



# Mill Plain Arrival on Green Project

## Select intersections from Andresen Road to SE 155<sup>th</sup> Avenue

### Project Goal:

- Acquire and install new hardware and software at specific signals in order to improve data collection from traffic signals by gathering high resolution data
- Allow the City to process data to use for better coordination and transit signal priority abilities.

### Project Outcome

- The new CPU hardware will now allow the City to begin gathering data to perform future improvements.
- The new CPU software will allow the City to use high resolution data to analyze and implement future corridor timing plans.

### Project Information

Federal Funding Program: CMAQ  
 RTC Awarded Funding: \$72,700  
 Total Project Cost: \$97,600  
 Project Type: TSMO  
 Project Length: 4.3 miles  
 Function Classification: Principal Arterial  
 Daily Traffic Volume: 23,000 to 46,000

### Project Description

This project purchased, installed, and programmed CPU signal controller equipment to upgrade 15 existing intersections on Mill Plain Boulevard to allow for high resolution data collection. The equipment upgrades allow the City to collect and process data for using arrival on green and transit signal priority to improve future intersection signal coordination along the corridor. This project also installed new central software to allow central data collection and analysis via Intelight MaxView.

### Project Funding

Phase	Year	Federal Funds	Other Funds	Total
PE	N/A	\$ 0	\$ 0	\$ 0
ROW	N/A	\$ 0	\$ 0	\$ 0
CN	2020-2021	72,700	\$ 24,900	\$97,600
Total		\$ 72,700	\$ 24,900	\$97,600

### Project Outcome Details

The project improves the efficiency of engineers to evaluate corridor operations for travel time and for the percent of vehicles arriving on green lights. Advanced traffic management and operations technologies facilitate higher frequency transit service. In addition, this new equipment and software will allow for better documentation of corridor operations.

The new traffic signal controllers improve the intersection efficiency by providing more features and flexibility for programming.

The new central system software, Intelight MaxView, is easier for staff to understand and the on-site controller software has easier implementation of abilities such as transit signal priority.

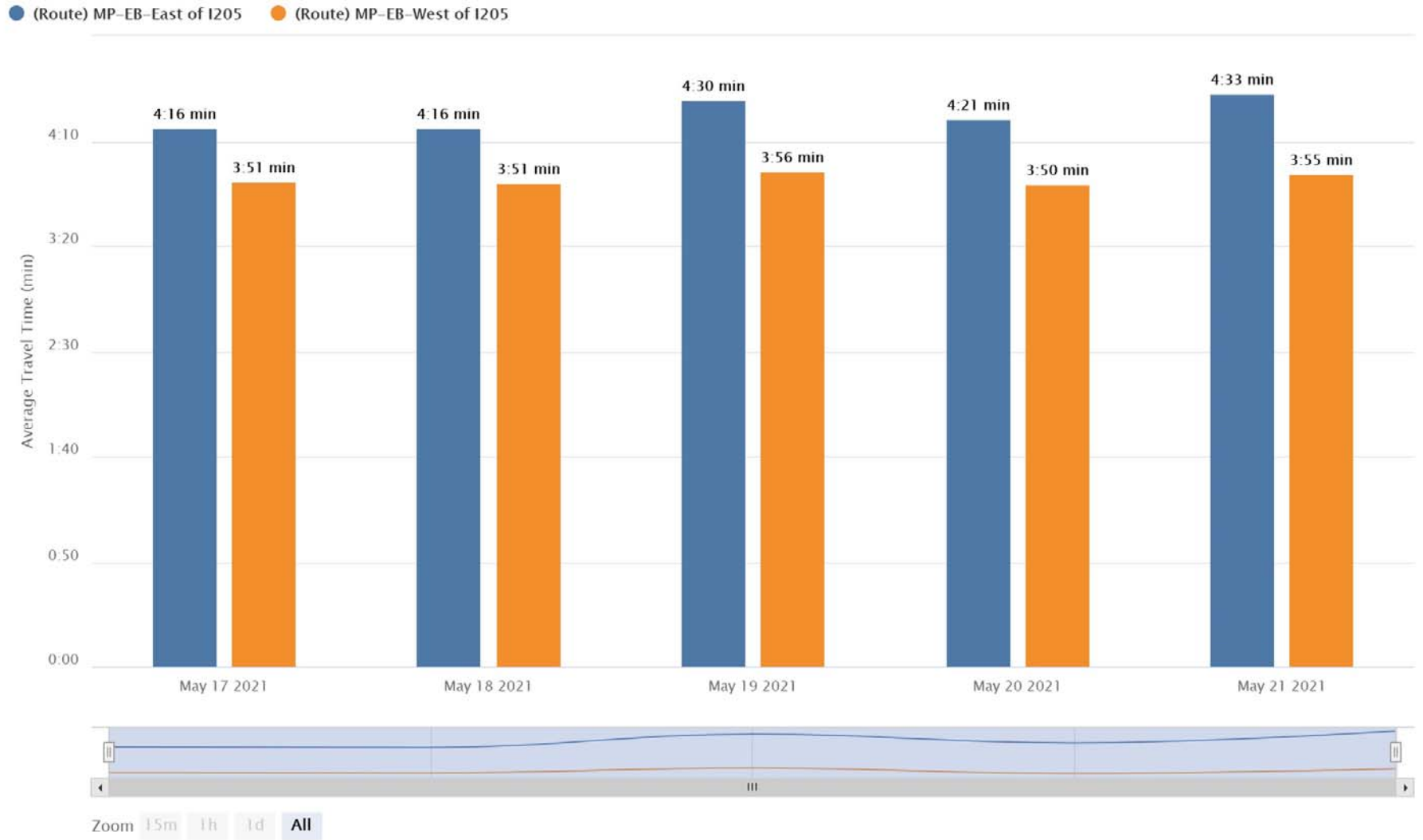
- Despite this project having a requirement to only install new CPU cards, a commitment was made to gather before and after analysis for collisions, travel time, and vehicle delay. Due to the time this project was initiated and how the Covid-19 pandemic affected traffic, these data are heavily affected by that situation. In addition, only minimal operations changes have been made at this time since a more steady-state situation for traffic would be desired before making dramatic corridor timing changes.
- The Covid-19 pandemic has some effect on these intersection volumes. Therefore, the reader is cautioned about comparing the before and after results because, although the travel times are similar and the delay is improved, this does not necessarily mean that installing new CPU cards in the traffic signal controllers had any effect on these results. However, these controllers do allow staff more capabilities for future analysis that we would expect to positively impact the users of the Mill Plain corridor.
- Collision data were obtained from WSP with the “before” condition for 2020 and the “after” condition having 3 months of data from July 1 through September 30, 2021. The collision rate was calculated along the corridor from Andresen to SE 155<sup>th</sup> Avenue using an average ADT of 35,000 vehicles and is a rate per 100 million vehicle miles. A project distance of 3.17 miles was used for the calculation. Primary collision types included in the calculation are rear-end, T-bone, turning, and angle collisions. Generally excluded collision types were fixed objects, pedestrian, merging, and backing since signal timing changes would be unlikely to improve any of these types of collisions. Collisions have increased in the “after” study compared to the “before study” for these specific types of collisions. The “before” condition had 124 collisions with 89 of them possibly improvable with signal timing. The “after” condition had 34 collisions with 13 of them possibly improvable with signal timing.
- The collision rate is calculated as:  $R = \frac{100,000,000 \times A}{365 \times T \times V \times L}$   
Where R = accident rate for the section  
A = number of reported collisions  
T = time frame in years  
V = Average Annual Daily Traffic  
L = length of section in miles
- The travel time data were collected in May of 2021 using data from SMATs, a data collection vendor. This data was collected Monday through Friday during the 3-hour AM and 3-hour PM hours. The “after” data were collected in the same manner in September 2021.
- The average vehicle delay was analyzed in Synchro from traffic counts taken at various times prior to the CPU card installations and then again based upon traffic counts taken in September 2021. Average vehicle delay is shown as the aggregated seconds of delay added for the overall intersection delays for all 15 intersections, e.g., if every intersection had 30 seconds of delay, then the aggregate delay would be 30 seconds x 15 intersections = 450 seconds of delay. Some adjustments to volumes were required to get this data because some intersections had U-turn volumes, but the mathematical analysis of U-turns is not defined in the 6<sup>th</sup> Edition of the Highway Capacity Manual. Therefore, these U-turn volumes were added to the left turn volumes to make a rough estimate of delay. Overall, these volumes were minimal across the entire corridor so their impact would be minimal on these results.

## Study Metrics Results

Metric	Before 2021	After (in 2021)
Collision rate (Accidents per million vehicle miles)	220	336
Travel Time (AM EB to I-205)	3:22	3:25
Travel Time (AM WB to I-205)	3:57	3:59
Travel Time (PM EB from I-205)	4:23	4:13
Travel Time (PM WB from I-205)	3:54	3:35
Vehicle delay AM peak hour (aggregate seconds)	328	321
Vehicle delay PM peak hour (aggregate seconds)	437	354

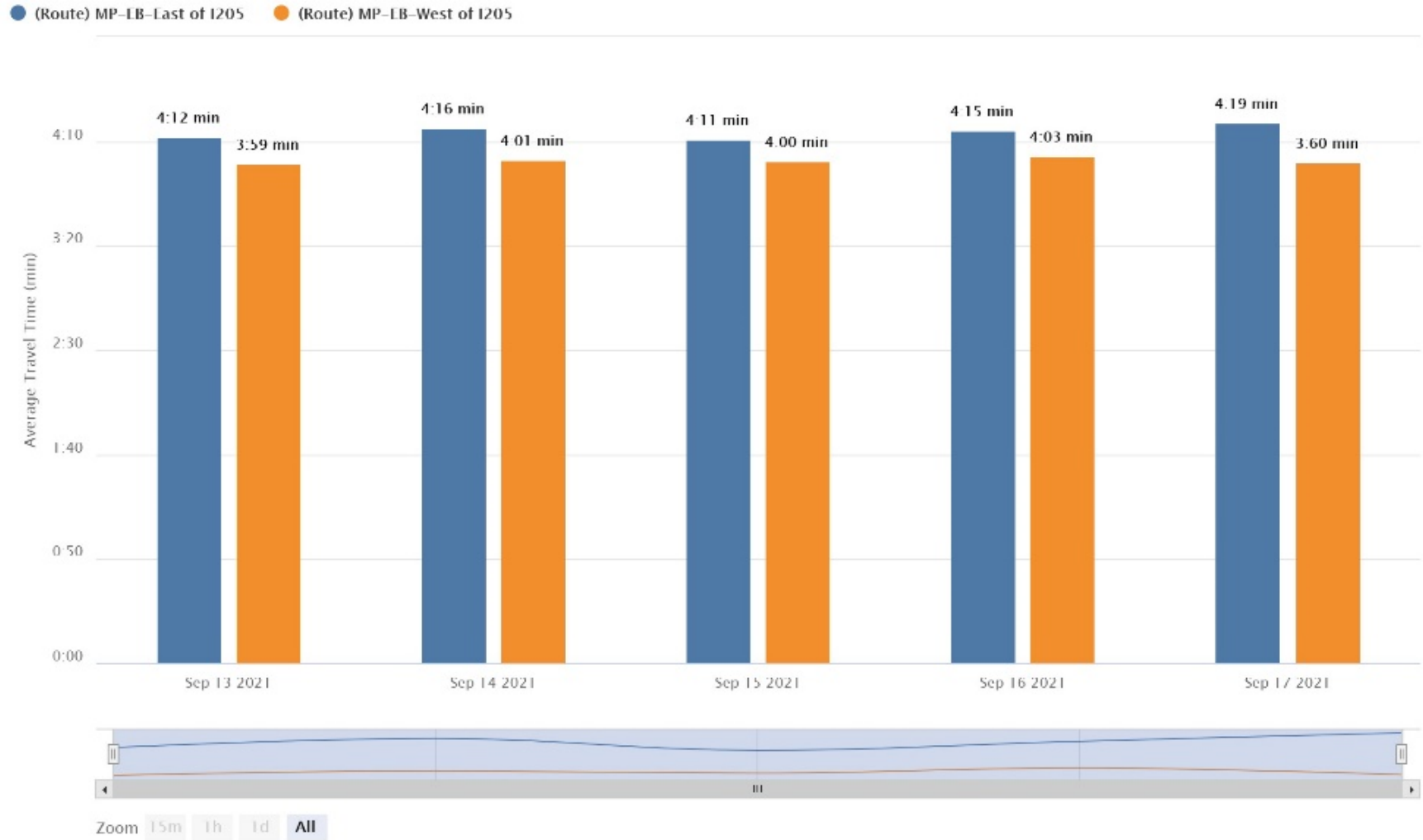
# Example Travel Time Report from SMATs (before)

Eastbound PM travel times, East and West of I-205



# Example Travel Time Report from SMATs (after)

Eastbound PM travel times, East and West of I-205



# Project Traffic Signal Controller Improvement Locations

