CAMBRIDGE
SYSTEMATICS

Think ➤ Forward

Memorandum

TO: NVTA

FROM: Feng Liu, Ph.D. and Vivek Yadav

DATE: September 24, 2025

RE: Transmittal Package: NVTA TransAction Model Version 1.0.6

This memorandum documents a transmittal package containing the latest NVTA TransAction Model Version 1.0.6 and its associated input files, i.e., zonal land use data and transportation network files (highway and transit networks).

The following documents should be used as a reference for NVTA TransAction Model Version 1.0.6:

- Cambridge Systematics, for NVTA. 2023. Northern Virginia Transportation Model, TransAction Model Version 1.0 User's Guide

- COG/TPB. 2023. USER'S GUIDE For the COG/TPB Gen2/Version 2.4.6 Travel Demand Forecasting Model.

Model. TransAction Model Version 1.0.6 was an updated version of TransAction Model Version 1.0, with the following revisions:

- Input files were updated based on the COG/TPB Ver. 2.4.6 Model input files.

- Congestion degradation for bus speed was revised using the updated procedure in COG/TPB Ver. 2.4.6

- Land use forecasts are based on the MWCOG Round 10 Cooperative Forecasting

- DTALite was incorporated as part of the user interface.

TransAction Model Version 1.0 was developed based on the COG/TPB Ver. 2.4 Model, which was released for production use on March 26, 2021. The Ver. 2.4 Model is based on the Ver. 2.3 Model, which was calibrated to year-2007 conditions, validated to year-2010 conditions and validated to year-2014 conditions in 2019. The COG/TPB Ver. 2.4 Model was used as the base to develop TransAction Model Version 1.0, which includes enhanced functionalities and features for the macroscopic modeling and added mesoscopic modeling capabilities. Detailed information on model functionalities, calibration, and validation can be found in the report *NVTA Model Development: Calibration and Validation*.

Transportation Networks: TransAction Model Version 1.0.6 networks are based on networks from the COG/TPB Gen2/Version 2.4.6 model and TransAction Model Version 1.0. In the COG/TPB Ver.2.4.6, the Constrained Long-Range Plan (CLRP) transportation networks were derived from the TPB Air Quality Conformity Analysis of the 2022 Update to Visualize 2045, a Long-Range Transportation Plan (LRTP) for the National Capital Region, and the FY 2023-2026 Transportation Improvement Program (TIP).

The COG/TPB Ver. 2.4 as released in March 2021 has the transportation networks used for the Air Quality Conformity analysis of the 2020 Amendment to Visualize 2045, the constrained long-range plan (CLRP) for the region, and the FY 2021-2024 Transportation Improvement Program (TIP). The 2017 analysis year was included to provide base-year network inputs with network adjustments/corrections that are consistent with forecast years.

TransAction Model Version 1.0 uses the 2017 networks as the base and 2045 as the horizon year. To support the NVTA's the TransAction Update and Six Year Program, a 2045 TransAction No-Build network was developed to represent the most likely future transportation network for Northern Virginia, in the absence of the projects being evaluated for TransAction.

Within Northern Virginia, changes were made to the CLRP network to support the evaluation of the TransAction plan including:

- Keeping projects fully funded by NVTA and other agencies; and

- Removing projects on the TransAction "Build" project list.

Outside of Northern Virginia, the CLRP network is retained. The Cube network files are stored in the "Inputs" folder in a scenario, while the DTALite network files are created in the DTALite subfolder under the "Outputs" folder for a scenario.

Land Use Data: TAZ-level land-use data from Round 10 of COG's Cooperative Forecasting program is used in TransAction Model 1.0.6. It should be noted that Round 9.2 Cooperative Forecasting was included in the 2023 release of Version 2.4.6.

Model File Structure. TransAction Model Version 1.0 has its inputs and application files organized in a structured subdirectory system similar to that for the COG/TPB Ver. 2.4 Model, with some differences. The subdirectories include Cube Voyager "scripts", "software", and "support", as in Ver2.4, with general files to be applied to every scenario to be evaluated. In addition, a "scenario" folder is established to store a scenario's "inputs" and "outputs", which includes model output summary files, Dashboard data, and DTALite output files.

Software and Hardware Requirements. As noted in the Ver. 2.4 Model User's Guide, the Ver.2.4 Model was developed using Cube Voyager ver. 6.4.1. TransAction Model Version 1.0 was developed using Cube Voyager ver. 6.4.5, and TransAction Model Version 1.0.6 was used in both Cube Voyager ver. 6.4.5 and Cube Voyager ver. 6.5, which is generally recommended for use for this model. See the User's Guide for more details on software and hardware requirements and recommendations. Cube Voyager software is available for purchase from

CAMBRIDGE
SYSTEMATICS

Bentley Systems, Inc. In addition, note that the model outputs are not included with this transmittal, due to their large size.

Model Application. In addition to enhancements in model functionalities, TransAction Model Version 1.0.6 has a Cube user interface with a scenario manager and application manager, dramatically different from the COG/TPB Ver. 2.4.6 Model, which uses a series of prepared batch files to execute the model for different years and scenarios. Further details about how to set up a scenario in the user interface for running the model are provided in the relevant chapters of the User's Guide.

Additional details about the COG/TPB Model Ver. 2.4.6 files can be found in the Transmittal Package memorandum:

https://www.mwcog.org/assets/1/6/Xmittal_Ver2.4.6_model_and_inputs_v3.pdf

The COG/TPB Ver. 2.4.6 Model User's Guide can be found:

https://www.mwcog.org/assets/1/6/mwcog_tpb_travel_model_Ver2.4.6_User_Guide.pdf

CAMBRIDGE
SYSTEMATICS