



Regional Transportation Operations Program and Traffic Signal Timing Briefs

Introduction

- Regional Transportation Operations Program.
 - Brief history.
 - Current status and future outlook.
- Traffic Signal Timing Briefs.
 - Benefits reporting for traffic signal improvements.



Circa 1989

- Situation

- 29 operating agencies; 2,600 signals.
- Systems operated independently.
- Lack equipment and systems standard.
- Inconsistent funding policies.

- Problem

- Signals not coordinated between jurisdictions.
- Coordination reliability poor.
- Coordination plan quality.

Energy Block Grant

- DRCOG demonstrated benefit of interjurisdictional signal timing.
- Recognized that regional partnership is critical.
- Recognized that capital investment is required to improve infrastructure.





Traffic Signal System Improvement Program

- The region's traffic signal systems will operate in a safe manner making most efficient use of the arterial street capacity.
 - Minimize traveler stops.
 - Minimize traveler stop time.
 - Minimize disruptions due to equipment failure.

TSSIP Elements

- DRCOG staff manage program.
- Capital improvement element:
 - Jurisdiction manages infrastructure construction.
 - Jurisdiction operates and maintains infrastructure and timing.
- Regional transportation operations support services element:
 - DRCOG staff manage consultant design for jurisdiction projects.
 - DRCOG staff coordinates development of optimized signal timing and coordination plans.
 - DRCOG staff collect data and prepare benefits report for project.

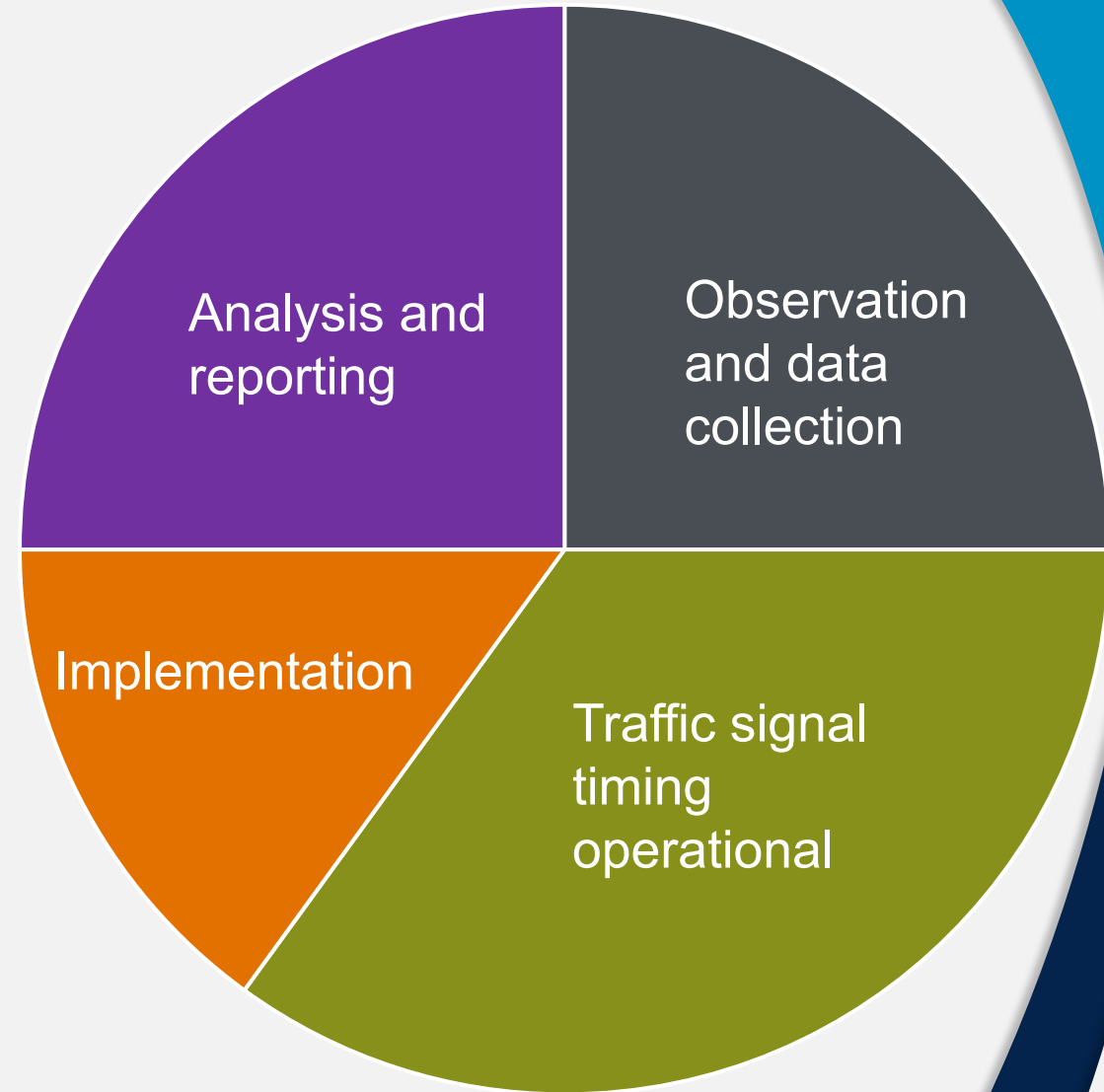
TSSIP Achievements

Output

- Upgraded systems for jurisdictions with more than 20 signals.
- Hundreds of miles of fiber optic communications connecting 95% of signals.
- Upgraded thousands of traffic signal controllers.

Benefits (last 25 years)

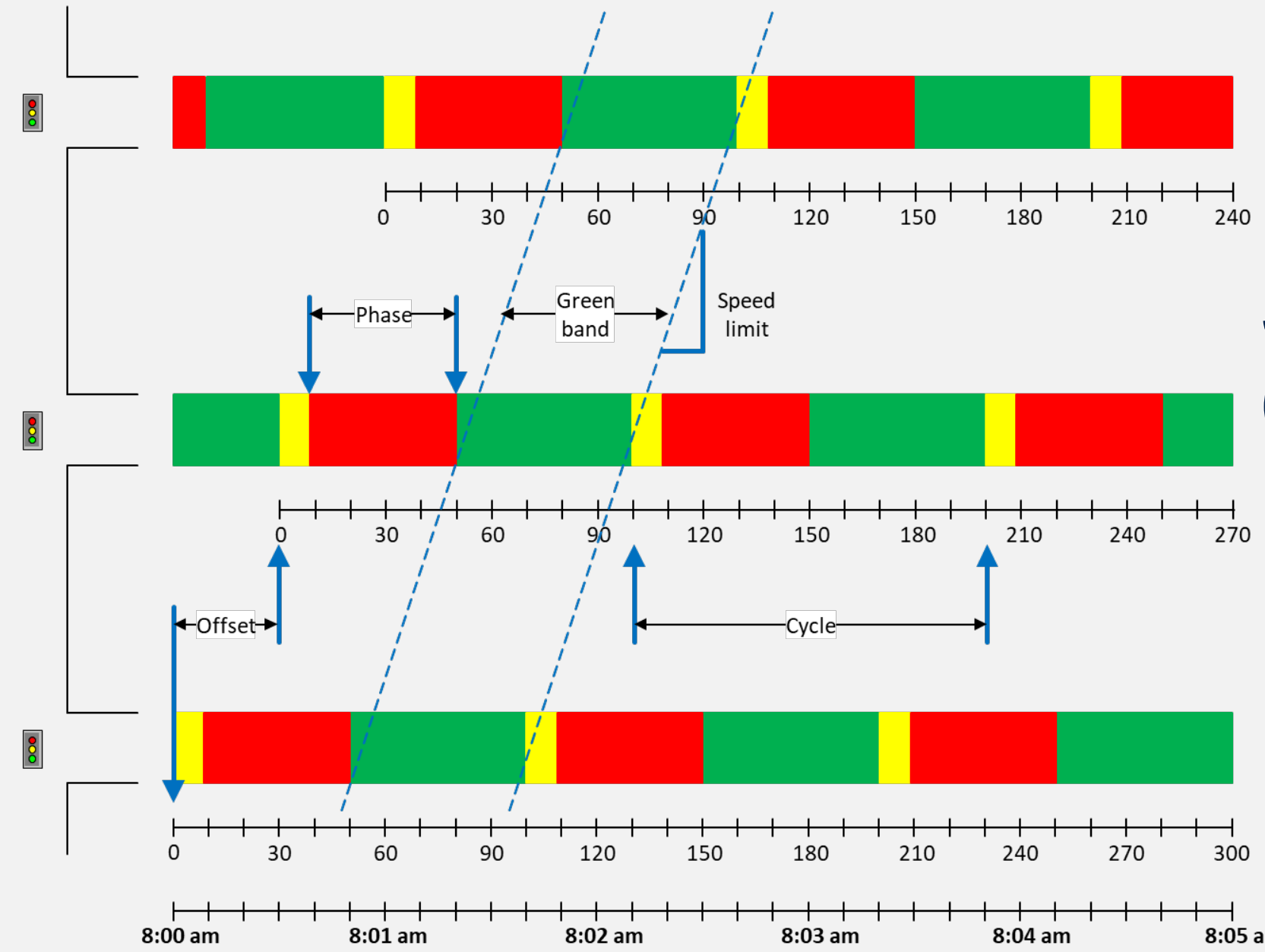
- Reported on 208 signal timing coordination projects:
 - > 25 million hours of delay (~ \$591 million).
 - > 15 million gallons of fuel consumption.
 - Over 6,000 tons of pollutants.
 - Over 116,000 tons of greenhouse gases.



Project Process and Reporting

- DRCOG staff coordinate signal timing plan development with jurisdictional staff.
 1. Define common cycle length.
 2. Determine phase timings.
 3. Establish offset for each intersection.
 4. Implement and optimize.
 5. Evaluate.

Phase



Signal Timing Coordination Fundamentals

Denver Regional Council of Governments

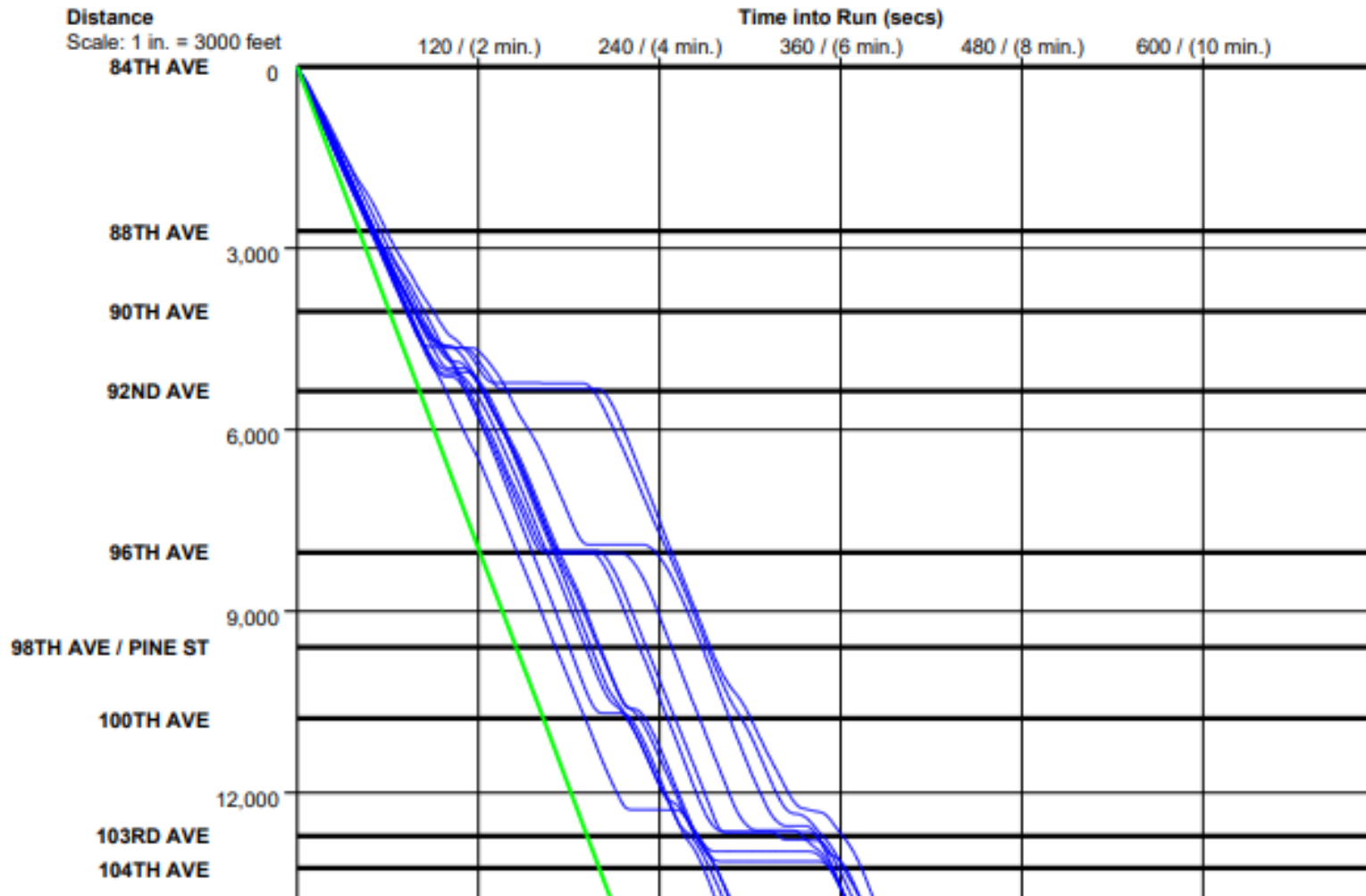
1001 17th St, Suite 700
Denver, CO 80202

Study Name : **FEDERAL_BEFORE_PM_NB**

Study Date : **2/13/2019**

Page No. : **4**

Time/Space Trajectories of All Runs



Corridor Travel Runs

Project Improvements

To account for variability of traveler volumes (vehicles, pedestrians and cyclists) throughout the day, three signal timing and coordination plans were implemented along the corridor based on time-of-day. Comparing data collected before and after implementation shows marked reduction in delay and the number of stops due to signal operations.

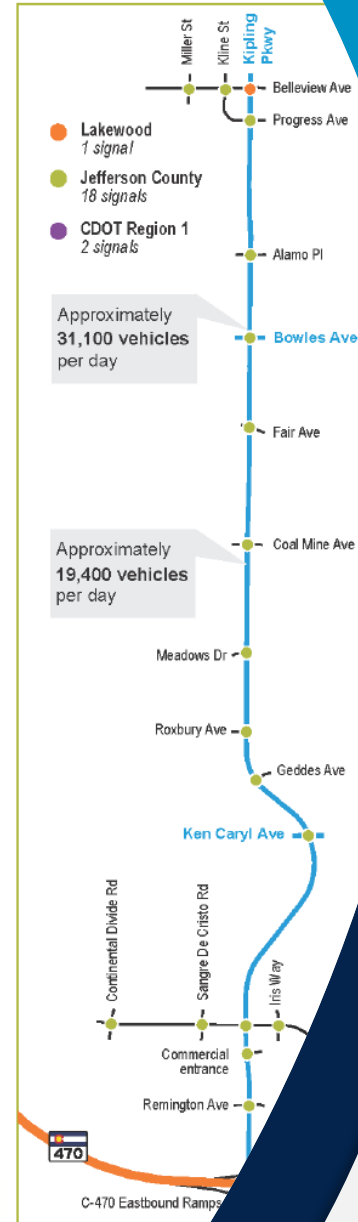
Time Period	Northbound Delay Reduction	Southbound Delay Reduction
6:00 - 9:00 a.m.	26%	18%
9:00 a.m. - 3:00 p.m.	28%	24%
3:00 - 7:00 p.m.	29%	29%

Time Period	Northbound Reduction in Stops	Southbound Reduction in Stops
6:00 - 9:00 a.m.	92%	67%
9:00 a.m. - 3:00 p.m.	77%	85%
3:00 - 7:00 p.m.	79%	84%

The operations improvements resulted in the following benefits.

Performance Measures	Annual Reduction
Intersection delay	239,000 hours
Fuel consumption	185,000 gallons
Time and fuel costs	\$7.9 million
Greenhouse gas emissions	1,800 tons
Pollutant emissions	20 tons

Project Scope



Signal Timing Briefs

- Project scope:
 - Location, roadway classification, signal ownership.
 - General project description.
- Benefits:
 - Reduction in stops and delay.
 - Reduction in fuel consumption.
 - Pollutant emissions reduction.
- Distribute in Board packet.
- Display on [web map](#).



Program Evolution

- Regional Transportation Operations and Technology Strategic Plan.
- Regional Transportation Operations and Technology set-aside.
- DRCOG to lead regional initiatives in partnership with select jurisdictions.

Thank you

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