

t17

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# Bus on Shoulder Reliability Analysis

# APPENDIX T17 – BUS-ON-SHOULDER RELIABILITY ANALYSIS

## Introduction

Since 2016, MnDOT has been working with neighborhoods, community groups, district councils, local governments and others interested in the future of I-94 between St. Paul and Minneapolis in an effort to plan for transportation changes on and along the freeway. This effort is known as Rethinking I-94. The work described in this technical memorandum was conducted as part of the initial phase of Rethinking I-94 conducted between 2016 and 2018.

This memorandum documents the methodology and results of the Improved Bus-On-Shoulder Analysis conducted for the Rethinking I-94 Project. The I-94 project study limits are between the West Broadway Avenue interchange in Minneapolis and the TH 61 interchange in St. Paul. Currently, Bus-On-Shoulders exist in both directions on I-94 between TH 280 and downtown Saint Paul.

## Methodology

The following summarizes the methodology and assumptions used as part of the analysis:

- Existing loop detector data was used to obtain average speed data (across all lanes) between the Hennepin/Lyndale on-ramp and TH 61.
- Travel time was calculated for each I-94 mainline segment based on detector speed and segment length.
- Assumes bus-on-shoulder would be available between the Hennepin/Lyndale on-ramp and TH 61. Accounts for current Bus-on-Shoulders between TH 280 and downtown Saint Paul.
- Assumes that buses would use the shoulder when average mainline speeds are less than 35 miles per hour (mph) and that buses operating on the shoulder would not exceed the speed of mainline traffic by more than 15 mph, and would not exceed 35 mph.
- No consideration was given for delay associated with lane changing.
- Calculated travel time difference between average mainline traffic and bus traffic that would use the shoulder when average mainline speeds are less than 35 mph.
- Person volumes used correspond to transit data documented in Appendix T15.
- Annualized and monetized travel time savings per person are based on MnDOT's BCA guidance for value of time (July 2017).

- Results were compared to estimated travel time savings for the MnPASS Concepts documented in Appendix T15.

## Analysis Results

Table 1 shows the results of the improved bus-on-shoulder travel time savings calculations. Results of the calculations indicate that improved bus-on-shoulder operations would result in an annual person travel time savings of approximately 9,000 hours or \$165,000.

**TABLE 1 – BUS-ON-SHOULDER TRANSIT EVALUATION**

	Number of Bus Routes on I-94 Segment <sup>(1)</sup>	Daily Trips	One-Way Rides	Annual Person Travel Time Saved (hours)	Annual Productivity Savings (millions)
Bus-On-Shoulder (Hennepin/Lyndale to TH 61)	13	260	7,900	9,000	\$0.17

<sup>(1)</sup> Only routes that can feasibly use bus-on-shoulder.

The following locations would experience the greatest opportunity for travel time savings with an improved bus-on-shoulder condition based on existing average speed:

### Eastbound I-94

- I-35W Commons Section
- Marion Street to TH 52

### Westbound I-94

- I-35E Commons Section
- Huron Boulevard through the I-35W Commons

Table 2 shows the results of the travel time savings calculations completed as part of the MnPASS Transit Evaluation documented in Appendix T15 for comparison purposes. The travel time savings calculated for an improved bus-on-shoulder condition are less than the travel time savings calculated as part of the MnPASS Transit Evaluation. However, costs have not been taken into consideration.

TABLE 2 MNPASS TRANSIT EVALUATION

MnPASS Concept	Number of Bus Routes on I-94 Segment	Daily Buses	Daily Trips	Annual Person Travel Time Saved (hours)	Annual Productivity Savings (millions)
A1 I-394 to TH 61 w/MnPASS Ramps	13	260	7,900	67,000	\$1.1
A2 I-394 to TH 61 w/o MnPASS Ramps	13	260	7,900	55,000	\$0.9
B I-394 to Downtown Saint Paul	8	205	6,800	31,000	\$0.5
C Downtown Minneapolis to TH 61	12	250	7,600	56,000	\$0.9
D Downtown to Downtown	7	195	6,600	40,000	\$0.7
E I-35W to I-35E	7	195	6,600	36,000	\$0.6
F Downtown to Downtown Lane Conversion	7	195	6,600	33,000	\$0.5

## Findings

Results of the analysis indicate that a bus-on-shoulder condition would result in an annual person travel time savings of approximately 9,000 hours or \$165,000.

Prepared by: SRF Consulting Group, Inc.