58     0 |  1.40
11 FRD  | 1.29  1.20  1.45  1.22  1.31  1.32  1.33  1.51  1.59  1.30  1.37  1.39  1.31  1.21  1.28  1.17  1.28  1.47  2.31  1.52  1.97  1.79     0 |  1.38
12 CAR  | 1.24  1.16  1.40  1.18  1.23  1.22  1.21  1.34  1.58  1.20  1.30  1.35  1.41  1.22  1.19  1.14  1.20  1.38  2.14  1.41  1.73  1.29     0 |  1.35
13 HOW  | 1.23  1.23  1.36  1.36  1.23  1.21  1.28  1.32  1.37  1.38  1.32  1.47  1.41  1.36  1.37  1.19  1.37  2.01  2.38  1.51  1.96  1.70     0 |  1.39
14 AAR  | 1.29  1.29  1.38  1.40  1.35  1.36  1.48  1.50  1.53  1.57  1.34  1.54  1.41  1.39  1.43  1.31  1.43  2.29  2.38  1.67  2.21  1.75     0 |  1.39
15 CAL  | 1.27  1.24  1.27  1.36  1.37  1.39  1.56  1.56  1.39  1.45  1.26  1.39  1.31  1.35  1.38  1.31  1.38  1.75  1.78  1.80  1.47  1.53     0 |  1.37
16 STM  | 1.32  1.25  1.23  1.33  1.42  1.44  1.73  1.66  1.37  1.41  1.31  1.59  1.26  1.28  1.36  1.30  1.45  1.53  1.61  2.33  1.56  1.59     0 |  1.32
17 CHS  | 1.27  1.22  1.25  1.30  1.34  1.36  1.52  1.56  1.54  1.57  1.39  1.69  1.30  1.29  1.36  1.34  1.37  2.06  1.92  2.41  1.65  1.67     0 |  1.36
18 FAU  | 1.48  1.26  1.25  1.34  1.38  1.27  1.23  1.35  1.30  1.35  1.39  1.79  1.62  1.64  1.62  1.20  1.56  1.40  1.40  1.36  1.42  1.33     0 |  1.39
19 STA  | 1.84  1.38  1.45  1.42  1.68  1.40  1.34  1.41  1.22  1.37  1.59  2.12  1.74  1.69  1.31  1.14  1.30  1.27  1.41  1.12  1.38  1.32     0 |  1.40
20 CL/JF| 1.35  1.19  1.47  1.20  1.34  1.27  1.22  1.48  1.61  1.34  1.49  1.52  1.42  1.28  1.89  1.41  1.66  1.44  1.23  1.34  1.22  1.14     0 |  1.39
21 SP/FB| 1.99  1.47  1.55  1.46  1.80  1.49  1.43  1.53  1.29  1.40  1.62  2.53  1.94  1.86  1.26  1.19  1.24  1.26  1.38  1.14  1.38  1.28     0 |  1.39
22 KGEO | 1.47  1.17  1.27  1.17  1.58  1.42  1.41  1.61  1.21  1.53  1.36  1.64  1.21  1.20  1.24  1.37  1.64  1.34  1.50  1.08  1.44  1.38     0 |  1.42
23 EXTL |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |     0
=========================================================================================================================================================
 TOTAL   1.29        1.43        1.36        1.42        1.41        1.37        1.41        1.38        1.38        1.42        1.39        0 |
               1.34        1.38        1.34        1.44        1.42        1.36        1.39        1.30        1.41        1.37        1.39                1.40
```

```
          DESTINATION
ORIGIN |    1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 |  TOTAL
=========================================================================================================================================================
 1 DC CR| 1.24  1.31  1.11  1.22  1.42  1.19  1.35  1.14  1.10  1.00     0     0  1.00  1.00     0  1.00  1.24     0  3.50     0     0  1.00     0 |  1.23
 2 DC NC| 1.45  1.40  1.45  1.27  1.26  1.24  1.17  1.26  1.38  1.15     0  1.00  1.00  1.18  1.33     0  1.38     0  3.50     0  2.17     0     0 |  1.38
 3 MTG  | 1.23  1.34  1.40  1.21  1.34  1.12  1.27  1.16  1.24  1.85  1.24  1.27  1.16  1.30  1.00     0  1.54     0  1.00  1.00  3.50     0     0 |  1.37
 4 PG   | 1.28  1.37  1.36  1.42  1.09  1.37  1.34  1.12  1.38  1.14  1.00  1.12  1.49  1.29  1.37  1.00  1.54     0     0     0     0  1.00     0 |  1.39
 5 ARLCR| 1.58  1.27  1.00  1.00  1.10  1.29  1.12  1.06     0  1.50     0     0  1.00  1.00     0     0     0     0     0     0     0     0     0 |  1.19
 6 ARNCR| 1.34  1.16  1.28  1.16  1.61  1.40  1.26  1.29  1.23  1.21  1.00     0  2.04  1.00     0     0  1.00  1.00  1.00     0     0     0     0 |  1.35
 7 ALX  | 1.33  1.31  1.12  1.24  1.20  1.24  1.39  1.32  1.26  1.08  1.00     0  2.51  2.18     0     0  1.27  1.00  1.00     0     0     0     0 |  1.35
 8 FFX  | 1.24  1.21  1.19  1.10  1.23  1.29  1.30  1.43  1.39  1.36  1.00     0  1.00  1.00  1.14  1.00  1.26  1.09  1.87  1.47  1.05  1.00     0 |  1.40
 9 LDN  | 1.14  1.05  1.00  1.00  1.00  1.40  1.00  1.27  1.48  1.17  1.83     0     0  1.00     0     0  1.27  1.36  1.70     0     0     0     0 |  1.41
10 PW   | 1.86  1.27  1.32  1.63  1.40  1.34  1.40  1.29  1.15  1.52     0     0     0     0     0  1.95  1.36  1.39  1.27     0  2.33  1.37     0 |  1.47
11 FRD  | 1.37  1.13  1.27  1.17  1.00  1.00  1.00  1.00  1.08  1.00  1.40  1.38  1.31  1.62     0     0     0     0     0  1.17     0     0     0 |  1.37
12 CAR  | 1.00  2.72  1.15  1.26     0  1.00  1.00  1.00     0     0  1.34  1.48  1.26  1.08     0     0     0     0     0     0     0     0     0 |  1.43
13 HOW  | 1.26  1.16  1.23  1.24  1.00  1.62  1.59  1.24  1.00     0  1.07  1.35  1.47  1.27     0     0  1.00  1.00     0  1.00     0     0     0 |  1.41
14 AAR  | 1.34  1.28  1.66  1.36  1.00  1.22  1.00  1.39     0  1.00  1.09  1.33  1.43  1.41  1.24  1.62  1.00     0  1.00  1.00     0     0     0 |  1.41
15 CAL  | 1.14  1.25  1.86  1.27  1.00  2.00  1.00  1.37     0  1.00     0     0  1.00  1.30  1.43  1.11  1.69     0     0     0     0     0     0 |  1.38
16 STM  | 1.00  1.16  1.00  1.12     0  1.00     0  1.00     0     0     0     0     0  1.32  1.38  1.31  1.42     0  1.00     0     0     0     0 |  1.31
17 CHS  | 1.19  1.23  1.38  1.20  1.68  1.22  1.19  1.13  1.00     0     0     0  2.00  1.00  1.10  1.12  1.36  1.41     0     0  2.00  1.19     0 |  1.36
18 FAU  | 1.00  1.00  1.00     0  2.00  1.00  1.00  1.00  1.42  1.21     0     0     0     0     0     0     0  1.39  1.63  1.83  1.00  1.00     0 |  1.32
19 STA  | 1.00  1.27  1.00  2.00  1.00  2.20  1.00  1.31     0  1.14  1.00     0     0  1.00     0     0     0     0  1.55  1.00  1.54  1.00     0 |  1.48
20 CL/JF| 1.00     0  1.00     0     0     0     0  1.19  1.40  1.00  1.09     0  1.00     0     0     0  1.00     0  1.41  1.00  1.00     0 |  1.37
21 SP/FB| 1.00  2.18  1.00  1.00  1.00  1.00     0     0  1.48     0     0     0     0     0  2.00     0  1.00  1.37  1.52  1.50  1.07     0 |  1.46
22 KGEO | 1.00  1.00     0     0     0     0     0  1.00     0  1.00     0     0     0  1.00     0  1.29  1.00  1.00  1.54     0  1.44  1.38     0 |  1.35
23 EXTL |    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0 |     0
=========================================================================================================================================================
 TOTAL   1.30        1.39        1.31        1.33        1.45        1.38        1.44        1.40        1.42        1.51        1.52        0 |
               1.35        1.37        1.33        1.38        1.48        1.46        1.39        1.30        1.37        1.42        1.30                1.39
```

Appendix B Year 2007 mode choice summary

```
       Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
       Purpose: Total Internal Trips    MODE: Est Pct. Tran

          DESTINATION
   ORIGIN |   1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 | TOTAL
=================================================================================================================================================================
  1 DC CR| 35.5  34.9  28.0  11.8  61.0  47.0  29.3  13.7   0.1   3.5    0     0    0.5   0.2   0.3   0.0   0.0    0     0     0    0.4    0     0  | 31.6
  2 DC NC| 63.7  18.8  25.0  12.2  55.3  42.3  25.5  10.9   0.1   3.7    0     0    0.7   0.3   0.0    0    0.0    0     0     0    0.0    0     0  | 30.0
  3 MTG  | 46.2  13.3   3.9   3.1  49.3  25.4  12.4   2.6   0.0   7.0   0.0    0    0.1   0.0   0.0    0     0     0     0     0     0     0     0  |  7.2
  4 PG   | 39.4  13.6   8.4   2.1  45.4  25.4   7.8   2.6    0    5.6    0     0    0.4   0.1    0    0.0    0     0     0     0     0     0     0  |  7.0
  5 ARLCR| 72.0  20.9  17.0   4.3   6.1  19.6  14.0   4.8   0.0   1.6    0     0     0    0.0    0     0     0     0     0     0     0     0     0  | 22.0
  6 ARNCR| 67.2  19.2  15.6   4.6  22.4   7.9  11.2   4.2   0.0   1.9    0     0    0.0   0.0    0     0     0     0     0     0     0     0     0  | 16.7
  7 ALX  | 56.3  16.1  13.6   2.3  22.5  16.2   4.3   3.2   0.0   1.5    0     0     0     0     0     0     0     0     0     0     0     0     0  | 11.7
  8 FFX  | 35.4  10.4   6.5   1.5  26.1  13.5   6.5   1.0   0.2   0.9   1.0    0    2.3   0.7   4.0  10.2   1.2    0    0.0    0    0.2    0     0  |  4.1
  9 LDN  | 16.4   5.1   2.1   0.5  17.3   7.6   2.4   0.3   0.2   1.1    0     0     0     0     0     0     0     0     0     0     0     0     0  |  0.8
 10 PW   | 28.8  16.8  12.3   7.1  28.4  16.6   8.5   2.0   1.2   0.3   7.8    0   22.5   8.0  30.6  45.1  13.8    0    0.0    0    0.3    0     0  |  1.8
 11 FRD  | 17.9   4.3   0.9   0.4   8.6   3.9   1.7   0.2    0    1.0   0.4    0     0     0     0     0     0     0     0     0     0     0     0  |  0.6
 12 CAR  |   0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0  |   0
 13 HOW  | 32.1  10.7   2.3   1.0  32.7  18.1   7.8   1.7    0   26.1    0     0    0.1   0.0    0     0     0     0     0     0     0     0     0  |  1.2
 14 AAR  | 25.7   6.4   2.3   0.6  21.6  10.1   2.9   1.4    0   14.0    0     0    0.1   0.0   0.0    0     0     0     0     0     0     0     0  |  0.8
 15 CAL  | 10.7   6.4   2.9   0.4  14.8   6.9   1.8   0.2    0    1.9    0     0     0    0.0   0.0   0.0    0     0     0     0     0     0     0  |  0.6
 16 STM  |  7.6   4.1   2.4   0.2   8.8   4.1   0.7   0.2    0     0     0     0     0     0    0.0   0.1   0.1    0     0     0     0     0     0  |  0.3
 17 CHS  | 20.9   9.6   5.7   0.6  20.4  10.1   2.2   0.5    0    6.2    0     0    0.0   0.0    0    0.1   0.3    0     0     0     0     0     0  |  1.5
 18 FAU  |  3.8   2.5   0.8   0.2   5.9   3.1   2.1   0.1    0    0.0    0     0     0     0     0     0     0     0     0     0     0     0     0  |  0.1
 19 STA  | 22.1  12.6   4.8   0.9  26.2  15.2   6.0   0.3    0    0.1    0     0     0     0     0     0     0     0     0    0.0    0    0.0    0  |  0.7
 20 CL/JF| 11.1   8.5   1.4   1.0  14.4   6.5   2.9   0.1    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0  |  0.2
 21 SP/FB| 28.5  19.0   8.0   2.0  33.8  19.9  11.1   0.9    0    0.6    0     0    0.2   0.1    0     0     0     0     0    0.0    0    0.0    0  |  0.6
 22 KGEO |  2.0   1.5   0.7   0.0   3.8   2.3   1.6   0.2    0    0.1    0     0     0     0     0     0     0     0     0    0.0    0    0.0    0  |  0.1
 23 EXTL |   0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0  |   0
=================================================================================================================================================================
  TOTAL    45.7        5.3        31.3         7.4         0.2         0.3         0.1         0.0         0.3         0.0         0.0         0  |
                 16.6        2.7        15.1         1.5         0.4          0         0.0         0.1          0           0           0          6.2


       Year: 2007 Estimate/Observed Trips - (Note: HTS trips Adjusted to On-board transit Survey data and CTPP Auto Occs.
       Purpose: Total Internal Trips    MODE: Obs Pct. Tran

          DESTINATION
   ORIGIN |   1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20    21    22    23 | TOTAL
=================================================================================================================================================================
  1 DC CR| 45.2  37.1  36.4  17.5  79.1  49.9  15.7  14.1   3.4  15.1 100.0    0   21.5  21.2 100.0    0     0  100.0    0     0     0     0     0  | 36.3
  2 DC NC| 56.1  20.0  16.0  12.5  57.8  49.8  41.2  10.3   5.4  10.2    0     0   11.2   4.2    0     0    0.6 100.0    0  100.0   2.6    0     0  | 28.7
  3 MTG  | 50.1  21.8   3.4   6.5  30.5  29.4  21.5   1.2   0.5   0.6   0.4    0    0.6   1.7   9.4 100.0   0.4    0    5.4    0     0     0     0  |  7.5
  4 PG   | 45.6  20.3   8.7   2.3  64.6  41.2  22.0   7.0   3.5    0    0.8    0    0.5   0.5    0     0    0.0    0     0     0     0     0     0  |  8.4
  5 ARLCR| 74.4  38.0  15.4  28.9   1.9  21.9  18.1   6.8 100.0   1.1    0     0     0   11.2    0     0     0     0     0     0     0     0     0  | 27.3
  6 ARNCR| 58.7  42.5  16.2  32.2  12.6   6.3   8.9   3.9   3.9   1.9    0     0     0    7.1    0     0     0   12.9   1.4 100.0    0     0     0  | 16.9
  7 ALX  | 48.1  35.5  19.4  11.2  27.6  20.1   4.0   3.5   2.2   1.6    0     0     0     0     0     0     0     0     0     0     0     0     0  | 12.1
  8 FFX  | 35.6  24.4   3.7   6.7  17.3  15.5   6.1   1.2   0.3   0.1    0     0    0.3   2.3    0     0     0    1.1    0     0     0     0     0  |  4.1
  9 LDN  | 11.7  13.8   0.2   2.1  21.4   7.5   5.9   0.1   0.0    0     0     0     0     0     0     0     0     0     0     0     0     0     0  |  0.4
 10 PW   | 33.4  16.2   3.8   3.2  11.0  17.0   4.9   0.5   0.6   0.3    0     0  100.0 100.0    0     0     0    0.0   0.0    0     0     0     0  |  1.5
 11 FRD  | 59.3  13.4   3.3   2.7   4.4  52.6   3.8    0     0     0    0.3    0     0     0     0     0     0     0     0     0     0     0     0  |  1.2
 12 CAR  | 29.9   2.3    0     0     0  100.0    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0  |  0.1
 13 HOW  | 36.8  10.5   0.4   0.2  49.5  38.2   2.5   1.6    0     0     0     0    0.0    0     0     0     0     0     0     0  100.0    0     0  |  0.8
 14 AAR  | 28.3  10.8   0.8   0.1  26.6  26.3   4.3   0.4    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0  |  0.7
 15 CAL  | 11.8  11.0   5.1   0.0  41.3   7.0   1.2   0.4    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0  |  0.5
 16 STM  |  1.5   2.2   8.2    0  100.0  12.5 100.0    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0  |  0.1
 17 CHS  | 23.3  11.1   3.3   0.7   9.4  23.6   1.0   0.8    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0  |  1.4
 18 FAU  | 23.6  16.5   3.8 100.0  16.1  13.6   4.8   0.4    0    0.0    0     0     0     0     0     0     0     0     0     0     0     0     0  |  0.5
 19 STA  | 35.7   8.6   3.3   2.0  40.1  11.7  13.3   1.5 100.0   0.2    0     0     0     0     0     0     0  100.0   0.0    0    0.0    0     0  |  0.8
 20 CL/JF|  0.4 100.0    0     0  100.0 100.0 100.0   0.0    0     0     0     0     0     0     0     0     0     0     0     0     0     0     0  |  0.1
 21 SP/FB| 10.7   9.3   1.0   4.3   2.7  19.2 100.0   7.4    0    0.6    0     0     0     0     0     0     0    0.1   0.0    0    0.0    0     0  |  0.4
 22 KGEO | 12.7   4.6 100.0    0  100.0 100.0 100.0   2.3    0    0.4    0     0     0     0     0     0     0     0     0    0.0    0     0     0  |  0.3
 23 EXTL |   0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0  |   0
=================================================================================================================================================================
  TOTAL    47.1        4.6        23.2         7.4         0.2         0.3         0.1         0.0         0.0         0.0         0.0         0  |
                 22.1        3.1        17.4         1.5         0.3          0         0.1         0.0         0.1         0.0         0.0          6.5
```

Appendix C Year 2007 mode choice output vs. targets

Appendix C. Year 2007 mode choice output vs. targets

Seg	Path #	HBW		HBS		HBO		NHW		NHO	
		Target	Model	Target	Model	Target	Model	Target	Model	Target	Model
(1) DC CORE / URBAN-DC CORE	DR ALONE	9,177	9,190	8,923	8,935	21,352	21,358	28,230	28,245	16,521	16,534
	SR2	3,145	3,149	5,503	5,511	21,272	21,278	11,622	11,628	10,252	10,260
	SR3+	923	924	2,547	2,551	12,297	12,300	3,971	3,973	4,090	4,093
	WK-CR	0	0	0	0	0	0	0	0	38	0
	WK-BUS	43,051	43,121	1,502	1,504	12,653	12,656	4,810	4,825	2,883	2,902
	WK-BU/MR	16,438	16,485	279	279	3,640	3,641	2,342	2,285	898	898
	WK-MR	51,755	51,637	664	665	14,539	14,543	20,682	20,766	4,423	4,452
	PNR-CR	0	22	0	0	0	0	0	0	0	0
	KNR-CR	15	15	0	0	0	0	0	0	0	0
	PNR-BUS	964	964	0	3	72	72	55	55	61	61
	KNR-BUS	207	208	0	0	147	147	99	99	210	210
	PNR-BU/MR	1,011	1,012	0	1	47	47	119	119	75	75
	KNR-BU/MR	332	333	0	0	52	52	225	221	45	45
	PNR-MR	5,461	5,457	57	53	1,274	1,274	761	760	497	497
	KNR-MR	1,922	1,926	14	14	269	269	723	727	300	300
(2) DC CORE / URBAN-VA CORE	DR ALONE	1,235	1,298	804	806	3,102	3,109	2,163	2,161	38	65
	SR2	227	239	1,310	1,252	2,110	2,114	480	480	45	73
	SR3+	111	117	0	60	908	910	1,660	1,659	0	4
	WK-CR	0	0	0	0	0	0	0	0	0	0
	WK-BUS	503	642	0	4	50	48	0	189	10	87
	WK-BU/MR	2,410	2,719	0	11	555	528	681	596	255	249
	WK-MR	6,734	6,112	145	121	2,448	2,278	3,135	3,044	1,410	1,277
	PNR-CR	0	1	0	0	0	0	0	0	0	0
	KNR-CR	0	0	0	0	0	0	0	0	0	0
	PNR-BUS	0	19	0	0	0	3	0	1	0	1
	KNR-BUS	0	1	0	0	8	8	0	0	0	9
	PNR-BU/MR	154	166	0	0	0	13	8	8	0	1
	KNR-BU/MR	16	17	0	0	0	0	0	0	0	1
	PNR-MR	503	547	0	2	0	175	113	111	14	13
	KNR-MR	155	174	0	6	81	77	344	342	191	181
(3) DC CORE / URBAN-URBAN	DR ALONE	6,284	6,817	47,643	47,643	108,019	108,002	43,946	44,029	53,563	53,610
	SR2	1,512	1,640	20,439	20,439	75,193	75,181	4,779	4,788	26,760	26,784
	SR3+	515	559	10,860	10,860	65,325	65,315	13,518	13,544	17,880	17,896
	WK-CR	0	0	0	12	0	49	0	178	0	18
	WK-BUS	24,338	27,416	3,132	3,127	24,891	24,857	7,291	7,249	4,780	4,776
	WK-BU/MR	14,825	16,690	1,167	1,165	5,167	5,160	2,810	2,790	971	970
	WK-MR	27,917	21,643	2,365	2,360	10,030	10,017	13,087	13,019	4,667	4,663
	PNR-CR	0	24	0	0	0	0	0	0	0	0
	KNR-CR	0	3	0	0	0	0	0	0	0	0
	PNR-BUS	225	269	0	15	133	133	26	26	107	107
	KNR-BUS	98	117	37	37	189	189	231	231	200	200
	PNR-BU/MR	65	77	50	45	241	241	23	23	125	125
	KNR-BU/MR	430	508	49	49	107	107	250	250	215	215
	PNR-MR	1,636	1,877	105	94	764	764	635	636	28	28
	KNR-MR	1,482	1,736	36	36	392	392	639	641	442	442
(4) DC CORE / URBAN-OTHER	DR ALONE	23,947	26,341	16,189	16,429	39,879	40,064	39,330	39,673	26,353	27,052
	SR2	4,197	4,617	14,368	14,581	18,262	18,347	9,260	9,346	14,326	14,706
	SR3+	1,557	1,713	11,789	11,964	20,241	20,335	2,005	2,025	3,479	3,571
	WK-CR	64	71	21	20	134	134	0	192	235	218
	WK-BUS	3,667	4,038	682	656	1,273	1,279	322	339	427	445
	WK-BU/MR	7,973	8,780	280	269	2,060	2,070	1,410	1,489	574	597
	WK-MR	7,667	3,383	255	245	1,181	1,168	3,992	3,490	1,123	1,156
	PNR-CR	23	31	0	0	0	0	0	2	15	10
	KNR-CR	10	13	0	0	24	23	0	0	130	113
	PNR-BUS	16	21	0	2	49	45	67	72	0	4
	KNR-BUS	83	110	0	2	0	10	46	49	42	50
	PNR-BU/MR	189	252	0	8	0	15	76	82	0	3
	KNR-BU/MR	412	547	0	18	75	72	39	41	55	65
	PNR-MR	391	509	0	10	117	106	500	491	16	15
	KNR-MR	443	576	0	25	115	110	181	184	64	76

Appendix C. Year 2007 mode choice output vs. targets

Seg	Path #	HBW		HBS		HBO		NHW		NHO	
		Target	Model	Target	Model	Target	Model	Target	Model	Target	Model
(5) MD URBAN-DC CORE	DR ALONE	5,031	5,215	1,749	1,667	3,997	4,006	1,876	1,875	2,566	2,572
	SR2	1,398	1,450	0	38	2,646	2,652	0	11	534	509
	SR3+	329	341	0	43	953	955	747	741	0	25
	WK-CR	0	0	0	0	0	0	0	0	0	0
	WK-BUS	1,387	1,549	25	24	374	381	136	136	50	50
	WK-BU/MR	4,005	4,491	78	72	656	667	272	270	22	22
	WK-MR	10,454	9,247	99	91	1,783	1,743	1,226	1,231	261	262
	PNR-CR	0	78	0	0	0	0	0	0	0	0
	KNR-CR	0	24	0	0	0	0	0	0	0	0
	PNR-BUS	24	25	0	1	0	37	0	7	0	4
	KNR-BUS	102	107	0	0	0	5	0	0	0	0
	PNR-BU/MR	218	228	0	0	165	153	63	62	34	32
	KNR-BU/MR	197	207	0	0	24	23	0	0	0	0
	PNR-MR	3,028	3,168	0	4	397	376	289	284	49	47
	KNR-MR	961	1,009	0	9	94	91	103	103	51	51
(6) MD URBAN-VA CORE	DR ALONE	699	709	0	8	0	37	0	2	0	1
	SR2	215	218	0	7	0	30	0	6	0	2
	SR3+	23	23	0	8	0	35	0	48	0	19
	WK-CR	0	0	0	0	0	0	0	0	0	0
	WK-BUS	24	25	0	16	31	146	0	62	0	17
	WK-BU/MR	302	320	0	25	65	207	42	76	0	23
	WK-MR	787	741	32	51	87	272	150	365	35	81
	PNR-CR	0	9	0	0	0	0	0	0	0	0
	KNR-CR	0	4	0	0	0	0	0	0	0	0
	PNR-BUS	0	3	0	0	0	0	0	0	0	0
	KNR-BUS	0	1	0	0	0	1	0	0	0	0
	PNR-BU/MR	30	30	0	0	0	3	0	0	0	0
	KNR-BU/MR	0	1	0	0	0	0	0	0	0	0
	PNR-MR	378	374	0	13	0	51	0	23	0	8
	KNR-MR	232	232	0	20	0	93	0	54	0	23
(7) MD URBAN-URBAN	DR ALONE	15,293	15,450	16,808	16,820	31,996	32,008	23,619	23,640	18,111	18,132
	SR2	3,057	3,088	7,652	7,657	27,570	27,580	2,206	2,208	14,321	14,338
	SR3+	647	654	6,344	6,348	21,239	21,247	4,427	4,431	3,496	3,500
	WK-CR	0	0	0	0	0	4	0	6	0	1
	WK-BUS	6,421	6,509	690	642	3,496	3,499	694	693	534	529
	WK-BU/MR	2,864	2,907	118	110	620	621	288	285	80	79
	WK-MR	4,729	4,421	92	86	2,179	2,147	882	882	187	185
	PNR-CR	0	20	0	0	0	1	0	0	0	0
	KNR-CR	1	1	0	0	0	0	0	0	0	0
	PNR-BUS	23	23	0	7	143	143	2	2	160	149
	KNR-BUS	61	63	0	6	39	37	46	46	23	23
	PNR-BU/MR	60	60	0	3	23	23	41	41	0	1
	KNR-BU/MR	173	178	0	4	0	3	53	53	0	0
	PNR-MR	584	581	0	12	122	122	47	47	0	18
	KNR-MR	494	507	0	29	34	32	31	31	30	30
(8) MD URBAN-OTHER	DR ALONE	18,737	18,920	15,296	15,366	24,056	24,108	18,644	18,670	21,192	21,271
	SR2	2,380	2,403	9,752	9,797	23,604	23,655	2,293	2,296	13,545	13,596
	SR3+	1,024	1,034	3,677	3,694	12,803	12,831	3,954	3,960	3,264	3,276
	WK-CR	27	27	0	1	0	9	0	7	19	19
	WK-BUS	3,003	3,009	288	261	1,519	1,492	1,363	1,360	891	881
	WK-BU/MR	1,411	1,415	0	17	191	188	157	157	60	59
	WK-MR	1,259	1,135	25	23	317	311	321	321	26	26
	PNR-CR	0	8	0	0	0	2	0	0	0	0
	KNR-CR	2	2	0	0	0	0	0	0	0	0
	PNR-BUS	35	35	0	1	604	556	0	1	0	1
	KNR-BUS	57	59	77	70	17	16	0	1	60	55
	PNR-BU/MR	45	45	0	3	0	34	0	1	0	1
	KNR-BU/MR	72	74	0	3	11	10	0	2	0	1
	PNR-MR	124	122	0	7	0	42	22	21	0	12
	KNR-MR	21	21	0	6	0	3	38	36	0	7

Appendix C. Year 2007 mode choice output vs. targets

Seg	Path #	HBW Target	HBW Model	HBS Target	HBS Model	HBO Target	HBO Model	NHW Target	NHW Model	NHO Target	NHO Model
(9) VA CORE / URBAN-DC CORE	DR ALONE	4,457	5,262	940	944	3,169	3,208	3,098	3,100	273	332
	SR2	1,302	1,537	1,148	1,099	2,954	2,990	1,077	1,078	173	200
	SR3+	317	375	0	53	2,339	2,368	2,303	2,304	0	10
	WK-CR	4	6	0	0	0	0	0	0	0	0
	WK-BUS	2,502	3,860	0	7	251	276	0	179	40	80
	WK-BU/MR	9,581	14,535	0	15	1,191	1,326	509	482	160	318
	WK-MR	30,058	21,093	169	133	5,387	5,074	4,277	4,128	1,988	1,547
	PNR-CR	22	0	0	0	0	0	0	0	0	0
	KNR-CR	0	0	0	0	0	0	0	0	0	0
	PNR-BUS	315	440	0	0	0	3	0	2	0	12
	KNR-BUS	0	35	0	0	0	1	0	0	0	0
	PNR-BU/MR	228	318	0	1	72	76	79	78	31	43
	KNR-BU/MR	215	289	28	23	87	83	27	27	45	43
	PNR-MR	1,332	1,855	0	12	426	440	132	132	150	199
	KNR-MR	2,020	2,758	0	6	275	296	403	403	126	201
(10) VA CORE / URBAN-VA CORE	DR ALONE	7,255	7,314	3,031	3,029	7,738	7,741	8,501	8,501	4,649	4,650
	SR2	1,349	1,360	3,165	3,163	6,649	6,652	1,846	1,846	1,868	1,869
	SR3+	494	498	1,759	1,758	6,322	6,324	3,663	3,663	510	510
	WK-CR	0	0	0	0	0	0	0	0	0	0
	WK-BUS	2,403	2,500	247	217	62	58	278	279	26	24
	WK-BU/MR	658	684	0	2	34	32	134	134	0	18
	WK-MR	3,675	3,467	0	24	842	749	2,353	2,351	432	396
	PNR-CR	0	0	0	0	0	0	0	0	0	0
	KNR-CR	0	0	0	0	0	0	0	0	0	0
	PNR-BUS	32	31	0	0	0	3	0	12	0	7
	KNR-BUS	0	2	0	0	0	3	13	13	0	6
	PNR-BU/MR	0	11	0	0	0	0	31	28	0	0
	KNR-BU/MR	0	1	0	0	0	0	0	0	38	32
	PNR-MR	166	160	0	1	0	6	128	118	0	15
	KNR-MR	226	230	0	9	0	77	40	40	90	86
(11) VA CORE / URBAN-URBAN	DR ALONE	16,709	18,034	27,858	27,914	46,606	46,631	30,921	30,943	25,818	25,876
	SR2	2,755	2,973	15,828	15,860	37,644	37,664	6,416	6,421	12,211	12,238
	SR3+	772	833	8,572	8,589	29,944	29,960	3,014	3,016	5,234	5,245
	WK-CR	8	9	0	0	0	0	0	0	0	0
	WK-BUS	5,065	6,154	793	720	2,410	2,425	1,016	1,016	640	604
	WK-BU/MR	3,733	4,533	59	54	953	951	548	545	111	105
	WK-MR	10,467	6,743	525	466	1,973	1,927	2,843	2,852	1,262	1,165
	PNR-CR	1	0	0	0	0	0	0	0	0	0
	KNR-CR	7	0	0	0	0	0	0	0	0	0
	PNR-BUS	86	107	0	2	0	26	0	8	0	50
	KNR-BUS	0	27	0	12	42	39	17	17	0	12
	PNR-BU/MR	80	99	0	0	60	52	31	29	0	2
	KNR-BU/MR	78	95	0	21	0	13	0	1	188	168
	PNR-MR	282	350	20	16	129	111	114	108	0	92
	KNR-MR	647	785	0	94	114	105	57	56	59	53
(12) VA CORE / URBAN-OTHER	DR ALONE	27,048	27,637	19,067	19,161	29,010	29,102	25,431	25,505	17,928	18,073
	SR2	3,188	3,257	11,159	11,214	19,767	19,829	4,392	4,405	11,141	11,231
	SR3+	1,529	1,562	2,881	2,895	17,732	17,788	2,274	2,281	9,563	9,640
	WK-CR	0	9	0	0	19	19	0	5	21	18
	WK-BUS	1,828	1,831	466	422	1,006	1,009	422	430	194	181
	WK-BU/MR	1,694	1,697	0	25	327	328	241	245	17	16
	WK-MR	1,595	907	0	10	512	482	767	731	117	108
	PNR-CR	0	0	0	0	0	0	0	0	0	0
	KNR-CR	0	0	0	0	27	0	0	0	0	0
	PNR-BUS	57	58	0	4	0	3	33	34	0	16
	KNR-BUS	65	75	0	2	7	7	48	49	25	22
	PNR-BU/MR	0	19	0	1	0	0	50	51	0	5
	KNR-BU/MR	65	75	0	7	0	32	20	20	0	1
	PNR-MR	90	90	0	1	20	17	109	106	0	5
	KNR-MR	79	90	0	4	73	69	13	13	0	2

Appendix C. Year 2007 mode choice output vs. targets

Seg	Path #	HBW Target	HBW Model	HBS Target	HBS Model	HBO Target	HBO Model	NHW Target	NHW Model	NHO Target	NHO Model
(13) MD OTHER-DC CORE	DR ALONE	94,737	97,120	6,286	6,369	20,600	20,640	10,442	10,512	3,103	3,156
	SR2	26,030	26,685	2,836	2,739	13,927	13,954	2,128	2,142	3,611	3,673
	SR3+	10,915	11,190	0	131	16,714	16,746	1,348	1,357	4,536	4,613
	WK-CR	958	926	0	0	42	40	0	1	54	45
	WK-BUS	7,510	7,247	48	47	1,349	1,346	180	181	101	108
	WK-BU/MR	16,167	15,608	80	77	1,381	1,379	655	658	72	77
	WK-MR	12,772	10,180	0	14	1,828	1,792	1,066	1,069	79	84
	PNR-CR	7,875	7,918	0	1	207	207	0	35	167	169
	KNR-CR	470	473	0	1	11	11	0	11	12	12
	PNR-BUS	1,073	1,084	32	33	194	194	0	4	0	2
	KNR-BUS	337	340	0	0	0	1	19	19	8	8
	PNR-BU/MR	7,428	7,451	18	18	486	481	371	349	40	40
	KNR-BU/MR	1,742	1,751	38	38	165	165	119	117	77	78
	PNR-MR	54,824	54,947	78	79	4,916	4,927	1,775	1,776	263	268
	KNR-MR	10,972	10,977	83	84	574	574	516	511	93	95
(14) MD OTHER-VA CORE	DR ALONE	13,760	13,857	136	138	2,581	2,587	997	1,002	0	2
	SR2	2,927	2,948	730	742	984	986	1,210	1,144	0	5
	SR3+	1,213	1,222	357	363	3,455	3,463	0	72	0	82
	WK-CR	12	12	0	0	0	0	0	0	0	0
	WK-BUS	241	238	0	0	0	10	0	4	0	5
	WK-BU/MR	1,489	1,469	27	23	82	79	127	125	0	13
	WK-MR	846	796	0	4	187	177	71	70	35	58
	PNR-CR	314	315	0	0	0	9	0	1	11	34
	KNR-CR	10	10	0	0	0	9	0	1	74	160
	PNR-BUS	192	192	0	0	0	1	0	0	0	92
	KNR-BUS	0	33	0	0	0	0	0	0	0	1
	PNR-BU/MR	1,358	1,356	0	0	102	99	0	0	76	36
	KNR-BU/MR	318	310	0	0	29	28	25	25	0	13
	PNR-MR	8,255	8,229	0	1	590	584	195	195	47	172
	KNR-MR	1,037	1,007	0	0	446	437	75	75	52	131
(15) MD OTHER-URBAN	DR ALONE	155,093	157,191	24,782	24,978	105,698	105,946	37,724	37,944	29,913	30,186
	SR2	25,914	26,265	22,956	23,137	72,486	72,656	6,529	6,567	20,895	21,085
	SR3+	6,750	6,841	16,106	16,233	62,977	63,125	2,963	2,980	18,810	18,981
	WK-CR	323	313	0	1	0	8	0	5	16	15
	WK-BUS	16,313	15,774	1,269	1,278	8,934	8,952	1,331	1,339	1,136	1,148
	WK-BU/MR	11,985	11,606	149	150	2,190	2,194	640	643	187	189
	WK-MR	6,961	5,909	235	236	967	969	523	528	117	118
	PNR-CR	1,869	1,902	0	0	53	53	0	7	15	14
	KNR-CR	213	217	0	0	56	56	0	14	0	4
	PNR-BUS	2,199	2,231	0	4	284	285	44	44	0	14
	KNR-BUS	788	800	0	2	638	639	358	353	97	97
	PNR-BU/MR	3,628	3,683	0	4	509	510	194	193	105	98
	KNR-BU/MR	1,355	1,377	21	19	339	340	137	135	259	259
	PNR-MR	17,059	17,279	92	85	1,935	1,939	551	550	64	60
	KNR-MR	5,369	5,428	13	12	573	574	206	203	81	81
(16) MD OTHER-OTHER	DR ALONE	968,321	970,194	624,202	624,794	1,139,599	1,140,423	432,717	433,164	645,396	645,782
	SR2	110,852	111,066	399,510	399,890	946,926	947,608	75,148	75,226	437,946	438,207
	SR3+	32,035	32,097	348,424	348,755	827,604	828,198	62,810	62,875	324,228	324,423
	WK-CR	122	122	0	9	15	15	0	3	17	17
	WK-BUS	25,851	25,832	5,231	5,212	17,871	17,886	3,358	3,359	2,606	2,546
	WK-BU/MR	5,666	5,664	72	72	1,517	1,518	267	267	73	76
	WK-MR	1,110	1,104	33	33	241	241	227	227	14	14
	PNR-CR	706	708	0	0	0	36	0	0	0	12
	KNR-CR	194	195	0	6	56	61	0	15	0	1
	PNR-BUS	2,643	2,651	27	20	1,081	938	22	22	1,180	1,054
	KNR-BUS	1,049	1,052	81	74	597	593	441	430	80	72
	PNR-BU/MR	1,220	1,224	0	15	51	176	13	13	0	109
	KNR-BU/MR	739	741	0	4	156	156	97	95	0	3
	PNR-MR	1,636	1,640	0	0	134	116	56	56	0	70
	KNR-MR	1,159	1,162	0	5	90	89	24	23	0	7

Appendix C. Year 2007 mode choice output vs. targets

Seg	Path #	HBW Target	HBW Model	HBS Target	HBS Model	HBO Target	HBO Model	NHW Target	NHW Model	NHO Target	NHO Model
(17) VA OTHER-DC CORE	DR ALONE	64,687	67,025	2,693	2,784	19,195	19,296	5,041	5,122	1,295	1,383
	SR2	17,650	18,288	1,598	1,652	11,119	11,178	514	522	393	397
	SR3+	19,358	20,070	1,633	1,688	2,021	2,032	673	684	0	22
	WK-CR	114	108	0	0	0	12	0	3	0	0
	WK-BUS	2,601	2,457	20	16	241	238	74	74	0	26
	WK-BU/MR	16,081	15,183	0	18	1,157	1,141	504	500	123	116
	WK-MR	9,604	6,564	95	67	1,110	1,012	360	329	123	107
	PNR-CR	1,303	1,321	0	2	0	14	0	9	0	0
	KNR-CR	136	138	0	0	0	6	0	2	0	0
	PNR-BUS	3,622	3,671	0	2	204	203	10	10	0	10
	KNR-BUS	567	575	0	0	0	4	0	36	0	5
	PNR-BU/MR	5,957	6,026	44	39	528	524	261	259	52	53
	KNR-BU/MR	1,417	1,436	0	1	241	238	79	75	81	83
	PNR-MR	26,121	26,372	59	55	2,970	2,955	1,313	1,317	284	292
	KNR-MR	8,507	8,572	0	18	741	731	619	588	90	93
(18) VA OTHER-VA CORE	DR ALONE	18,214	18,524	2,573	2,577	7,516	7,525	5,785	5,800	988	991
	SR2	4,183	4,254	1,616	1,618	6,955	6,963	490	460	993	996
	SR3+	4,828	4,912	2,238	2,241	6,847	6,855	0	31	2,086	2,092
	WK-CR	49	47	0	0	0	1	0	0	0	0
	WK-BUS	2,850	2,723	17	6	100	100	26	26	34	30
	WK-BU/MR	3,140	3,004	0	17	94	94	53	53	68	60
	WK-MR	1,467	1,225	0	0	259	249	43	43	0	10
	PNR-CR	1,146	1,153	0	0	0	4	0	1	0	0
	KNR-CR	92	93	0	0	0	0	0	0	0	0
	PNR-BUS	2,500	2,512	4	5	5	5	4	4	0	1
	KNR-BUS	242	244	0	0	0	8	0	20	0	0
	PNR-BU/MR	1,099	1,104	0	0	22	22	21	21	0	0
	KNR-BU/MR	275	277	0	0	53	49	53	48	0	0
	PNR-MR	6,304	6,323	0	1	471	467	301	301	21	18
	KNR-MR	2,248	2,251	0	4	57	53	175	160	0	6
(19) VA OTHER-URBAN	DR ALONE	98,401	100,281	23,531	24,019	55,367	55,685	20,331	20,441	18,443	18,721
	SR2	13,991	14,257	17,535	17,899	39,176	39,401	4,753	4,779	8,922	9,056
	SR3+	8,612	8,780	3,548	3,622	26,884	27,038	1,680	1,689	4,281	4,345
	WK-CR	118	111	0	0	0	3	0	2	0	0
	WK-BUS	4,876	4,551	282	230	1,549	1,534	383	383	238	242
	WK-BU/MR	9,040	8,461	157	135	1,359	1,341	429	429	258	262
	WK-MR	3,779	2,830	100	79	908	847	482	437	75	76
	PNR-CR	2,650	2,678	0	2	0	66	0	5	0	9
	KNR-CR	235	238	0	18	0	32	0	4	0	7
	PNR-BUS	1,499	1,512	0	1	114	111	0	20	0	12
	KNR-BUS	258	261	0	4	104	101	0	13	0	7
	PNR-BU/MR	3,997	4,034	0	4	279	271	72	67	21	20
	KNR-BU/MR	983	994	0	45	297	287	51	48	0	8
	PNR-MR	9,446	9,507	58	48	1,274	1,234	230	214	130	112
	KNR-MR	4,200	4,218	0	35	378	365	191	181	149	129
(20) VA OTHER-OTHER	DR ALONE	792,489	794,225	405,087	405,833	820,506	821,074	322,630	322,885	414,713	415,105
	SR2	85,469	85,656	329,163	329,769	669,146	669,609	74,999	75,058	317,542	317,844
	SR3+	27,861	27,922	307,187	307,751	642,269	642,712	58,847	58,891	257,442	257,685
	WK-CR	50	48	0	33	0	104	0	3	0	17
	WK-BUS	17,400	16,664	3,741	2,395	8,984	7,854	2,001	1,944	1,634	1,226
	WK-BU/MR	2,680	2,571	21	175	457	417	308	299	31	100
	WK-MR	529	447	19	12	126	110	92	85	54	40
	PNR-CR	738	759	0	52	0	136	0	7	0	0
	KNR-CR	87	90	0	1	23	66	0	14	0	48
	PNR-BUS	462	475	19	584	147	366	92	85	15	30
	KNR-BUS	639	657	4	112	216	634	108	99	135	244
	PNR-BU/MR	758	777	0	324	115	347	29	39	0	43
	KNR-BU/MR	429	440	0	119	97	337	35	40	0	119
	PNR-MR	364	372	0	4	118	14	0	3	0	0
	KNR-MR	620	633	0	0	130	18	0	8	13	16

Appendix C. Year 2007 mode choice output vs. targets

Seg	Path #	HBW		HBS		HBO		NHW		NHO	
		Target	Model	Target	Model	Target	Model	Target	Model	Target	Model
All 20 Segments	DR ALONE	2,341,574	2,360,603	1,247,598	1,250,215	2,489,986	2,492,548	1,061,426	1,063,213	1,300,863	1,303,491
	SR2	311,741	315,351	866,268	868,063	1,998,390	2,000,328	210,142	210,410	895,478	897,067
	SR3+	119,813	121,668	727,922	729,607	1,778,874	1,780,536	169,857	170,225	658,899	660,034
	WK-CR	1,849	1,809	21	77	210	399	0	407	400	368
	WK-BUS	171,834	176,138	18,433	16,784	87,044	86,047	23,685	24,067	16,224	15,907
	WK-BU/MR	132,142	138,821	2,487	2,709	23,696	23,882	12,417	12,330	3,960	4,248
	WK-MR	194,165	159,582	4,853	4,720	46,904	46,109	56,579	55,968	16,428	15,826
	PNR-CR	16,647	16,948	0	57	260	529	0	67	208	248
	KNR-CR	1,472	1,515	0	27	197	265	0	60	216	345
	PNR-BUS	15,967	16,325	82	684	3,030	3,127	355	409	1,523	1,625
	KNR-BUS	4,553	4,768	199	323	2,004	2,440	1,426	1,475	880	1,020
	PNR-BU/MR	27,525	27,972	112	467	2,700	3,086	1,482	1,462	559	687
	KNR-BU/MR	9,248	9,652	136	350	1,733	1,997	1,210	1,200	1,003	1,136
	PNR-MR	137,984	139,762	469	496	15,657	15,721	7,271	7,248	1,563	1,942
	KNR-MR	42,794	44,292	146	417	4,436	4,456	4,378	4,379	1,831	2,011
	TOTALS	3,529,308	3,535,205	2,868,726	2,874,995	6,455,121	6,461,470	1,550,228	1,552,920	2,900,035	2,905,954

Appendix C. Year 2007 mode choice output vs. targets

Total person trips by market segment

Market Segment	HBW Target	HBW Model	HBS Target	HBS Model	HBO Target	HBO Model	NHW Target	NHW Model	NHO Target	NHO Model	ALL Target	ALL Model
1	134,786	134,427	19,348	19,352	87,303	87,263	72,382	72,460	39,716	39,739	353,535	353,241
2	12,133	11,990	2,227	2,235	9,206	9,169	8,690	8,695	1,950	1,955	34,206	34,044
3	79,319	79,415	85,457	85,738	289,420	289,716	86,681	87,053	109,231	109,589	650,108	651,510
4	49,745	50,918	43,616	44,349	83,705	84,443	57,723	58,272	46,846	48,384	281,635	286,365
5	27,519	27,155	1,958	1,949	11,182	11,133	4,746	4,750	3,575	3,573	48,980	48,559
6	2,742	2,692	145	147	875	876	652	653	173	176	4,587	4,543
7	34,331	34,424	31,372	31,397	86,556	86,589	31,830	31,875	36,666	36,716	220,755	221,001
8	27,760	28,338	29,406	29,575	63,881	64,099	27,209	27,279	39,287	39,473	187,543	188,764
9	52,190	52,461	2,292	2,318	16,163	16,156	12,000	12,029	2,962	2,973	85,607	85,936
10	16,031	16,095	8,284	8,273	21,747	21,737	16,567	16,567	7,556	7,553	70,185	70,225
11	41,084	40,698	53,099	53,175	118,878	118,881	44,467	44,520	45,094	45,181	302,622	302,455
12	37,068	37,421	34,013	34,225	69,317	69,619	34,541	34,675	39,452	39,821	214,391	215,760
13	254,417	254,051	9,364	9,571	62,069	62,327	18,769	18,970	12,171	12,477	356,790	357,396
14	32,461	32,129	1,239	1,271	8,429	8,486	2,774	2,793	801	815	45,704	45,494
15	255,653	256,798	66,070	66,577	259,012	259,667	51,863	52,187	72,183	72,871	704,781	708,100
16	1,151,911	1,155,234	1,377,161	1,378,466	2,934,719	2,936,808	574,027	574,808	1,411,015	1,411,833	7,448,833	7,457,149
17	176,264	177,492	6,141	6,364	39,390	39,639	9,578	9,716	2,374	2,597	233,747	235,808
18	48,179	48,732	6,395	6,427	22,321	22,377	7,159	7,195	4,222	4,258	88,276	88,989
19	160,827	162,780	45,796	46,763	128,770	129,499	29,273	29,395	32,867	33,433	397,533	401,870
20	933,426	931,950	1,044,636	1,046,466	2,141,388	2,142,647	457,862	458,389	991,263	992,035	5,568,575	5,571,488
Total Person	3,527,846	3,535,199	2,868,019	2,874,636	6,454,331	6,461,132	1,548,793	1,552,280	2,899,404	2,905,451	17,298,393	17,328,698
Total Transit	756,180	732,948	26,938	26,737	187,871	187,041	108,803	108,424	44,795	44,566	1,124,587	1,099,715
Transit Pct	21.4%	20.7%	0.9%	0.9%	2.9%	2.9%	7.0%	7.0%	1.5%	1.5%	6.5%	6.3%

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Transit person trips by market segment

Market Segment	HBW Target	HBW Model	HBS Target	HBS Model	HBO Target	HBO Model	NHW Target	NHW Model	NHO Target	NHO Model	ALL Target	ALL Model
1	121,156	120,830	2,516	2,494	32,693	32,643	29,816	29,838	9,430	9,407	195,611	195,211
2	10,475	10,274	145	140	3,142	3,110	4,281	4,292	1,880	1,857	19,923	19,673
3	71,016	70,406	6,941	6,925	41,914	41,917	24,992	25,074	11,535	11,542	156,398	155,863
4	20,938	18,528	1,238	1,250	5,028	5,021	6,633	6,453	2,681	2,728	36,518	33,980
5	20,376	19,892	202	182	3,493	3,441	2,089	2,083	467	453	26,627	26,051
6	1,753	1,706	32	33	183	173	192	193	35	32	2,195	2,138
7	15,410	15,275	900	889	6,656	6,605	2,084	2,056	1,014	1,002	26,064	25,827
8	6,056	5,999	390	372	2,659	2,638	1,901	1,885	1,056	1,047	12,062	11,941
9	46,277	45,356	197	183	7,689	7,572	5,427	5,429	2,540	2,461	62,130	61,001
10	7,160	7,073	247	246	938	922	2,977	2,953	586	570	11,908	11,763
11	20,454	18,725	1,397	1,371	5,681	5,634	4,626	4,604	2,260	2,235	34,418	32,569
12	5,473	4,846	466	471	1,991	1,935	1,703	1,662	374	352	10,007	9,264
13	122,128	118,147	377	358	11,153	11,123	4,701	4,719	966	951	139,325	135,298
14	14,072	13,682	27	22	1,436	1,420	493	479	295	287	16,323	15,890
15	68,062	66,130	1,779	1,765	16,478	16,471	3,984	3,988	2,077	2,043	92,380	90,397
16	42,095	41,998	5,444	5,434	21,809	21,786	4,505	4,468	3,970	3,963	77,823	77,648
17	76,030	71,137	218	202	7,192	7,102	3,220	3,205	753	808	87,413	82,454
18	21,412	20,626	21	32	1,061	1,025	676	654	123	114	23,293	22,451
19	41,081	38,659	597	584	6,262	6,148	1,838	1,792	871	855	50,649	48,038
20	24,756	23,661	3,804	3,784	10,413	10,356	2,665	2,596	1,882	1,861	43,520	42,257
Total Transit	756,180	732,948	26,938	26,737	187,871	187,041	108,803	108,424	44,795	44,566	1,124,587	1,099,715