



Variable Speed Limits

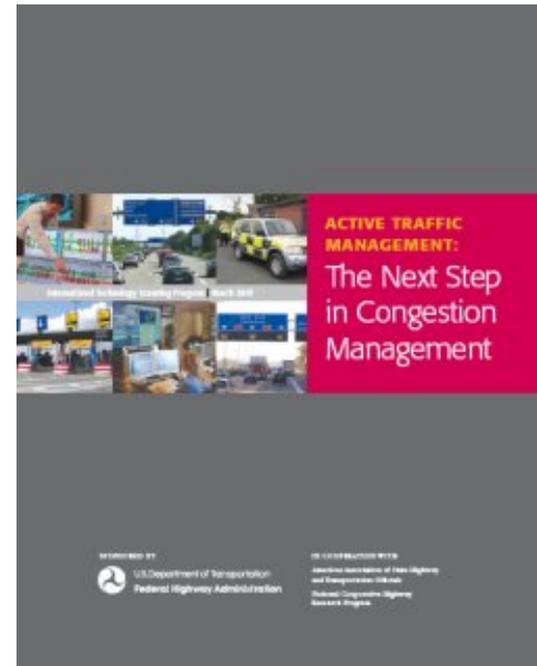
Dennis Mitchell
Transportation Engineering
Conference
September 2013



Active Traffic Management

System Management

- Speed Harmonization
- Temp Shoulder Use
- Managed Lanes
- Dynamic signing/routing
- Junction Control

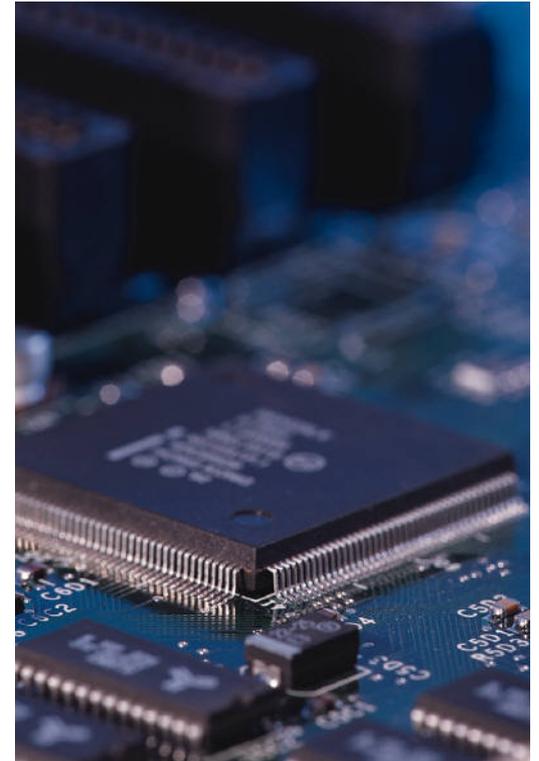




A Smart Transportation System

Three Key Trends

1. Our World is becoming Instrumented
2. Our World is becoming interconnected
3. All things are becoming intelligent



Source: "A Smart Transportation System: Improving Mobility for the 21st Century, Samuel J. Palmisano, ITS America Annual Meeting, Houston, TX, May 5, 2010



Challenges to the System

- Underinvestment
- Population Growth
- Urbanization
- Globalization

The U.S. spends at most **2.6%** of GDP on infrastructure—27th among 36 OECD nations. Compare that to China, which invests at a rate of **9% to 12%** of its GDP.

Source: “A Smart Transportation System: Improving Mobility for the 21st Century,” Samuel J. Palmisano, ITS America Annual Meeting, Houston, TX, May 5, 2010



ATM in Europe



Netherlands



Germany



Active Traffic Management in the UK





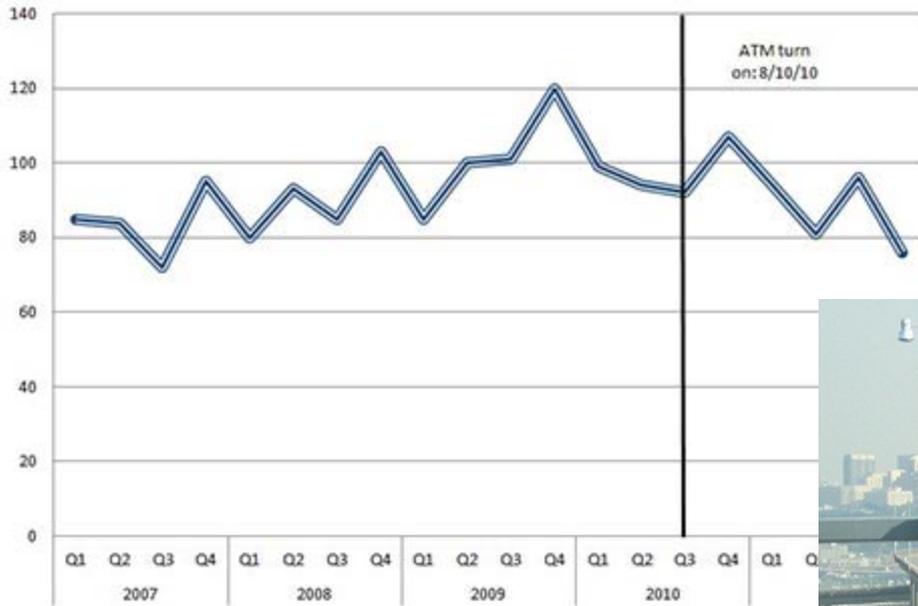
Reported Benefits

- Increase average congested period throughput – 3% to 7%
- Increase overall capacity – 3% to 22%
- Decrease primary incidents – 3% to 30%
- Decrease secondary incidents – 40% to 50%
- Harmonization of speeds during congested periods
- Decreased headways and more uniform driver behavior
- Increase in trip reliability
- Delay the onset of freeway breakdown



Washington ATM System

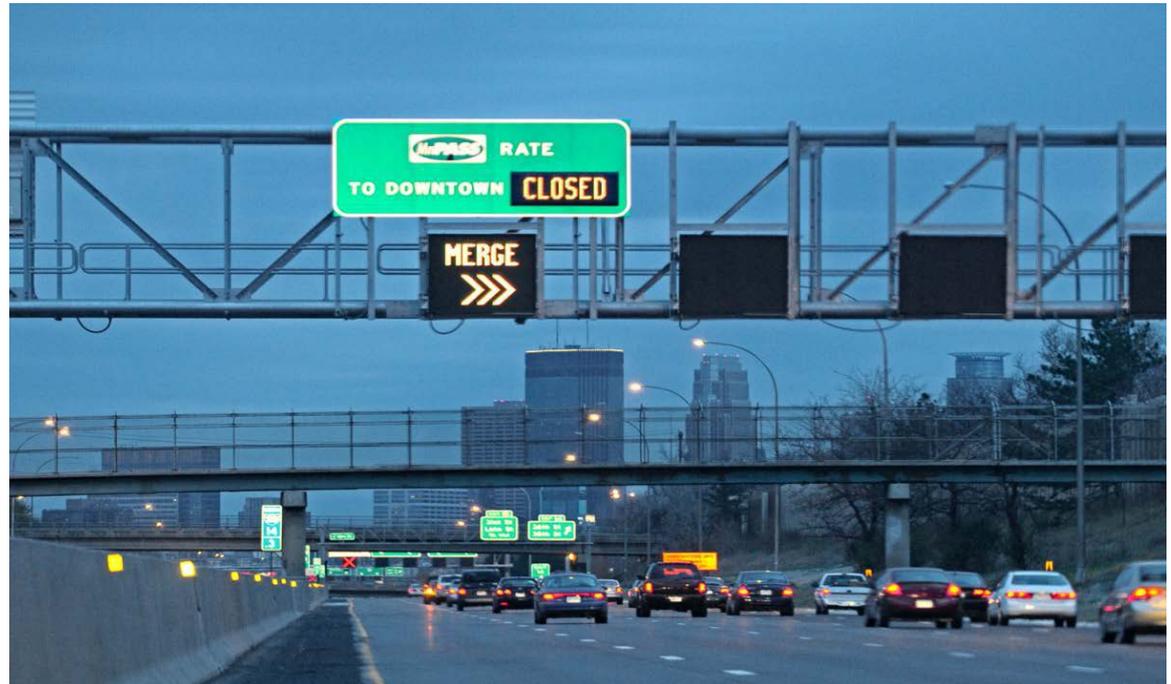
Collisions within the I-5 NB ATM Corridor 5am-8pm





Minnesota

- Variable Advisory speed
- Priced Dynamic Shoulder Lane





Staley's Junction

- Variable Speed Limit
- Rural non-freeway
- Interim Project

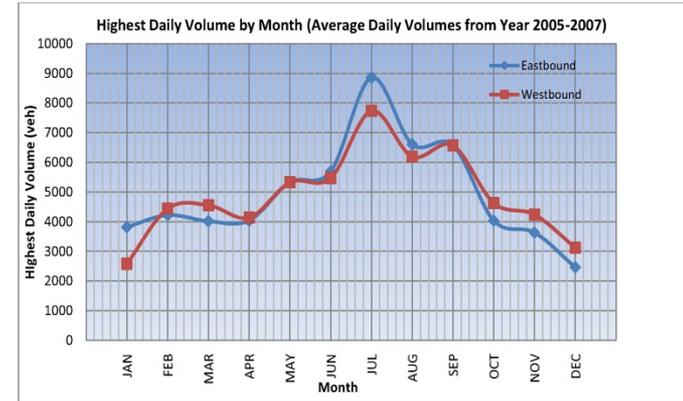


1/28/2010 Hwy 047 (1) Sunset MP 45.475 US 26



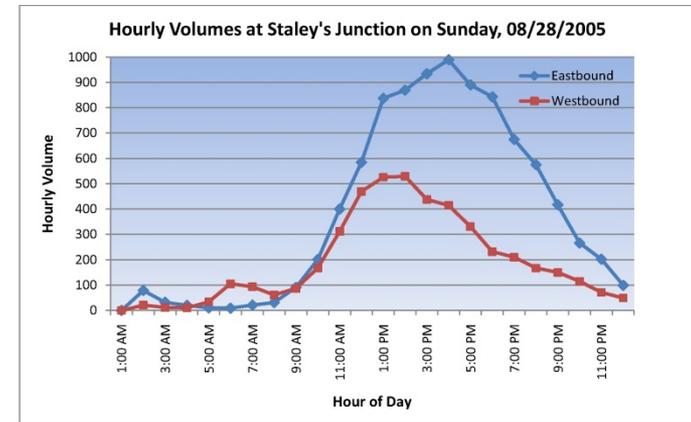
Staley's Junction

- Two lane, two-way rural location through intersection
- Safety and delay for left turns from side streets
- Long delays from recreation traffic



Source: Data from ODOT Automated Traffic Recorder # 34-005, located at Timber Junction on US 26.

Figure 4: Monthly Variation of Peak Traffic on Mainline US 26



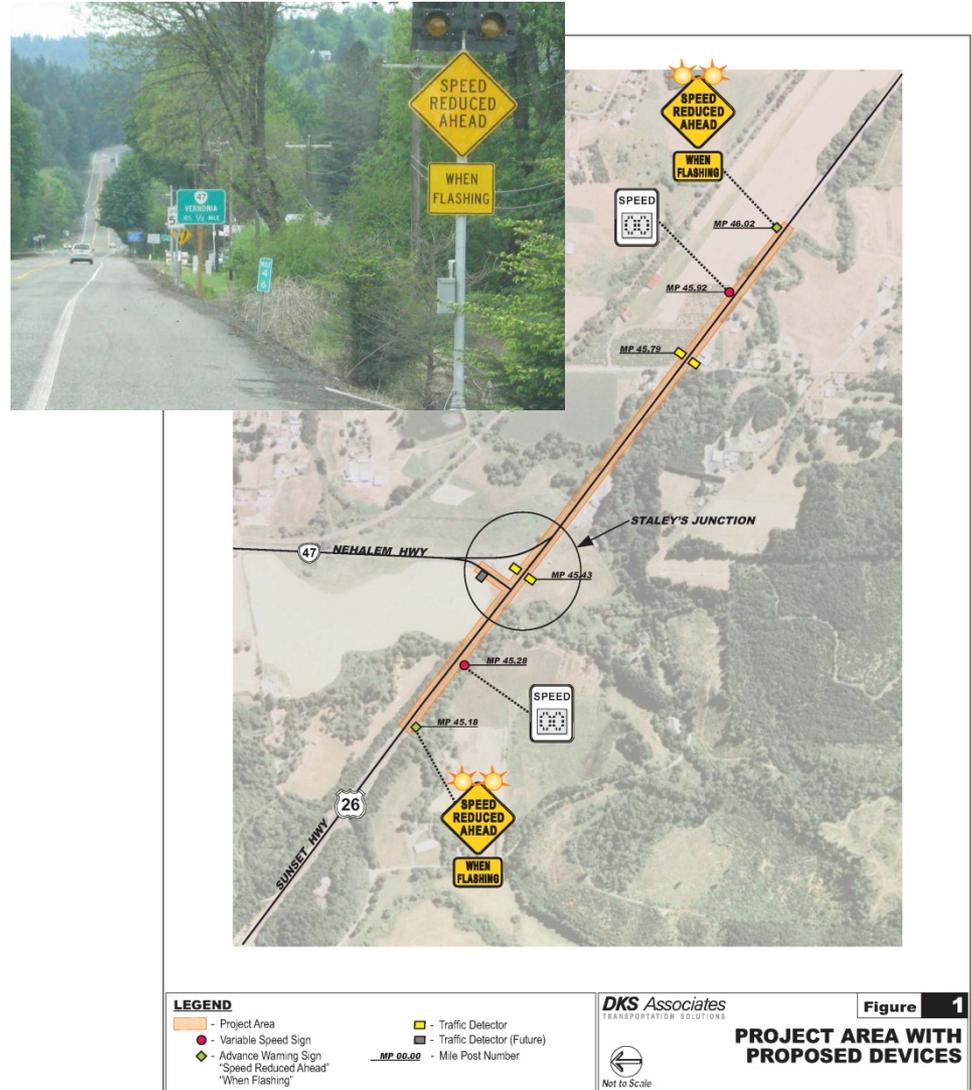
Source: Data from ODOT 24-hour count conducted on Sunday August 28, 2005, at Staley's Junction

Figure 5: 24-Hour EB and WB Hourly Volumes



Staley's

- Variable Speed Signs
- Warning Signs
- Detection
- Cameras
- Battery Backup
- Re-stripe median





System Performance

- Lower speeds both average and 85th %
- Less side street delay & shorter queues
- No complaints

TABLE 7								
STALEY'S JCT. VSL ANALYSIS BY POSTED SPEED SUMMARY								
June 12 & July 24, 2011								
	Vehicles	Posted Speed	Average Speed	85% Speed	Percent Exceeding	Pace Limits	Percent In Pace	Maximum Speed
AVERAGES	231	50 MPH	47	52	>50=23%	43-53	82%	58
AVERAGES	217	45 MPH	44	48	>45=45%	39-49	81%	56
AVERAGES	282	40 MPH	35	41	>40=27%	32-42	75%	50
AVERAGES	278	35 MPH	31	37	>35=31%	26-36	68%	46
AVERAGES	316	30 MPH	23	29	>30=10%	20-30	66%	38



ATIM

I-5 / I-405 SB

Variable Advisory Speed System

- Significant merging/weaving
- Recurring congestion
- Top 5% SPIS Site
- 65% rear-end accidents
- 47% occur 3 to 7 pm





I-5





I-405



9/15/2009 Hwy 061 (2) Stadium Freeway MP 0.650 I-405



9/15/2009 Hwy 061 (2) Stadium Freeway MP 0.385 I-405



9/15/2009 Hwy 061 (2) Stadium Freeway MP 0.740 I-405

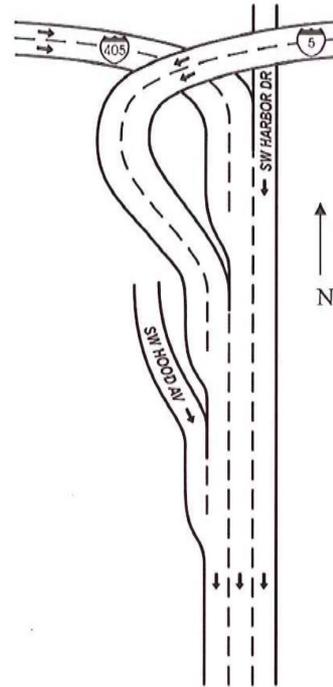


9/15/2009 Hwy 061 (2) Stadium Freeway MP 0.625 I-405



Issues

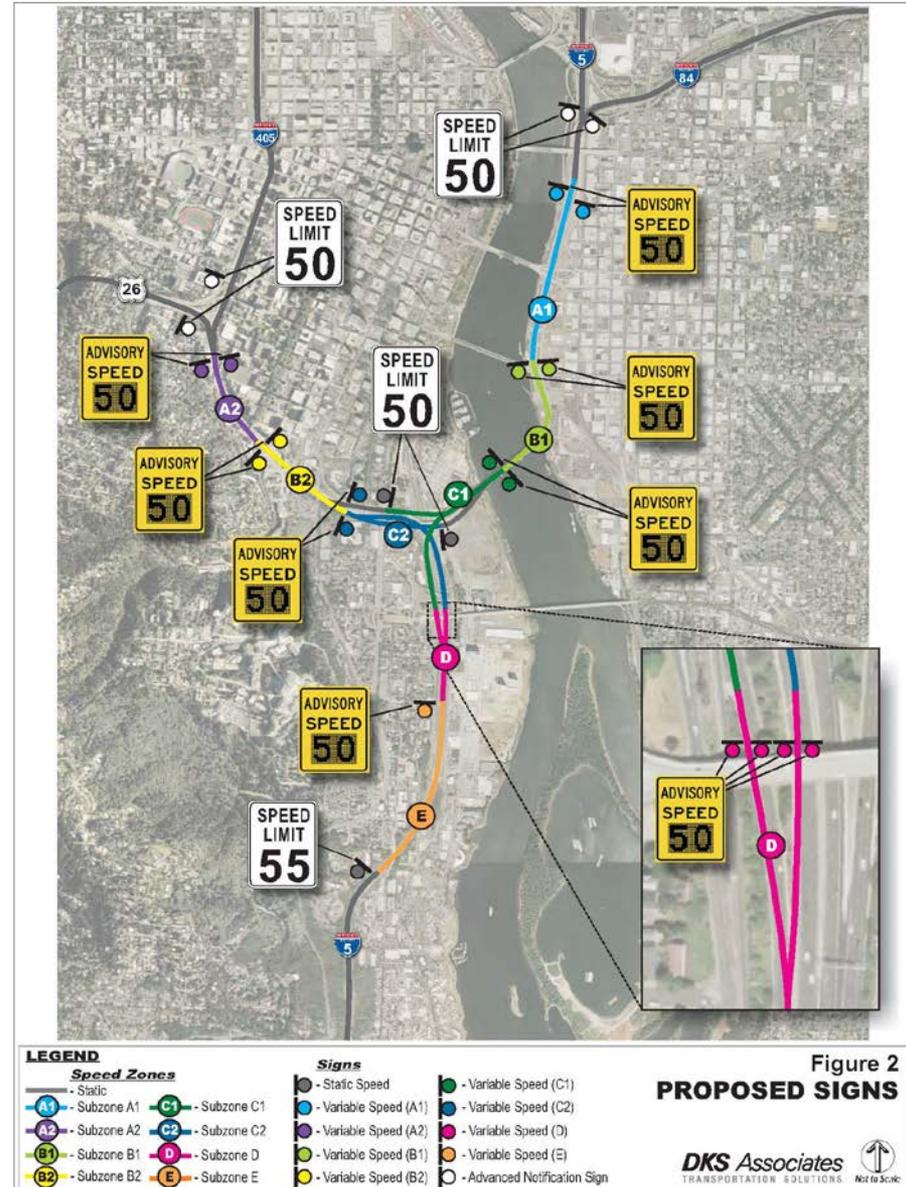
- Oregon Administrative Rule
- Enforcement
- Complexity of system





I-5 / I-405

- Multiple zones





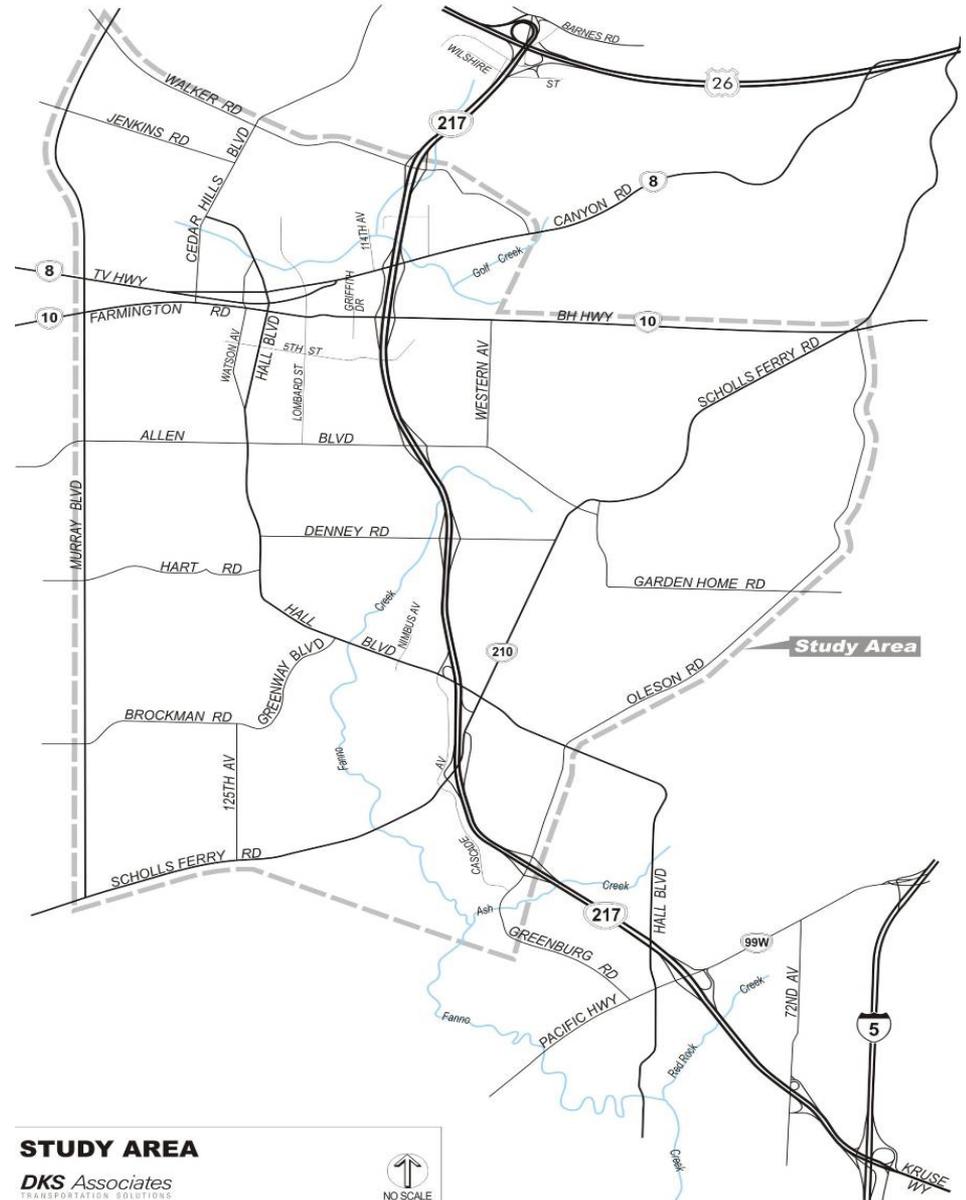
I-405 at Broadway





ORE 217

- Variable Advisory Speed System
- Part of ATM System



STUDY AREA

DKS Associates
TRANSPORTATION SOLUTIONS

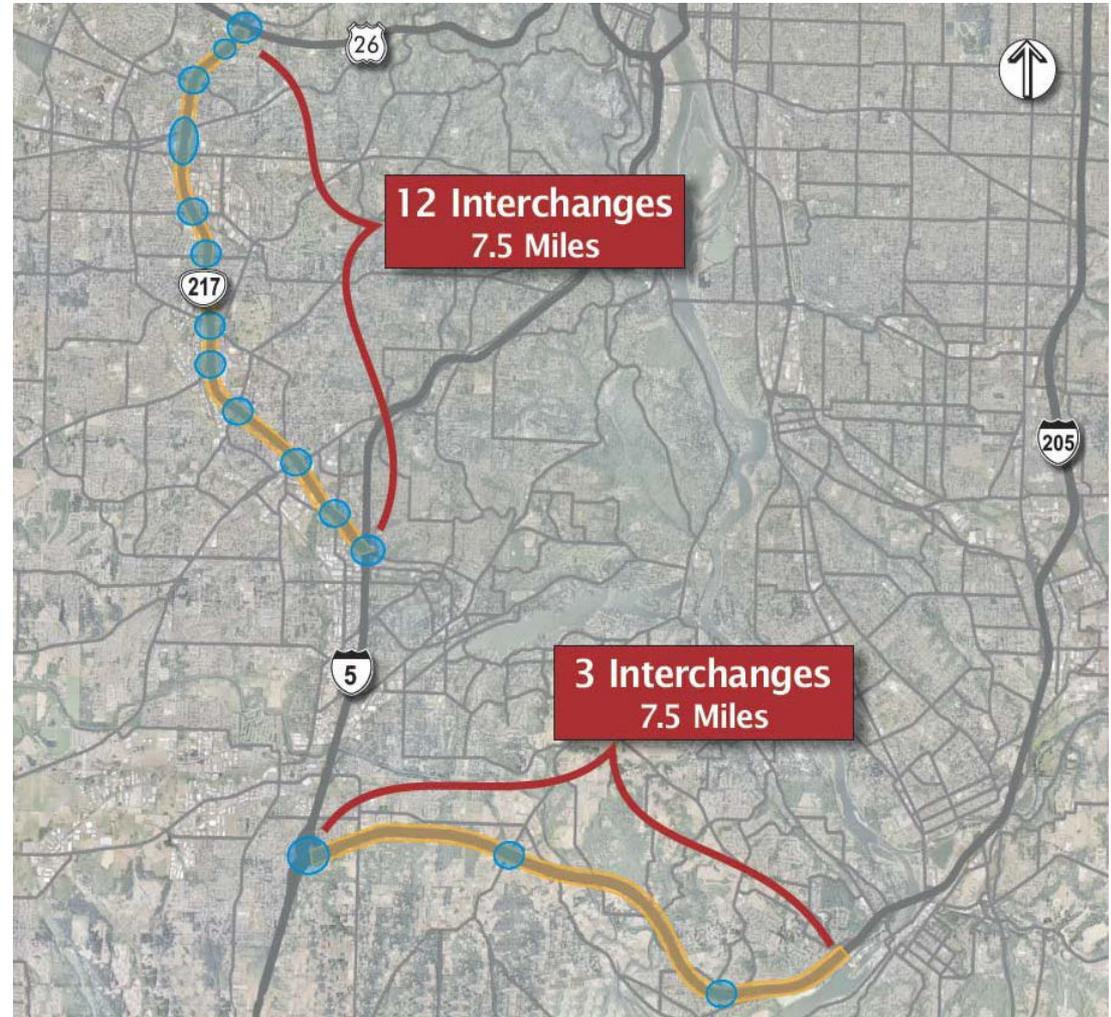


NO SCALE



ORE 217

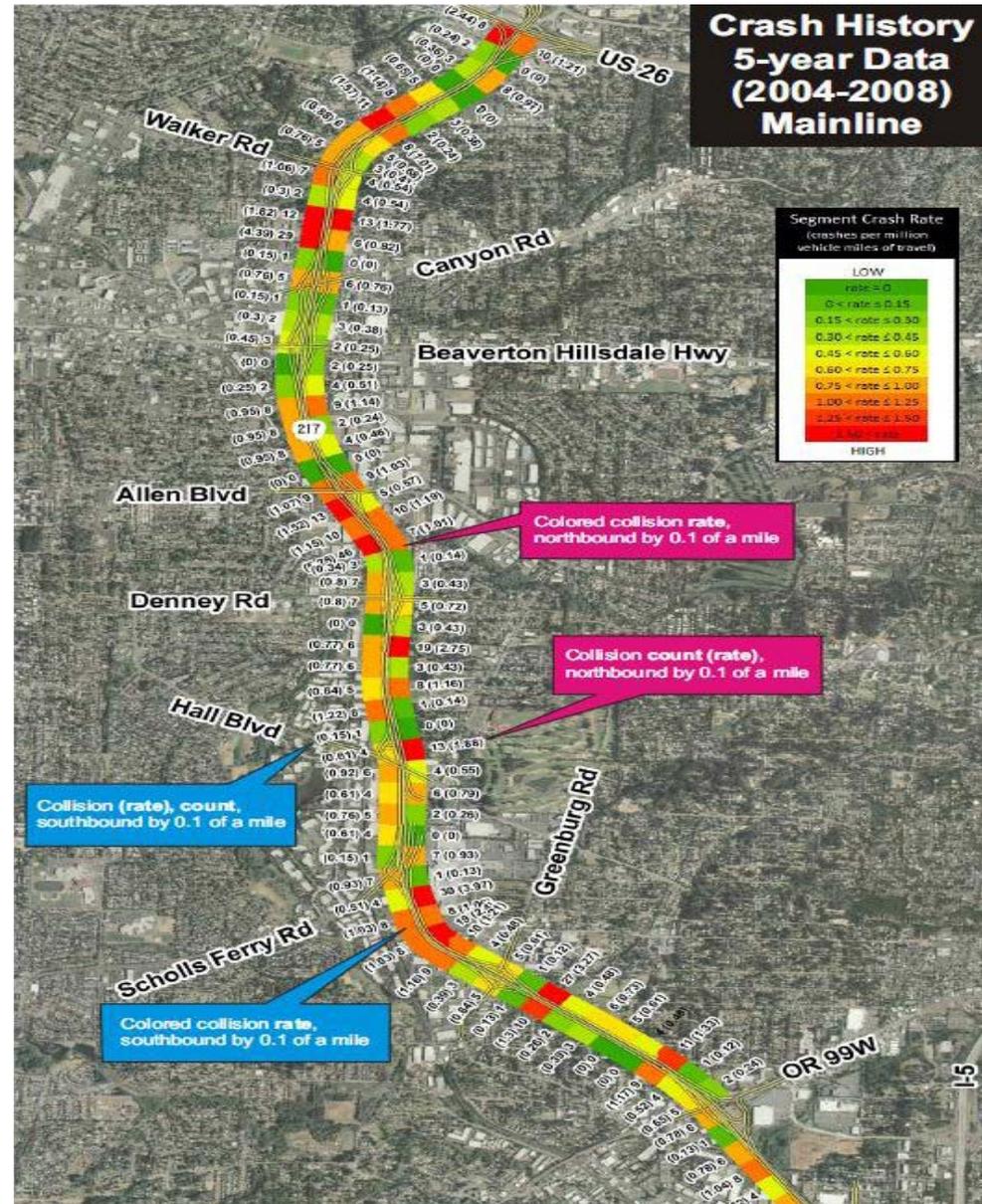
- Closely spaced interchanges





ORE 217

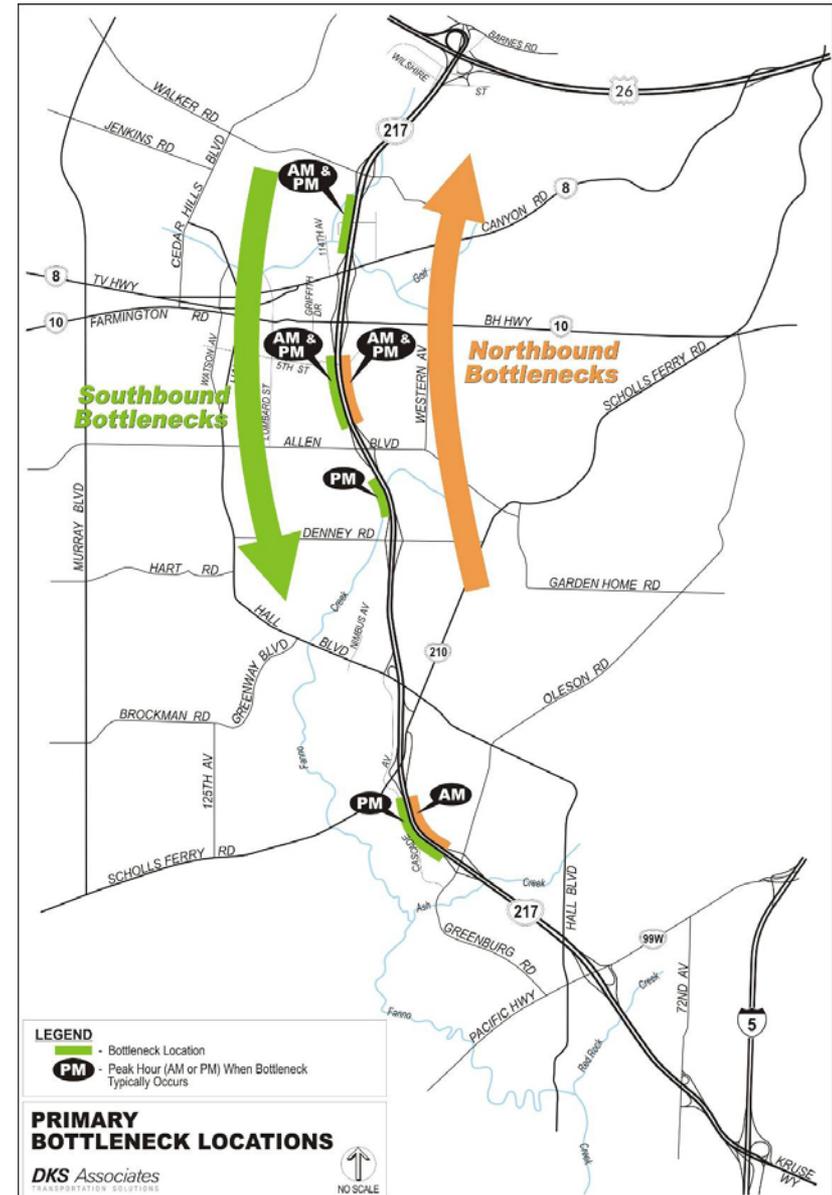
- 200 crashes per year
- Crash every other day
- 70% rear-end crashes





ORE 217

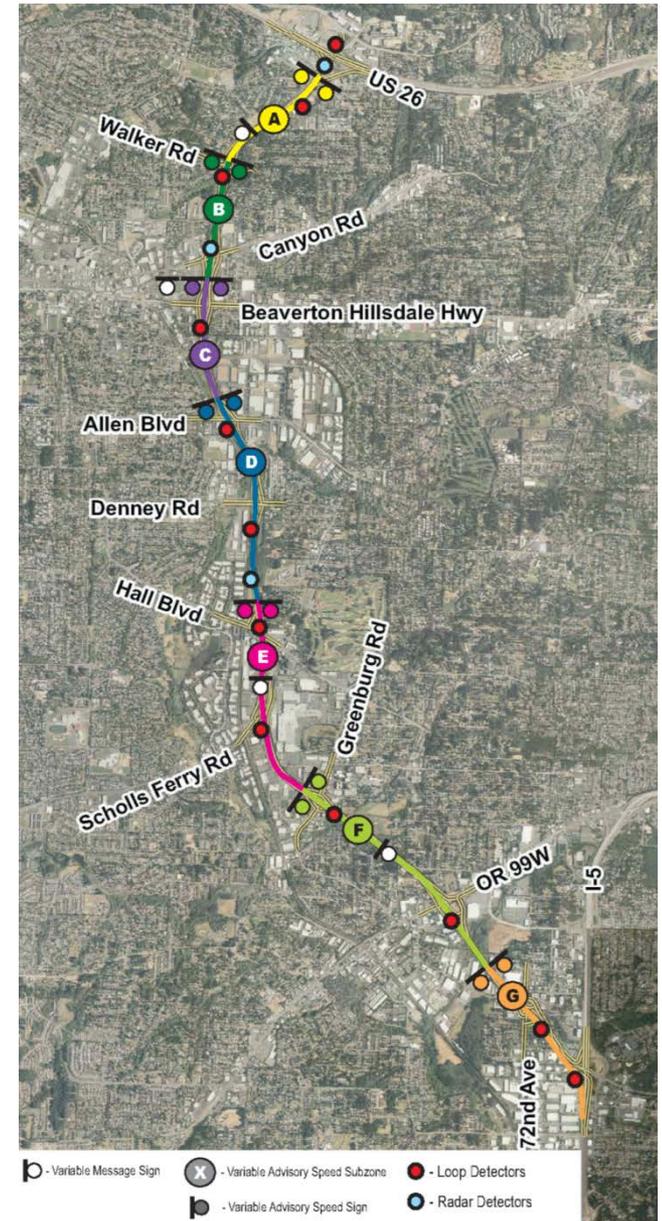
- Queues form and extend back from bottlenecks
- Secondary crashes





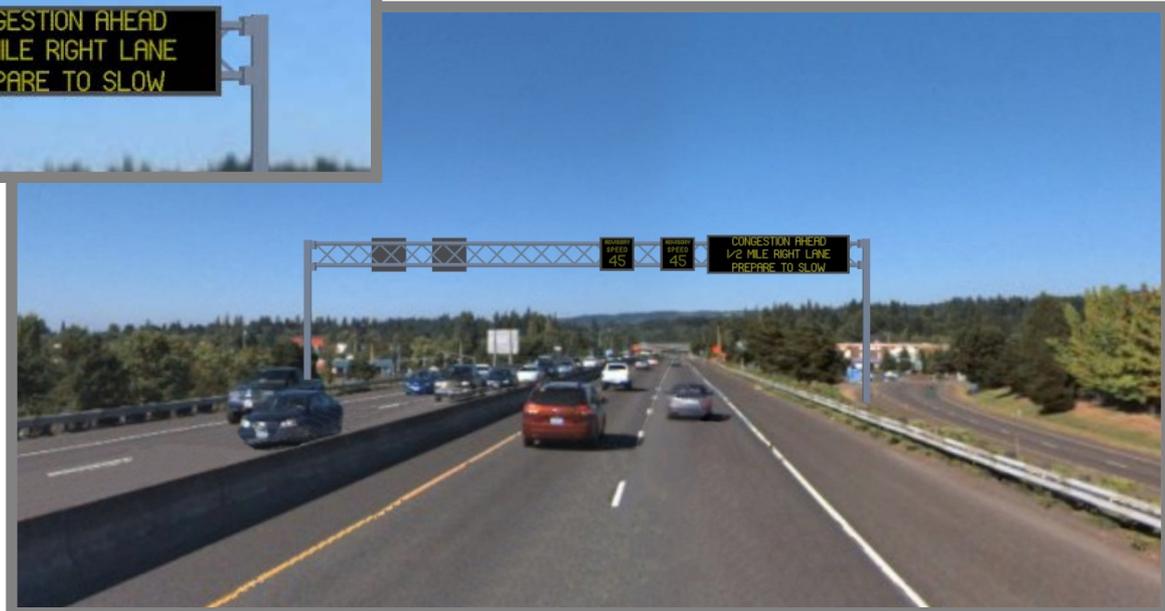
ORE 217 ATM

- Variable Advisory Speed
- Travel Time
- Queue Warning
- Curve Warning System
- Updated Adaptive Ramp Metering
- Full matrix, high resolution, color VMS





ORE 217





Mt Hood





Mt Hood

- US26 & ORE35
Variable Speed
Limit
- Federal Grant
- Recreational route
 - Through traffic in
summer to central
Oregon
 - Skiing on Mt. Hood
in winter





Mt Hood

- VSL triggered by congestion and/or weather





Mt Hood

- Warning based on weather





Mt Hood

- Advisory based on weather





Software

