

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.
- US14 Bypass – between the US14/US14 Bypass intersections east and 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**.

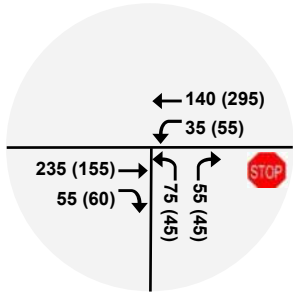


Table 1. US14-US14 Bypass ADT Summary for 2019, 2024 and 2050

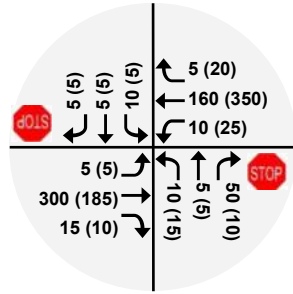
US14-US14 Bypass Segment Description		Existing Condition 2019 ADT	Forecasted No-Build Condition 2024 ADT	Forecasted No-Build Condition 2050 ADT
From	To			
Project Beginning MRM 402.95	US 81	4,700	5,100	7,000
US 81	458 th Avenue/CR 11	4,600	5,000	6,900
458 th Avenue/CR 11	459 th Avenue/CR 1	5,000	5,400	7,500
459 th Avenue/CR 1	464 th Avenue/CR 5	5,400	5,800	8,000
464 th Avenue/CR 5	Kasan Avenue	6,900	7,400	10,300
Kasan Avenue	Hansina Avenue	7,500	8,100	11,200
Hansina Avenue	Caspian Avenue	9,300	10,100	14,000
Caspian Avenue	466 th Avenue/CR 7	12,100	13,100	18,100
466 th Avenue/CR 7	469 th Avenue/CR 9	12,400	13,400	18,600
469 th Avenue/CR 9	US14 Bypass (west)	13,000	13,900	18,600
US14 Bypass (west)	Western Avenue	7,000	7,500	10,250
Western Avenue	Medary Avenue	9,500	10,100	13,400
Medary Avenue	Jackrabbit Avenue	10,700	11,400	14,750
Jackrabbit Avenue	22 nd Avenue	10,800	11,500	14,850
22 nd Avenue	I-29 SB Ramp Terminal	8,400	8,900	11,700
I-29 SB Ramp Terminal	I-29 NB Ramp Terminal	6,900	7,400	9,800
I-29 NB Ramp Terminal	32 nd Avenue	5,500	5,900	8,100
32 nd Avenue	34 th Avenue	3,000	3,300	4,800
34 th Avenue	US14 Bypass (east) MRM 423.24	3,400	3,700	5,300



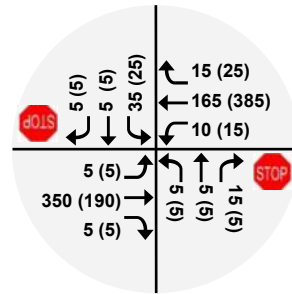
1 US 14 & US 81



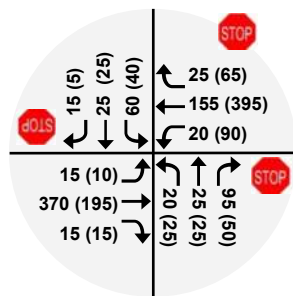
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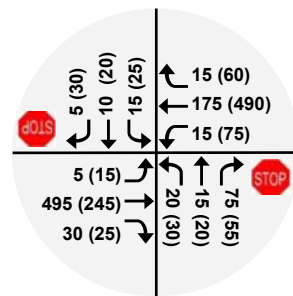
3 US 14 & Brookings Co. 1 / 459th Ave



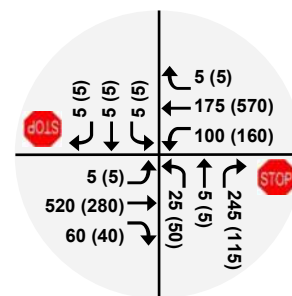
4 US 14 & Brookings Co. 5 / 464th Ave



5 US 14 & Kasan Ave



6 US 14 & Hansina Ave

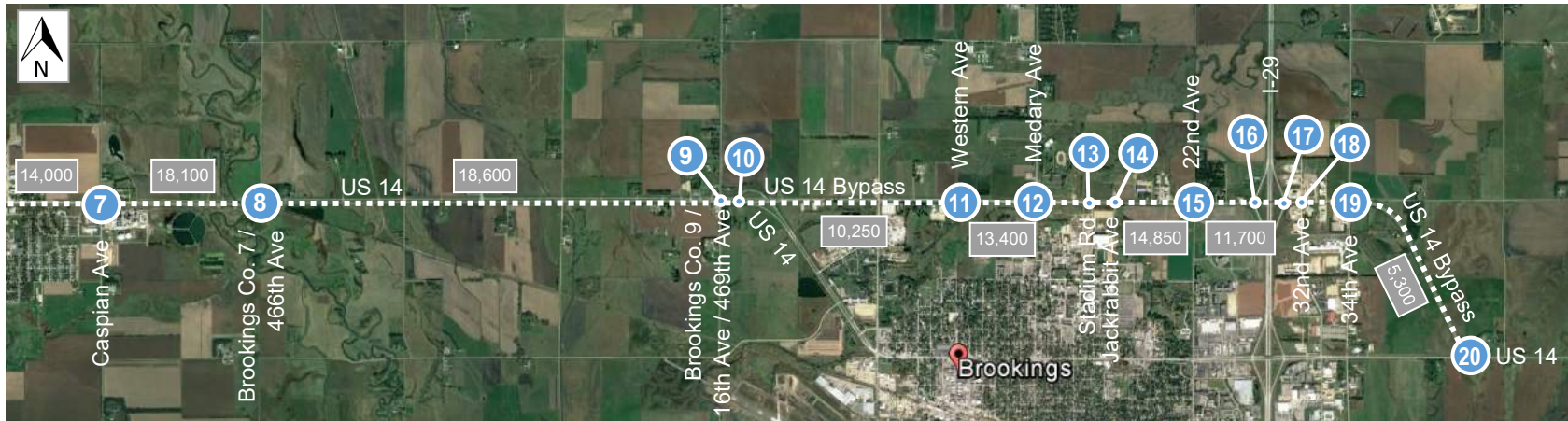


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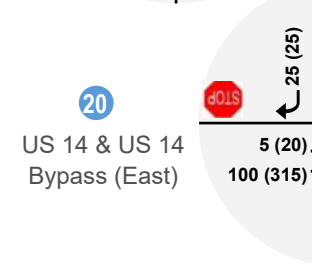
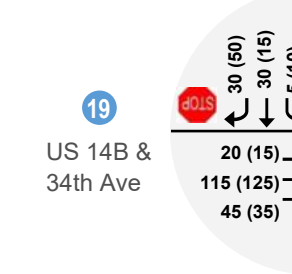
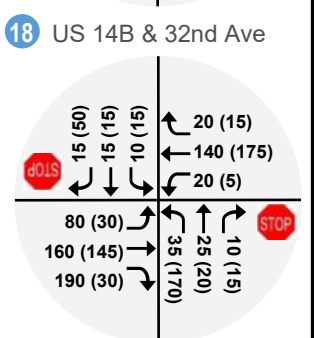
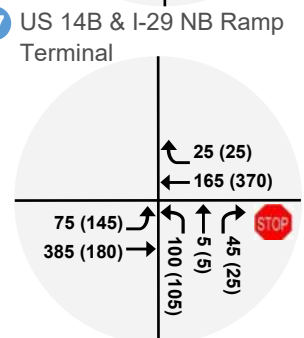
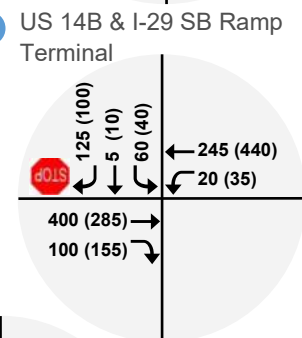
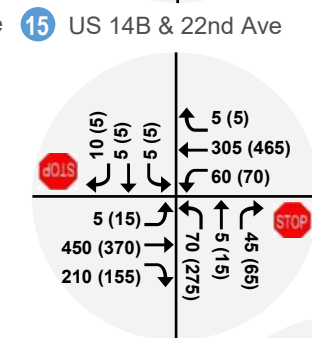
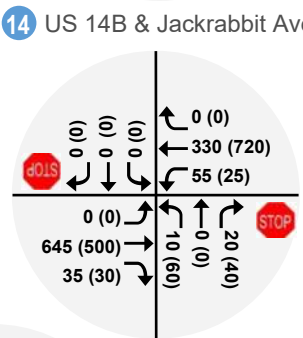
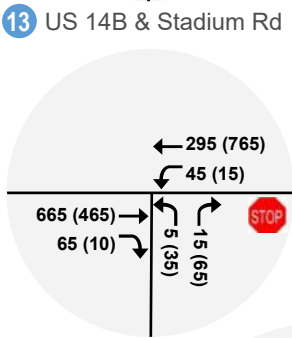
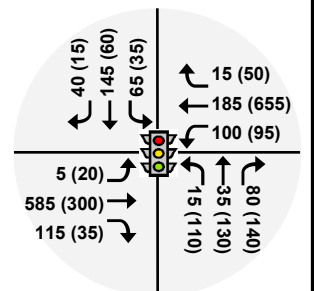
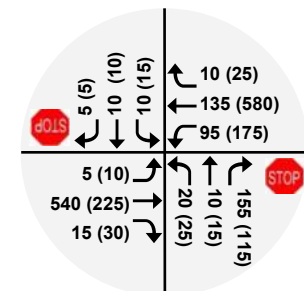
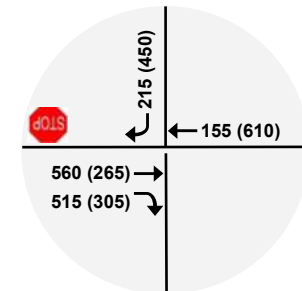
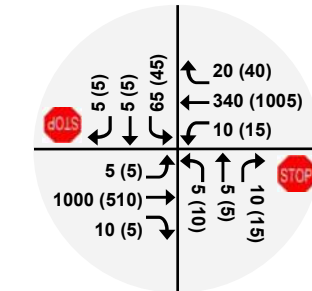
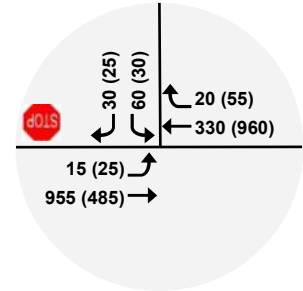
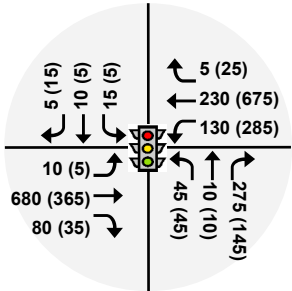
- Study Intersection
- Daily Traffic Volumes
- Peak Hour Traffic Volumes: AM (PM)
- Traffic Movement
- Existing Traffic Control

NOTES

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



- 7** US 14 & Caspian Ave
- 8** US 14 & Brookings Co. 7 / 466th Ave
- 9** US 14 & Brookings Co. 9 / 16th Ave W / 469th Ave
- 10** US 14 & US 14 Bypass (West)
- 11** US 14B & Western Ave
- 12** US 14B & Medary Ave
- 13** US 14B & Stadium Rd
- 14** US 14B & Jackrabbit Ave
- 15** US 14B & 22nd Ave
- 16** US 14B & I-29 SB Ramp Terminal
- 17** US 14B & I-29 NB Ramp Terminal
- 18** US 14B & 32nd Ave
- 19** US 14B & 34th Ave
- 20** US 14 & US 14 Bypass (East)



*See Figure 1 for legend and notes



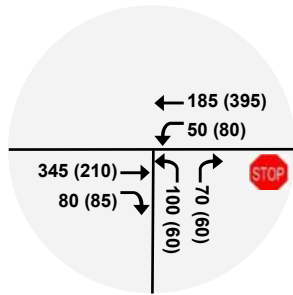
2024 No-Build Conditions Traffic Volumes: Caspian Ave to US 14 & US 14 Bypass (East) (2 of 2)

US14-US14 Bypass Corridor Study

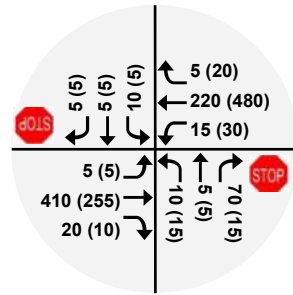
Figure 2



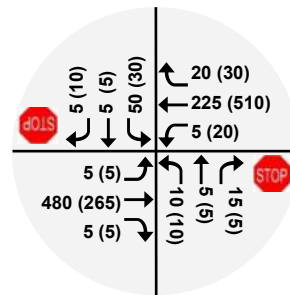
1 US 14 & US 81



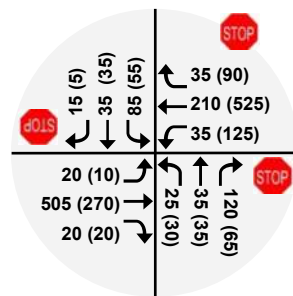
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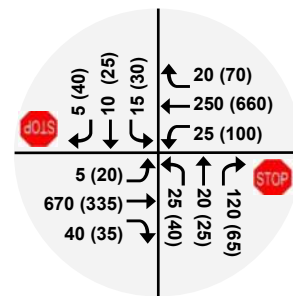
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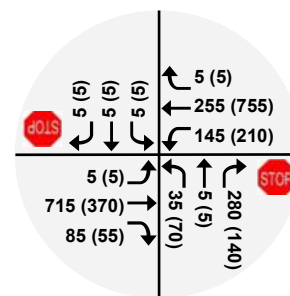
4 US 14 & Brookings Co. 5 / 464th Ave



5 US 14 & Kasan Ave



6 US 14 & Hansina Ave



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Study Intersection



Daily Traffic Volumes



Peak Hour Traffic Volumes: AM (PM)



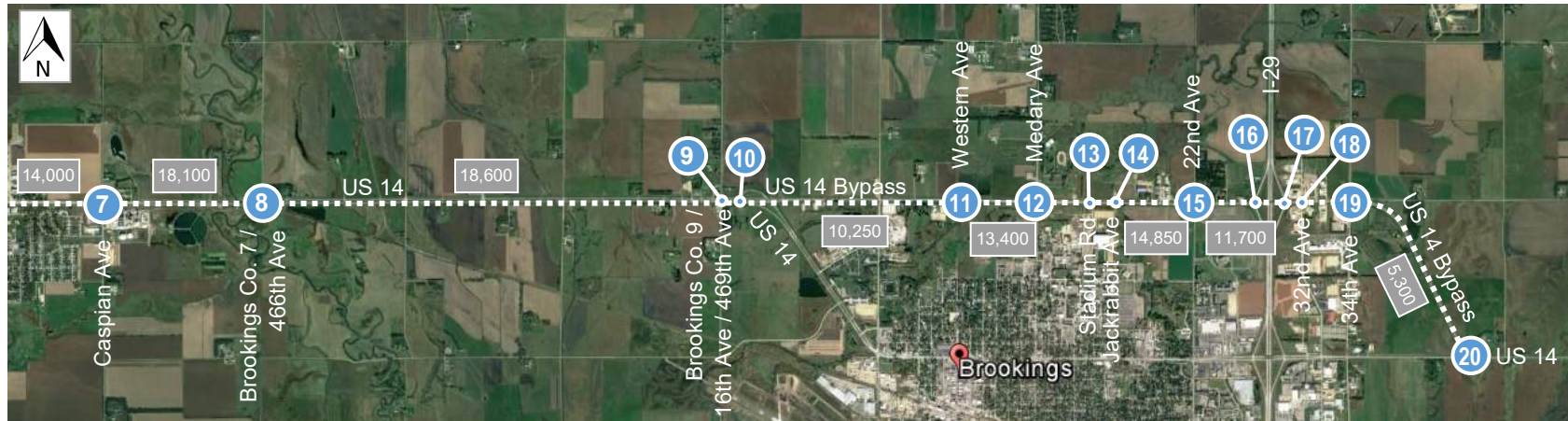
Traffic Movement



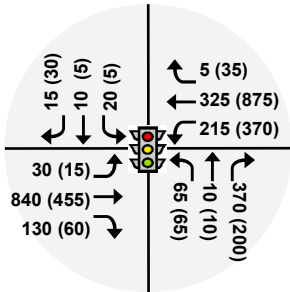
Existing Traffic Control

NOTES

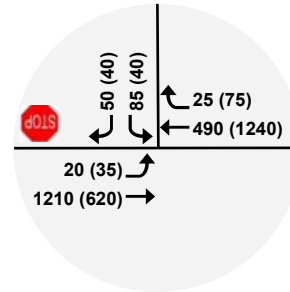
- AM peak hour is from 7:15 to 8:15
AM and PM peak hour is from 4:30 to 5:30 PM.



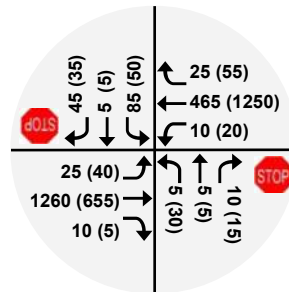
7 US 14 & Caspian Ave



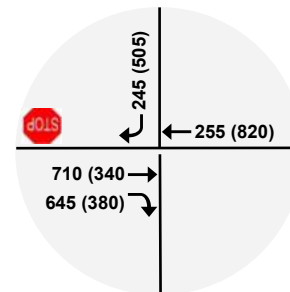
8 US 14 & Brookings Co. 7 / 466th Ave



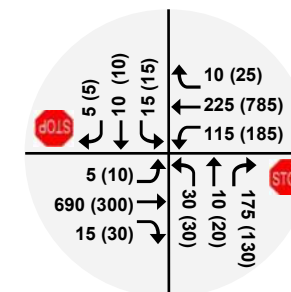
9 US 14 & Brookings Co. 9 / 16th Ave W / 469th Ave



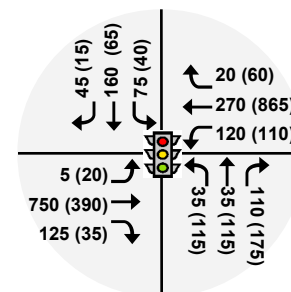
10 US 14 & US 14 Bypass (West)



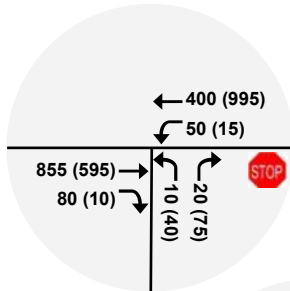
11 US 14B & Western Ave



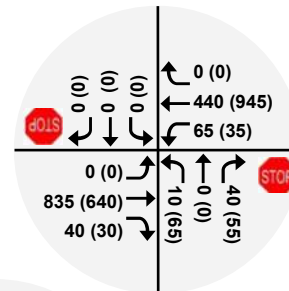
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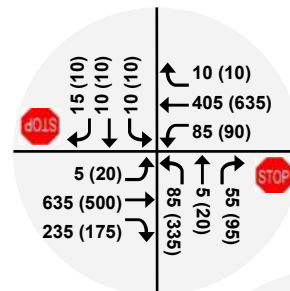
13 US 14B & Stadium Rd



14 US 14B & Jackrabbit Ave



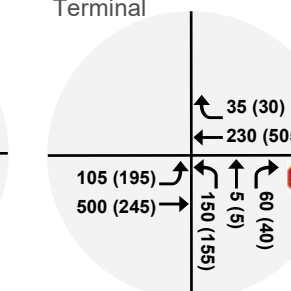
15 US 14B & 22nd Ave



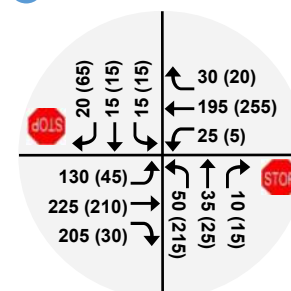
16 US 14B & I-29 SB Ramp Terminal



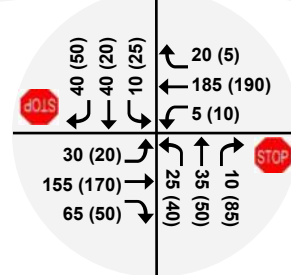
17 US 14B & I-29 NB Ramp Terminal



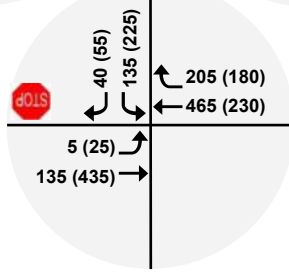
18 US 14B & 32nd Ave



19 US 14B & 34th Ave



20 US 14 & US 14 Bypass (East)



*See Figure 3 for legend and notes