APPENDIX B

Rice County Forecast Modeling Methodology

The general approach to forecasting the traffic volumes consisted of the following:

- Utilize the Twin Cities regional travel demand model parameters, maintained by Metropolitan Council
- Translate Tranplan model by the Minnesota DOT into TransCAD, Transportation GIS software by Caliper Corporation
- Update model to include additional roadways and external load stations
- Collect year 2000 census data from the U.S. Census Bureau
- Update year 2000 household, employment, and special generator data
- Collect year 2000 traffic count data and basic roadway attribute information in the study area for the purpose of validating the model, run for the base year of 2000
- Apply the model for the base year and validate its projections against the observed traffic count information; make appropriate adjustments as necessary to reach an acceptable validation
- Collect year 2025 household and employment data from the public entities. Apply to data and update special generators for 2025.
- Apply the model for the forecast year of 2025, taking into account the adjustments made to the 2000 model run, to generate the projected volumes
- Analyze traffic patterns that ultimately comprise the assignments themselves, through a series of special selected link analyses; use this information as a basis for adjusting the forecasted volumes if determined to be necessary
- Prepare the final set of forecast volumes

Details – Additional details concerning the methodology follow:

Regional Model – The regional model provides a systematic procedure for forecasting volumes, taking into account projected changes in regional land use/socioeconomic data and the regional transportation network. Trip projection and trip length parameters were taken from the regional model and adjusted to fit Rice County. The trip estimation was based on the Twin Cities Regional Model methodology.

TransCAD Model – Model was built from an existing Tranplan model. Aerials and road network files were used to refine the model. This info was imported into TransCAD and the road network was designed to scale within the Minnesota State Plane for Rice County. The Tranplan model was primarily focused on the Trunk Highways. Many county roads and primary city roads were added to the network. Additional external links into Rice County were added, providing an additional 18 external nodes for traffic to enter the County. This includes additional nodes to the north for traffic into and out of Scott County.

Census Data – Year 2000 census data was collected from the U.S. Census Bureau. This data includes population, households, auto ownership, and income by census block.

Travel Behavior Inventory (TBI) – The most recent Travel Behavior Inventory by MetCouncil (2000) was used to establish the travel behavior data for each of the TAZs.

Traffic Analysis Zones (TAZs) – Based on the existing TAZs, census blocks, roadway network, and land features (including railroads and waterways), zones were identified for traffic to enter and exit from the roadway network. These zones include both traffic productions and attractions. These TAZs are limited in scope to match a road network with fewer roads. Additional roads with centroid connectors were added as necessary, but the TAZ areas were not changed from the base Tranplan model. The TAZ data is included in the attached table and are location is noted in the attached map.

Employment Data – Employment figures were obtained from the Public entities in Rice County to identify trip attractions within the County.

Special Generators – Schools were identified as locations that attract trips that are not taken into account by employment data. The trip attractions for schools were based on the number of students using ITE Trip Generation. All elementary, secondary, private, and high schools were included. Additional consideration was given to the local colleges.

Traffic Count Data – Year 2000 traffic count data in the study area was collected from various municipal and county governments as well as the Minnesota Department of Transportation (Mn/DOT). These volumes were used to calibrate the Model.

Roadway Attribute Information – The model network was designed and reviewed in detail for conformity to current conditions. A thorough check of roadway functional classification, speed, number of through lanes, and roadway capacity was completed.

Base Model Validation – The 2000 model was validated using many resources, including: 2000 traffic count data, aerial photos, and field observations. The assigned volumes in the model were then compared to the 2000 counts. The production/attraction rates were assumed to be consistent with the Twin Cities Regional Model. The total productions for each TAZ were based on household income, household size, number of vehicles per household, and travel type. The attractions were based on retail and non-retail employees. Adjustments to centroid locations and centroid connectors were added to help smooth volumes along individual roadways and more closely match ground counts. Additionally, speed and capacities on roadways were refined. The model was calibrated to the primary county roads and the Minnesota highways within the County. The model was not calibrated within the individual city limits, so the model is less accurate within the complicated roadway network within the Cities. Other limitations of the model include the size of the TAZs county-wide and within the Cities. All City roads were not added to the model, consequently the model cannot accurately forecast volumes where numerous local roads are missing from the roadway network.

2025 Model – Data was received from Rice County Public entities and input into the Excel spreadsheets to determine productions and attractions of each TAZ. It is recognized that these numbers may be high for the County in 2025 due to the fact that the some areas consider are

considered to be at 50% overage, resulting in 50% higher productions and attractions to some TAZs.

Review of Forecasts – The traffic forecasts were reviewed for reasonableness. As with any travel demand model, it would be inappropriate to rely solely on direct model output for design volumes. The modeled volumes were reviewed and adjusted based on existing and historic travel patterns and also through some additional selected link analysis of model output. A series of selected link assignments were performed and the model estimated volumes were adjusted to more accurately reflect future traffic patterns within the study area. Forecasts were estimated for the roadways not included in the model. Additional post-processing work was completed within the City roadway networks. This was necessary given the limited roadway network for the Cities that was provided in the Tranplan model.