Memo

Date: Friday, August 16, 2019
Project: US14-US14 Bypass Corridor Study
To: Study Advisory Team
From: HDR
Subject: Forecasting Memo

Introduction
The purpose of this memorandum (memo) is to present the methodology and forecasted traffic volumes for the years 2024 (First Possible Year of Project Completion) and 2050 (Planning Horizon). US14-US14 Bypass corridor study limits include:

- US14 – from the Brookings/Kingsbury County line west of the US81 intersection to the US14/US14 Bypass intersection west of Brookings.

Methodology
This section summarizes methodology used in the development of traffic volumes for future-year scenarios, which included:

- 2024 First Possible Year of Project Completion
- 2050 Planning Horizon

The 2019 Existing Conditions traffic volume data sets developed in the existing conditions traffic operations memorandum were used as the base year.

Because the study corridor traverses through both rural and urban settings, multiple methods of forecasting traffic were investigated:

- Growth rates based on historical daily traffic counts collected through SDDOT traffic data collection programs.
- County-wide 20-year growth factors developed by the SDDOT.
  - Rural: 1.323
  - Urban: 1.266
- Growth factors based on Brookings travel demand model output.
  - Model years included 2015 base year and 2045 planning horizon.
The Brookings Travel Demand Model was developed using Quick Response System II (QRS II) software and encompasses the US14-US14 Bypass study corridor between:

- West end: 16th Avenue West / 469th Avenue/County Highway 9
- East end: US14-US14 Bypass intersection

For the rural areas outside of the Brookings travel demand model area, it was determined that county-wide growth factors developed by the SDDOT best represented rural future-year growth for this analysis.

For areas inside the Brookings travel demand model area, it was determined that growth factors based on model base year and 2045 planning horizon year best accounted for growth within the Brookings area. The model was recently updated for a study of the 20th Street interchange with I-29 study to account for new planned development within the model area. Because the model uses 2045 as the planning horizon, straight line growth was applied to the 2045 volumes to determine 2050 forecasts for this study.

Through a review of the model and model output, it was found that while the model accounts for development contained within the Brookings area, it did not show growth in external station traffic (traffic entering or exiting the model) along US14. Through model post-processing and assignment of traffic, additional external traffic was added to the corridor within the Brookings area based on the following:

- Account for growth in pass-through traffic, between the two US14 external stations. This estimate was based on a review of historical corridor counts and comparison to model volumes.
- Account for growth in traffic entering the Brookings area with an origin or destination in Brookings. This estimate and assignment of traffic was based on a review of model volumes, historical counts, and existing turning movement counts.
- Additional traffic was needed to align with the rural growth west of Brookings (outside of the travel demand model area). The application of this external traffic to the Brookings model area provided a coherent data set between rural and urban areas of the US14-US14 Bypass corridor.

After post-processing model-derived traffic forecasts, the daily traffic volumes were smoothed throughout the corridor.

2050 Planning Horizon peak hour volumes were developed by applying growth rates equivalent to the daily forecast growth rates were applied to peak hour turning movement volumes throughout the corridor. Volumes were post-processed for reasonableness, to account for future development not included in the travel demand model (see next section), and to balance and smooth between intersections throughout the corridor.

2024 forecasts, both daily and peak hour turning movement volumes, were developed through straight-line interpolation between 2019 and 2050 volume sets.
Traffic Volume Forecasting

A review of future development throughout the corridor was conducted to determine whether any shifts in traffic patterns or future growth would alter the forecasted growth in traffic based on the applied growth factors. Existing and future land uses as portrayed in the 2040 Comprehensive Plan were referenced to identify locations of development and future growth. Based on the 2040 Comprehensive Plan, the area near US14 and I-29 Interchange is expected to experience industrial/commercial growth. Areas along 469th Avenue/CR 9 north of US14 is anticipated to experience some moderate residential development as well.

There was also discussion during the first Study Advisory Team (SAT) meeting that the area north of US14 along Caspian Avenue was expected to experience development in the near future and the City of Volga was extending utilities under US14. Projected trips generated from this development was incorporated into the traffic volume forecasts.

Based on this information and methodology, the highest growth of traffic volumes along the study corridor was expected to occur on US14-US14 Bypass between Kasan Avenue and 469th Avenue/CR 9.

Table 1 provides a summary of the Average Daily Traffic (ADT) for the 2019 base year, 2024 Future No-Build Conditions and 2050 Future No-Build Conditions. The turning movement volumes for the forecasted year 2024 are provided in Figure 1 and Figure 2. The turning movement volumes for the forecasted year 2050 are provided in Figure 3 and Figure 4.
<table>
<thead>
<tr>
<th>US14-US14 Bypass Segment Description</th>
<th>Existing Condition 2019 ADT</th>
<th>Forecasted No-Build Condition 2024 ADT</th>
<th>Forecasted No-Build Condition 2050 ADT</th>
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Study Intersection

LEGEND

Daily Traffic Volumes

Peak Hour Traffic Volumes: AM (PM)

Traffic Movement

Existing Traffic Control

NOTES

- AM peak hour is from 7:15 to 8:15 AM and PM peak hour is from 4:30 to 5:30 PM.

2024 No-Build Conditions Traffic Volumes: US 81 to Hansina Ave (1 of 2)

US14-US14 Bypass Corridor Study

Figure 1
2024 No-Build Conditions Traffic Volumes: Caspian Ave to US 14 & US 14 Bypass (East) (2 of 2)

US14-US14 Bypass Corridor Study

*See Figure 1 for legend and notes
2050 No-Build Conditions Traffic Volumes: US 81 to Hansina Ave (1 of 2)

US14-US14 Bypass Corridor Study

Figure 3

Legend:
- Study Intersection
- Daily Traffic Volumes
- Peak Hour Traffic Volumes: AM (PM)
- Traffic Movement
- Existing Traffic Control

Notes:
- AM peak hour is from 7:15 to 8:15 AM and PM peak hour is from 4:30 to 5:30 PM.
2050 No-Build Conditions Traffic Volumes: Caspian Ave to US 14 & US 14 Bypass (East) (2 of 2)

US14-US14 Bypass Corridor Study

*See Figure 3 for legend and notes