

## Appendix E

### Trip Generation

The current land use-based trip generation program includes 13 land use categories plus an estimator for trips oriented to and from the APO region. Land uses are grouped and summed within model Transportation Analysis Zones (TAZ) provided by the APO. Within the St. Cloud TDM extent, there are 261 TAZs, with an additional 30 TAZs representing “external stations” at the edge of the region.

Standard travel demand modeling nomenclature considers trips to be “produced” at the household end (or trip origin if neither end is at the home) and attracted to the non-household end of the trip.

*Home-based trips are forecast from the home locations to activities outside the home including work, school, shopping, recreation, social, or other activities. The nonwork related trips are often aggregated into one or more nonwork trip purposes. The model forecast trip productions and attractions, with each trip having one production end and one attraction end. Productions are related to the home end of the trip while attractions are related to the nonhome end. For example, on a daily basis, a single worker may generate two home-based work trip productions at home – a trip from home to work and a trip from work to home. At the work location, the same worker would generate two attractions for the same two trips. Trip productions and attractions focus on the locations generating the travel, not the directionality of travel. (Federal Highway Administration et al., 2010, p. 5-1)<sup>1</sup>*

Many of the trip generation rates were originally developed using Institute of Transportation Engineers (ITE) estimates that have since been updated by ITE. The model’s trip generation rates were reviewed, and it was determined that most of the rates fall within the typical ITE range. Three land uses (office, medium-density retail, and high-density retail) use trip generation rates consistent with ITEs. The trip generation rates for office and medium-density retail are logarithmic with an effective trip generation rate of 13.18 and 63.32 per 1,000 square feet, respectively. High-density trip generation is specific to the Crossroads shopping center, and has an effective rate of 33.95 trips per 1,000 square feet. Trip generation rates by land use category are depicted in Table 4.

Table 4: Trip Generation Rates by Land Use/Trip Purpose

	Production			Attractions		
	Home-based Work	Home-based Other	Non-home Based	Home-based Work	Home-based Other	Non-home Based
SFR	2.42	5.25	0.71	0.00	1.01	0.71
MHR	1.45	3.17	0.43	0.00	0.61	0.43
OFFICE	-	-	-	-	-	-
IND	0.00	0.00	1.68	2.80	0.84	1.68
LIND	0.00	0.00	0.96	1.60	0.48	0.96
LRET	0.00	0.00	14.25	3.33	15.68	14.25
MedRET	-	-	-	-	-	-
HighRET	-	-	-	-	-	-
HOT	0.00	0.00	2.61	0.61	2.87	2.61
SCH	0.00	0.00	3.10	0.07	0.34	0.31
PARK	0.00	0.00	3.00	0.70	3.30	3.00

<sup>1</sup> Travel Model Validation and Reasonability Checking Manual Second Edition, <https://connect.ncdot.gov/projects/planning/tpb%20training%20presentations/fhwa%20model%20validation%20handbook.pdf>

HOSP	0.00	0.00	2.35	1.77	5.30	2.35
COLL	0.00	0.00	0.47	0.24	1.19	0.47
ADT	0.30	0.40	0.10	0.06	0.07	0.06

Previously, the trip generation step of the TDM was done outside of the model catalog. SRF updated the TDM to include the trip generation program within the CUBE model catalog.