How We Fixed a Roundabout to Match Driver Expectations

SH-82 & Maroon Creek Rd, Aspen

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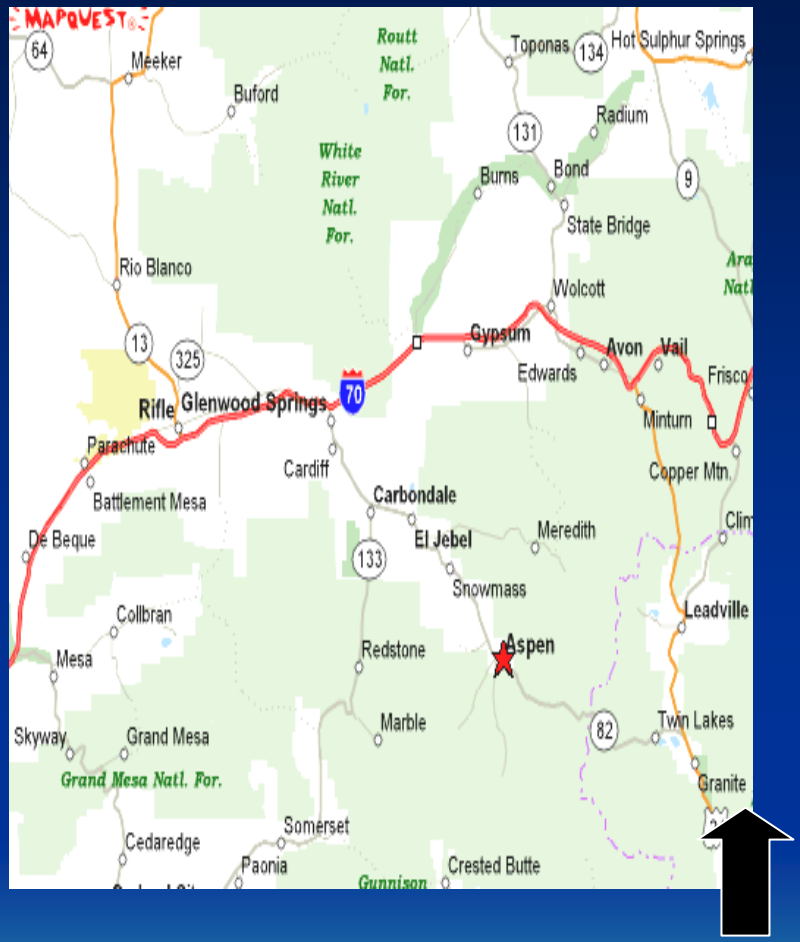
Colorado Dept of Transportation - Region 3 Traffic Section

Presentation Outline

- History & Previous Conditions
- Comments on Operational Problems
- Develop Possible Solutions
- Coordination with Stakeholders
- Implement & Assess Solution
- Results
- Lessons Learned

Project Location



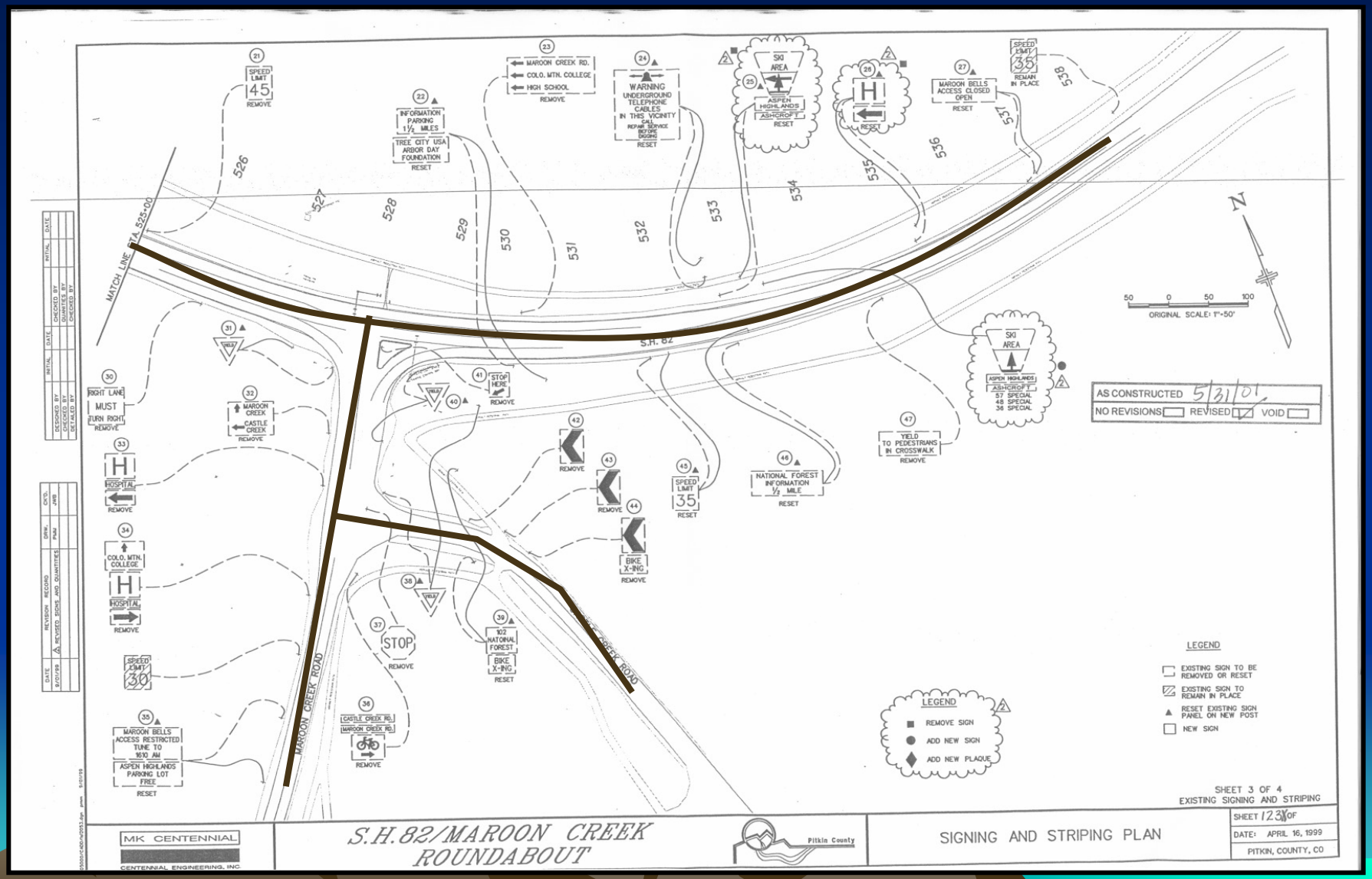
SH-82 & Maroon Creek Rd

Aspen

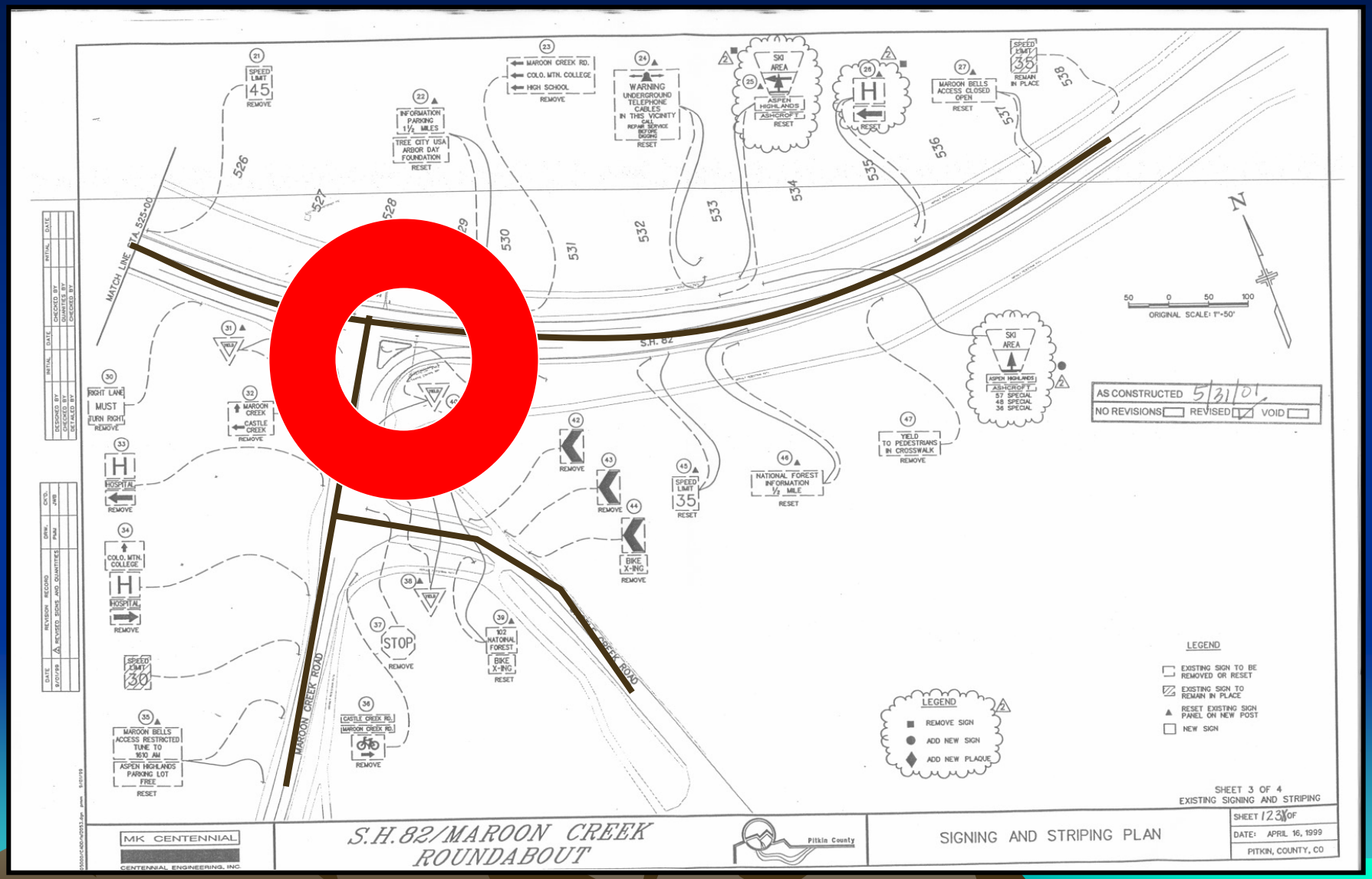
Colorado

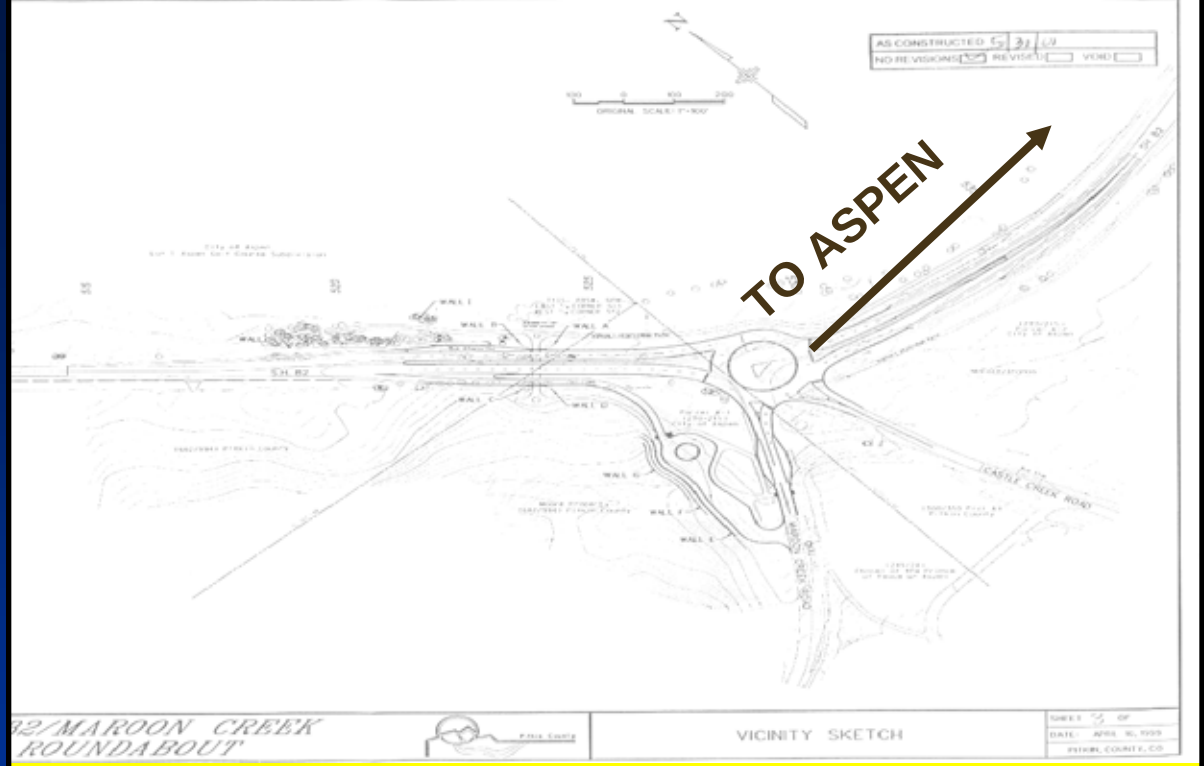
National Roundabout Conference 2005 DRAFT

Previous Conditions



Previous Conditions





Original Roundabout Design

Maroon Creek Project History

- **Design completed in 1999**
- Construction completed in 2001
- **Break-in period & growing driver discontent for two years**
- Public Comment started in winter of '03/'04
  - Citizen Phone Calls to CDOT & Governors Hotline
  - Pitkin County request to Region 3 Director
- **Evaluate Solutions in Summer & Fall 2004**
- Implement Solutions in Winter 2004
- **Evaluation continues into 2005**

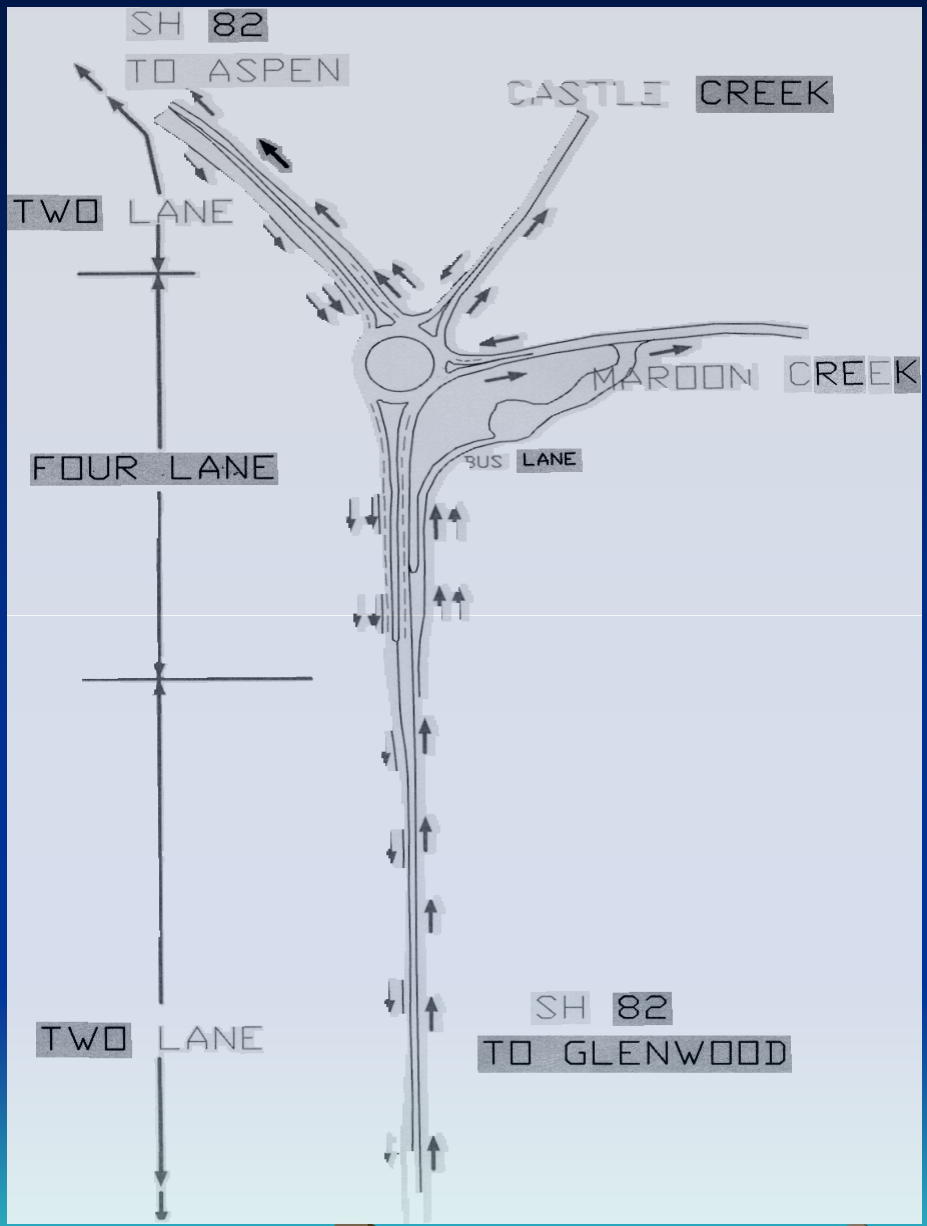
Problem Statement

- **System Level lane Imbalance**
  - There is only one lane in the "Upvalley" direction before and after the two lane roundabout
  - Therefore, there are no overall capacity benefits of the two lane roundabout under current traffic volumes
- **System Level Capacity Limitation**
  - Total Upvalley traffic flow is limited by the one lane capacity between the roundabout and Aspen
  - This merge point is located just 300 feet Upvalley from the roundabout and there is a traffic signal a few hundred feet past the merge point
  - Peak hour volumes exceeded the available one lane capacity and caused queuing and spillback through the roundabout and a substantial distance upstream of the roundabout

Driver Expectations

- **Driver Frustration about operations**
  - Perception by some drivers that outside lane of roundabout was legally a “right lane must turn right” lane (which was untrue)
  - This pitted the through-movement “waiters” in the inside lane against the through-movement “poachers” who used the outside lane and bypassed the waiters.
  - The eventual result was incidents of road rage at the second merge point during the am and pm rush hours.
  - Drivers asked a good question, “why do you allow us to use two lanes into the roundabout, then we have to merge to one lane again after the roundabout?”

Problem Illustration



Morning peak hour traffic backs into roundabout from two-lane Aspen direction

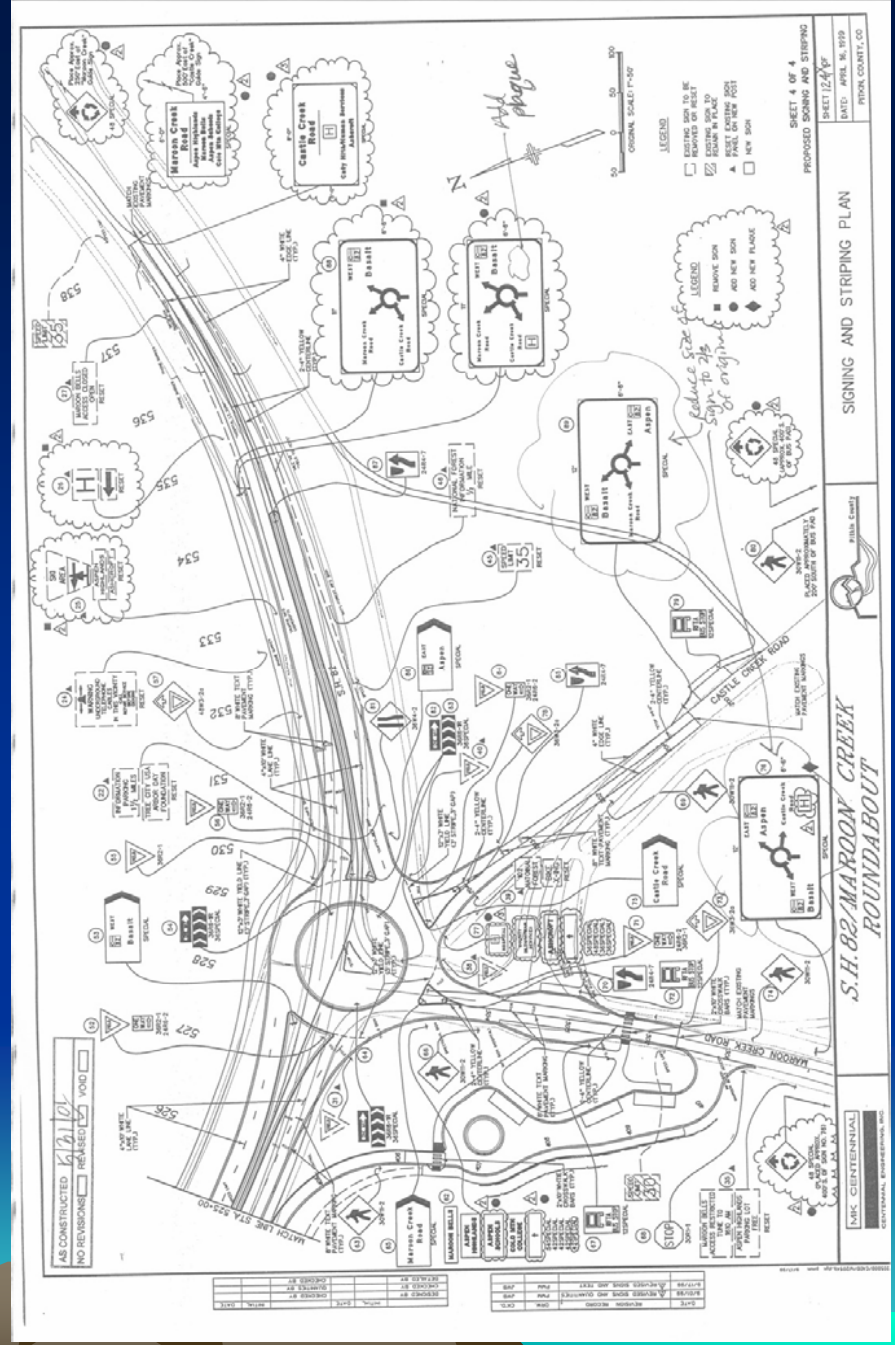
Roundabout "fills up" as cars attempt to use right lane for thru traffic to Aspen

Roundabout no longer has right turn capability for Maroon and Castle Creek exits

Circulating traffic is blocked

Original Sign Plan

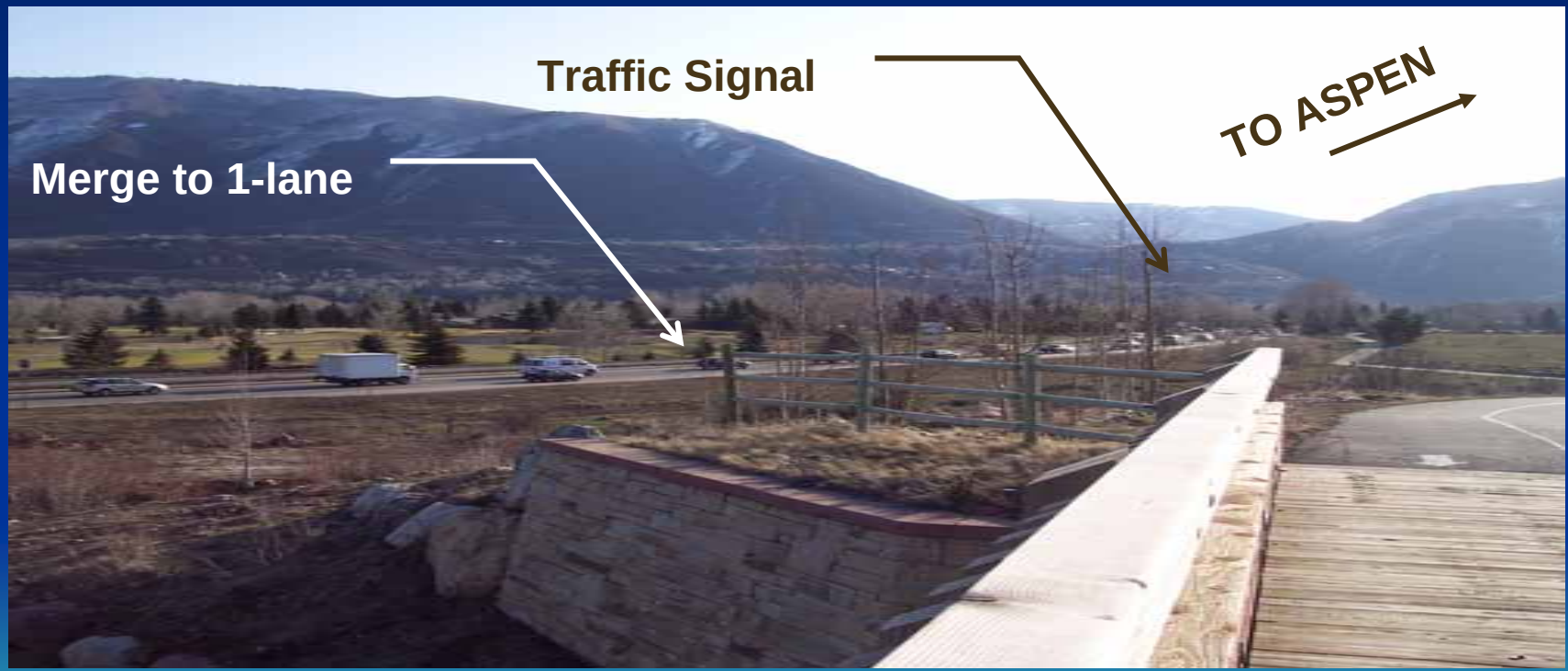
Signs are crowded & need consolidation



Aspen-bound traffic entering Roundabout

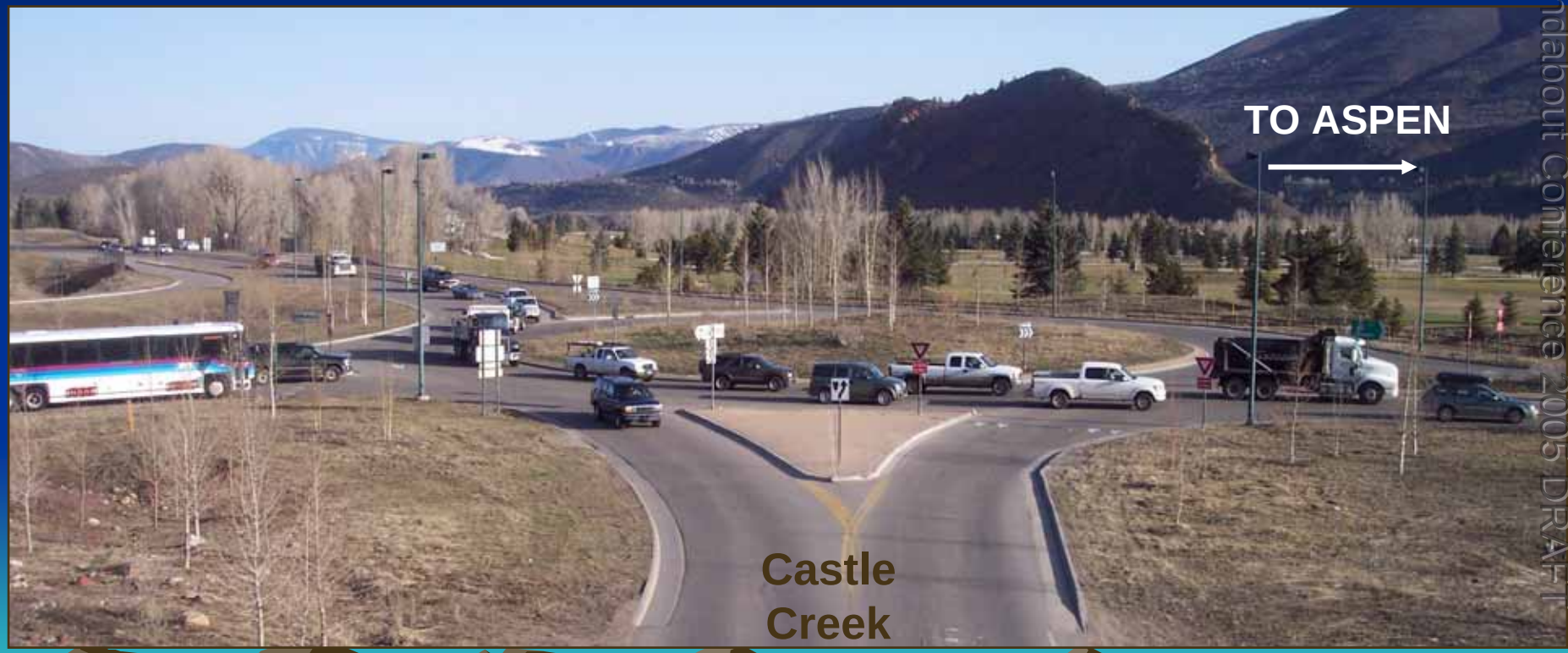
Source of Spillback

Aspen-bound Traffic Restrictions



Spillback Impact to Roundabout

Morning Peak gridlock



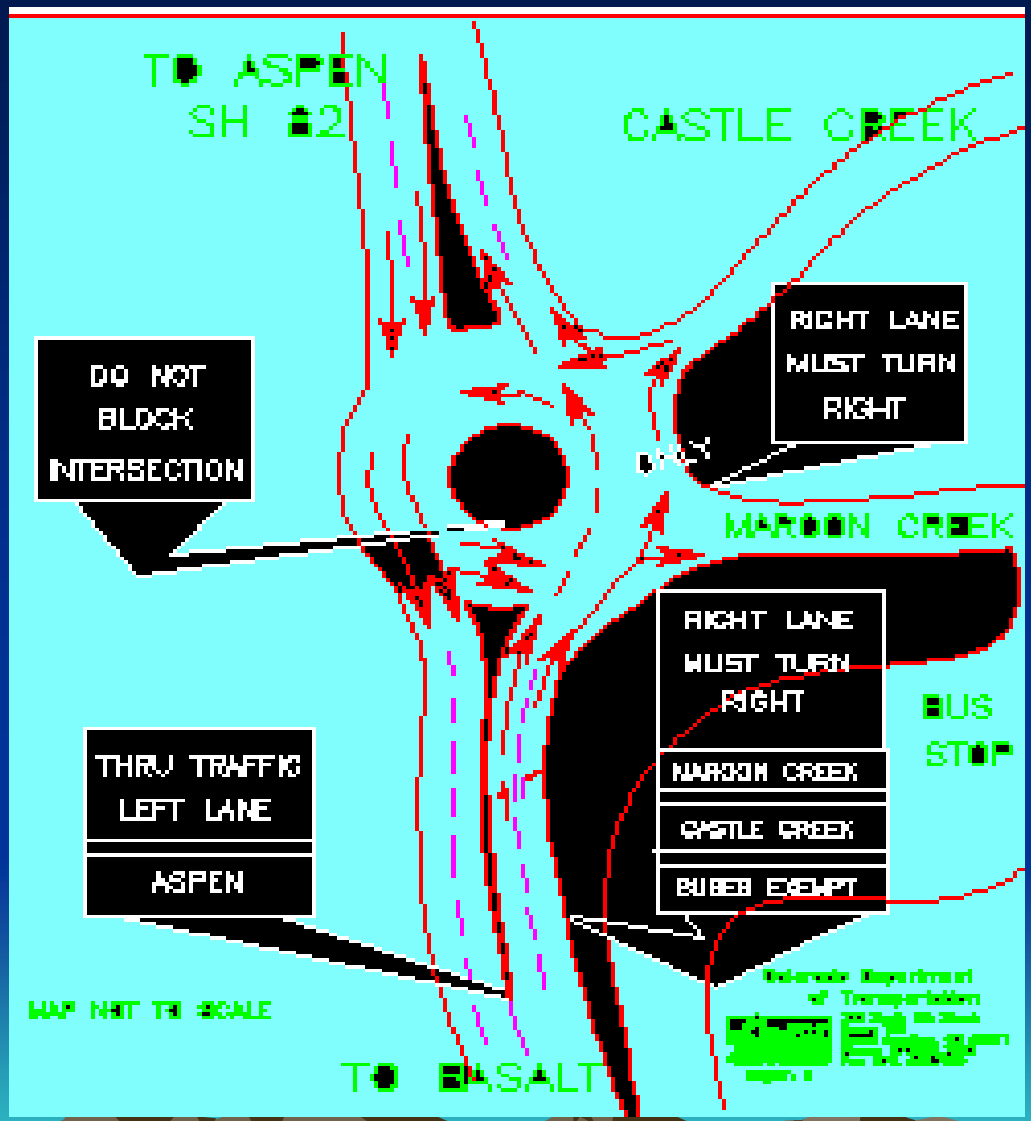
Development and Coordination of Solution

- CDOT met with Aspen and Pitkin County engineers, CDOT Maintenance, and other stakeholders
- We observed of peak hour traffic flow
- Conclusion - Intersection works well except for the morning peak hour
  - Goal #1: maintain smooth operations during non-peak periods
  - Goal #2: separate movements of through (Aspen) and right-turns (Castle Creek/Maroon Creek) into two dedicated lanes
  - Goal #3: Strive for high lane use compliance with signing and marking to open up right turn lane and eliminate blockage of circular flow

Implementation of Solution

- Sign Aspen-bound traffic to stay in Left Lane Only.
- Sign & place pavement markings for Maroon Creek and Castle Creek turning traffic to “Right Lane Only”.
- Sign to discourage Aspen-bound traffic from blocking the roundabout.
- Use radio and news to inform public.
- Maintain Bus traffic in right lane.

Signing Plan



Install 4 new signs

Right Arrow pavement marking at Castle Creek

Straight-Right Arrow at Maroon Creek

Right Lane Must Turn Right to Maroon and Castle Creeks

Thru Traffic Use Left Lane - Aspen

Performance Measures

- Prior to fix, many cars used roundie as two “thru” lanes to Aspen, as per original design intent
- After fix, goal is to separate Aspen Traffic from Right Turning traffic
- Expectation was 98% compliance or less than 5 veh/hr ‘cheating” to Aspen using Right Turn Only lane

Results of Solution

- 1 day after fix, approx 10 vph cheated. 3 days after fix, approx 3 vph cheated at am rush hour.

- Noticeable improvement of inadvertent blocking of roundabout, as drivers' expectations realized with dedicated lanes.

Summary of Lessons Learned

- **Designers should consider the context of the roundabout**
  - **Upstream and downstream constraints**
  - **Current volumes vs. future volumes**
- **Operations staff should listen to the intersection users and find source of problem**
- **Effective solutions involve stakeholder communication and some trial and error**
- **Continually monitor operations and adjust signing and pavement markings to optimize traffic flow and safety**

Questions & Answers

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