North/West Passage
Work Zone Management Practices for I-90/I-94

Project Webinar

April 26, 2017

TODAY'S WEBINAR WILL BE RECORDED

Agenda

1. Introductions
2. North/West Passage Overview and Project Purpose
3. Summary of North/West Passage State Work Zone Management Practices

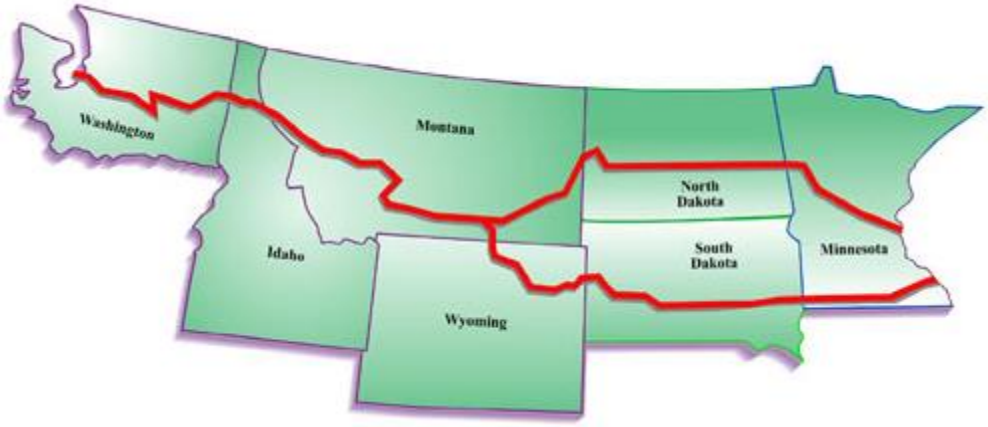
   Presenter: Tina Roelofs, Athey Creek
4. Minnesota DOT I-94 IWZ Experience

   Presenter: Tom Dumont, MnDOT
5. Iowa DOT IWZ Contracting and Experiences

   Presenter: Tim Simodynes, Iowa DOT
6. Focused Discussion on North/West Passage Work Zone Management Topics

North/West Passage Overview

- North/West Passage has been a Transportation Pooled Fund since 2003
- Members
  - 7 States from Washington to Minnesota along I-90 and I-94



North/West Passage Overview

- States share common challenges
  - Commercial and recreational travel corridor
  - Extreme weather conditions
  - Road closures and transportation management
- North/West Passage vision is to develop effective **methods for sharing, coordinating, and integrating** traveler information and operational activities across borders

Project Background

- From 2010-2014, there were 42 fatal crashes in work zones on Interstate routes within the North/West Passage states
- Work zone management practices continue to evolve, particularly those involving the use of technology
- Effective work zone management improves both safety and mobility for travelers

Project Purpose

Identify work zone management practices (including technology used in work zones) that are being used among the NWP states for road work projects that significantly impact travel along the I-90/I-94 Corridor.

Project Approach

- Review and summarize national information and resources on work zone management practices
- Interview North/West Passage states
- Conduct a webinar to highlight work zone practices
- Develop a Final report

Summary of North/West Passage State Work Zone Management Practices

Presenter: Tina Roelofs, Athey Creek

North/West Passage Interviews

- **Idaho Transportation Department**
  Justin Wuest
- **Montana DOT**
  Mike Miller and Jim Wingerter
- **North Dakota DOT**
  Brandon Beise, Doug Schumaker, and Travis Lutman
- **Minnesota DOT**
  Adam Wellner and Jeff Rieder, District 6
  Tom Dumont, District 3
- **South Dakota DOT**
  Christina Bennett
- **Washington State DOT**
  Steve Haapala

Purpose of Interviews

- What WZ management practices have been used on I-90/I-94 (and other interstates)?
- What Intelligent Work Zone (IWZ)/Technology applications have been used?

Idaho Highlights

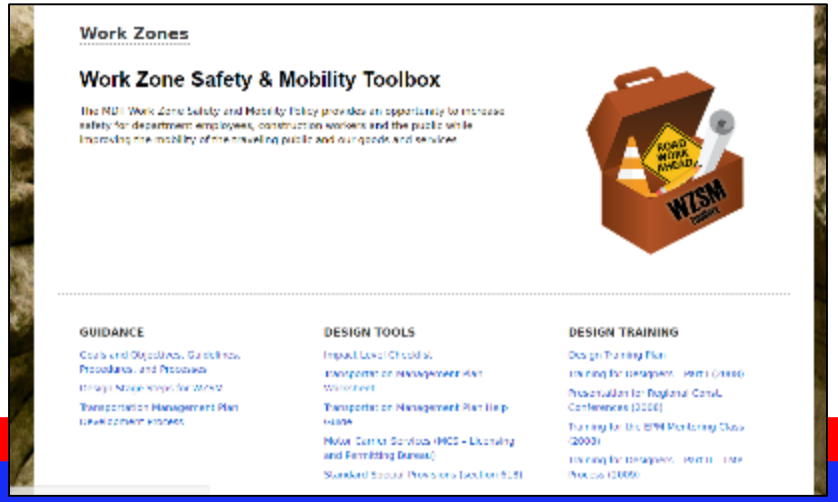
- IWZ/Technology Applications
  - Speed Detection Signs to slow down traffic through work zones
  - Installed WiFi detectors at the top of Lookout Pass on the Idaho-Montana line to observe vehicle travel times to internally discuss modifications
- Lookout Pass has many cyclists who were restricted from crossing during construction so ITD shuttled cyclists through the work zone since there was no good detour for them

Idaho Highlights

- I-90 from Washington to Coeur d'Alene
  - Heavily traveled
  - Typically complete work at night to minimize delay
  - Full reconstruction project - Summer 2017
    - Work can't all be completed at night
    - Considering:
      - Crossovers to prevent long queues
      - Incorporate technology (e.g. communication to VMS)

Montana Highlights

- Work Zone Practices
  - Completes most construction projects and highway maintenance during daylight hours
  - Work Zone Safety and Mobility Toolbox
    - Provides guidance, design tools, design training and construction tools



Montana Highlights

- IWZ/Technology Applications
  - Arrow boards for maintenance (mandatory)
  - LED lights on the outside edge flagger signs
  - Tried intrusion alarms on cones but found construction zone noise prevented alarms from being heard
  - Portable VMS to alert motorists of lane closures
  - Speed message board to alert motorists they are entering work zone too fast
  - Starting to implement the zipper merge

Montana Highlights

- Steel Bridge Rehab Project: Northbound I-15 over the Missouri River
  - Reduced speed from 70 mph to 35 mph
  - Technology
    - Portable arrow boards
    - CMS
    - Speed display
      - Increased driver compliance

Approach Speed Display

Slow Down Display

North Dakota Highlights

Work Zone Practices

- Handbook
  - Standard layouts for short term work (maintenance)
  - Standard general traffic management practices
- Typically work is complete during the day

North Dakota Highlights

IWZ/Technology Applications

- Used BlueTOAD to provide website of current and historic travel times of a project in Fargo
- Explored using dynamic merge and queue warning but benefit/cost prohibits until technology costs decrease further
- Considering using smart cones and currently working with a vendor to get vibrating wrist bands for workers
- Portable DMS signs may be used in work zones when available

Minnesota Highlights

I-90 Work Zone Practices

- Lowest volume expressway in southeastern district
- Plenty of capacity even with lane closures
- Use static signing for zipper merge on I-90
- In the process of developing a Lane Closure Manual for smaller volumes of traffic (similar to the manual used in the Twin Cities area)

Minnesota Highlights

I-35 and US 52

- Higher volume roadways
- Dynamic speed limits
  - Only activated when vehicles were within a certain distance of a work crew.
- Queue warning system
- Dynamic zipper merge
- Established alternate route with permanent signing for I-35 to use during emergencies, construction and maintenance
  - Alternate route has also been identified for I-90 to address bridge crossings (won't permanently sign, but shared with law enforcement, local road authorities etc. for pre-established detours)

Washington Highlights

- Work Zone Practices
  - Median crossovers
  - Avoid work zones during peak hours, complete work at night
  - Maintain full lanes during peak hours
  - Design Manual

Washington Highlights

- IWZ/Technology Applications
  - Variable speed limits
  - Queue warning system
    - Shadow vehicle with a VMS to alert motorists in advance of slow or stopped traffic
  - More IWZ used around Seattle area

South Dakota Highlights

- Work Zone Practices
  - Restrict lane closures along interstates to 3 miles
- IWZ/Technology Applications
  - Interested in radar speed and motorist feedback board to encourage drivers to slow down
  - Interested in Smart Cones to track vehicle speeds to determine if extra law enforcement is needed

South Dakota Highlights

- Sturgis Rally
  - Avoid construction and maintenance in the area during the Rally
  - Last year there were high traffic volumes on the interstate causing stopped traffic
    - Used queue detection system to warn motorists

Summary

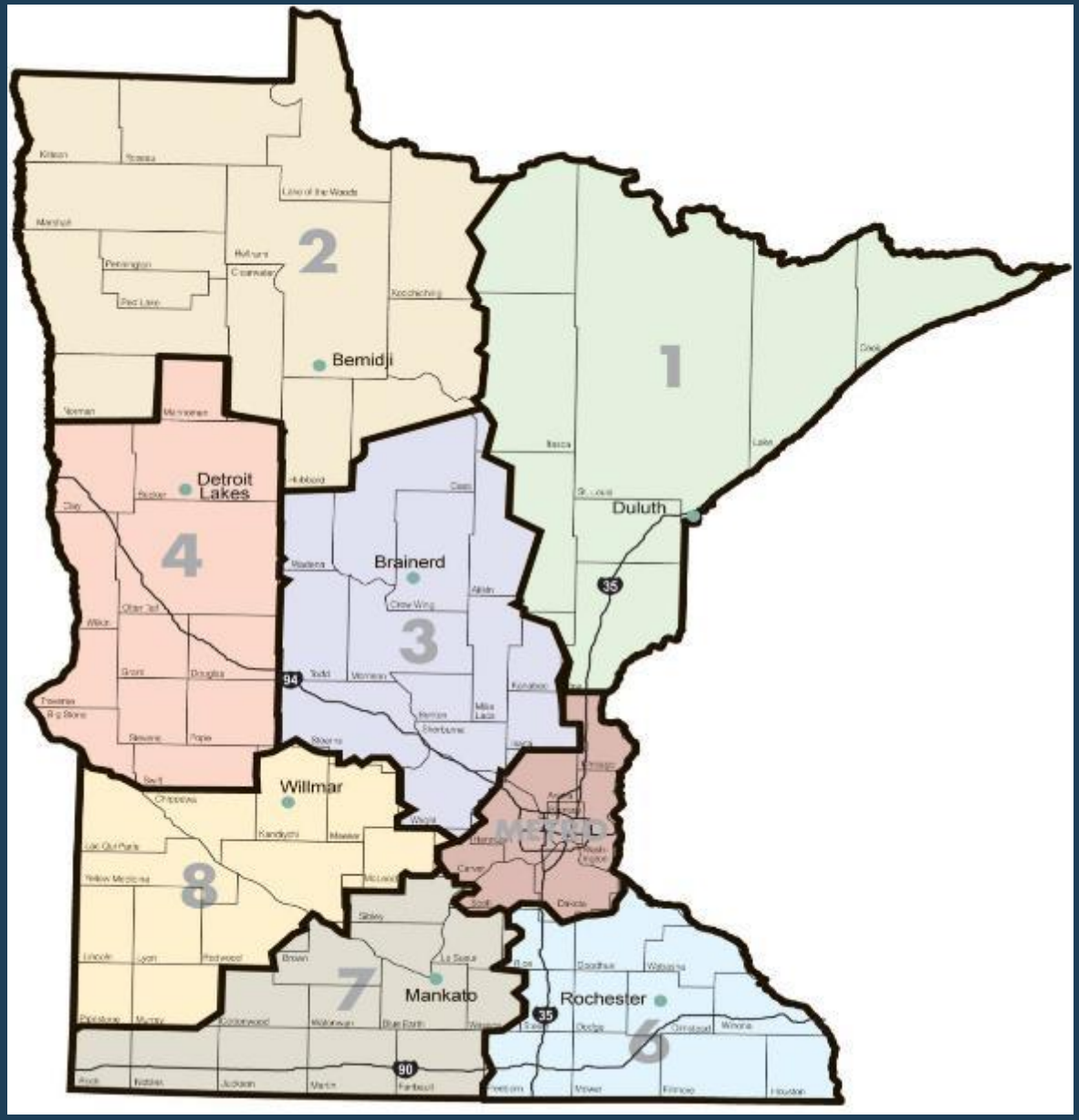
- NWP states are using IWZ/Technology in work zones
- Lower volumes in rural areas may not warrant some applications
- However, DOTs are willing to use IWZ/ technology if it is cost effective

Minnesota DOT I-94
Intelligent Work Zone Experience

Presenter: Tom Dumont, MnDOT

District 3

- 12 Counties
- Central Minnesota
- I-94 - 90 miles
- Baxter – headquarters
- St. Cloud – sub area



Traffic Control Impacts

1. Significant Impact
   - Over 30,000 ADT
     - Lane restrictions/night work
     - Traffic rerouted
2. Non-Significant Impact
   - Under 30,000 ADT
     - Completed under traffic
     - Restrictions/night work?
     - Depends type of Construction

Types of Construction

- Bituminous
  - Done under traffic
  - Work/Lane restriction may apply - night
- Concrete
  - Joint rehab may be done under traffic/night
  - Overlays/Reconstruction – Traffic rerouted onto opposing lanes

Data Collection

- ADTs
  - 10% for peak hour estimation
  - 60/40 direction flow
- Hourly count data
  - Tube counts
  - Existing count stations
  - Adjust for time of year
    - Month, Weekends, etc.

Capacity Thresholds

- 1,500 vph at lane drop
  - Rural 2 =>1 lane drop
  - No construction friction
- 1000 vph if construction “friction”
  - Less capacity inside construction zone due to “friction” activities.

Demand vs Capacity

- Demand vs Capacity (1500)
  - Queueing/Delay Analysis
  - Feasibility of alternate routes
  - 10% diversion
  - Seasonal Traffic – +15% on weekends
  - Holiday weekends

➢ Impacts determine IWZ efforts

Intelligent Work Zone (IWZ) efforts

- Active Zipper Merge/Use Both Lanes
- Stopped Traffic
- Travel Times
- 511
- Dynamic Detour

❖Combination

I-94 Project
Un-bonded Concrete Overlay

- SP 7380-238
- Clearwater to St. Cloud
- Spring 2013
- 7.5 miles length
- $16.5 M

I-94 Traffic Volumes

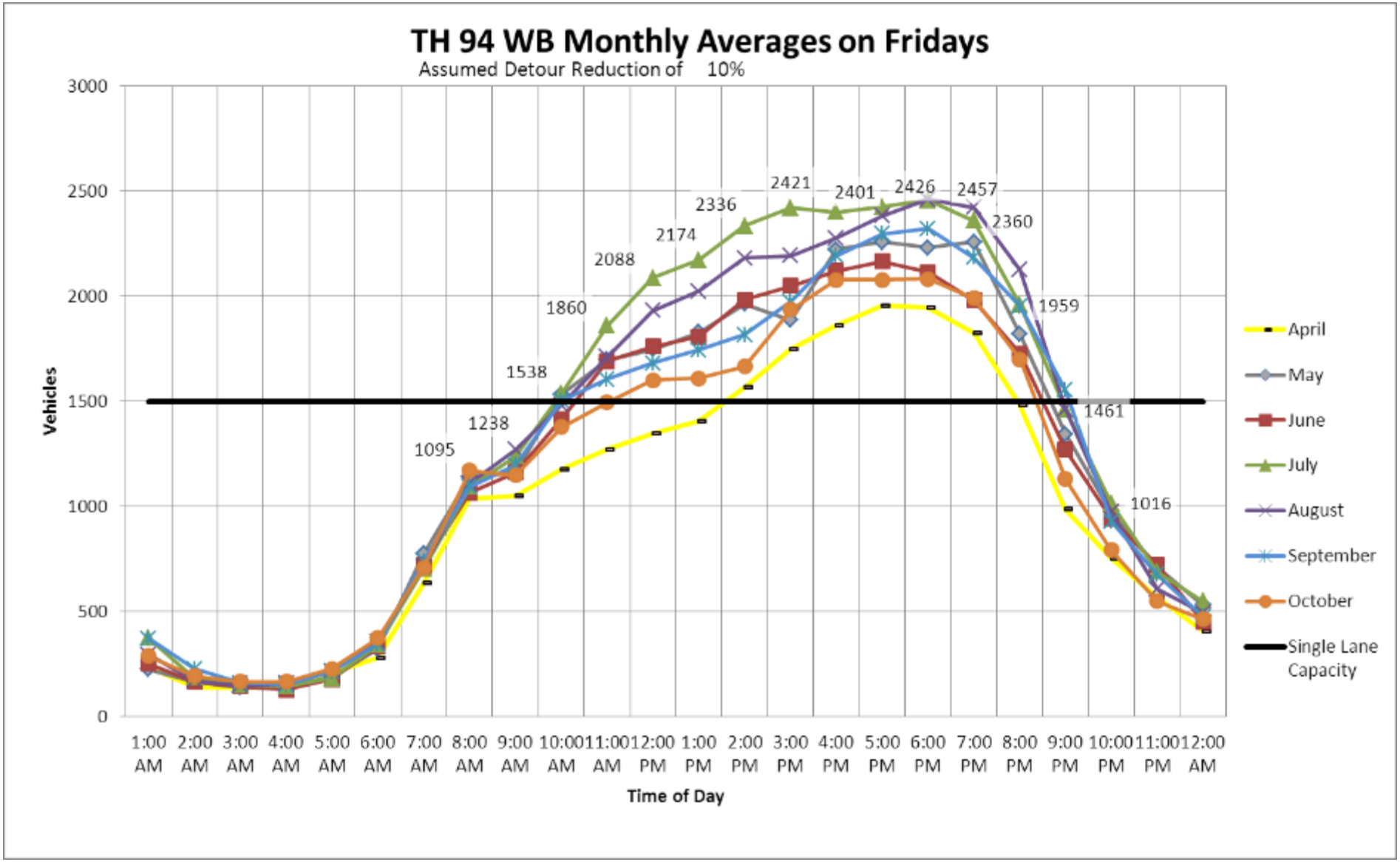
- Average Daily Traffic (ADT)
  - 45,500 (M-Thur)
  - 55,000 (Average Weekends)
- Hourly volumes
  - Peak periods – 2,400 – 2,800 VPH
- Single Lane Capacity
  - 1,500 VPH – merge area
  - 1000 vehicles per hour over capacity

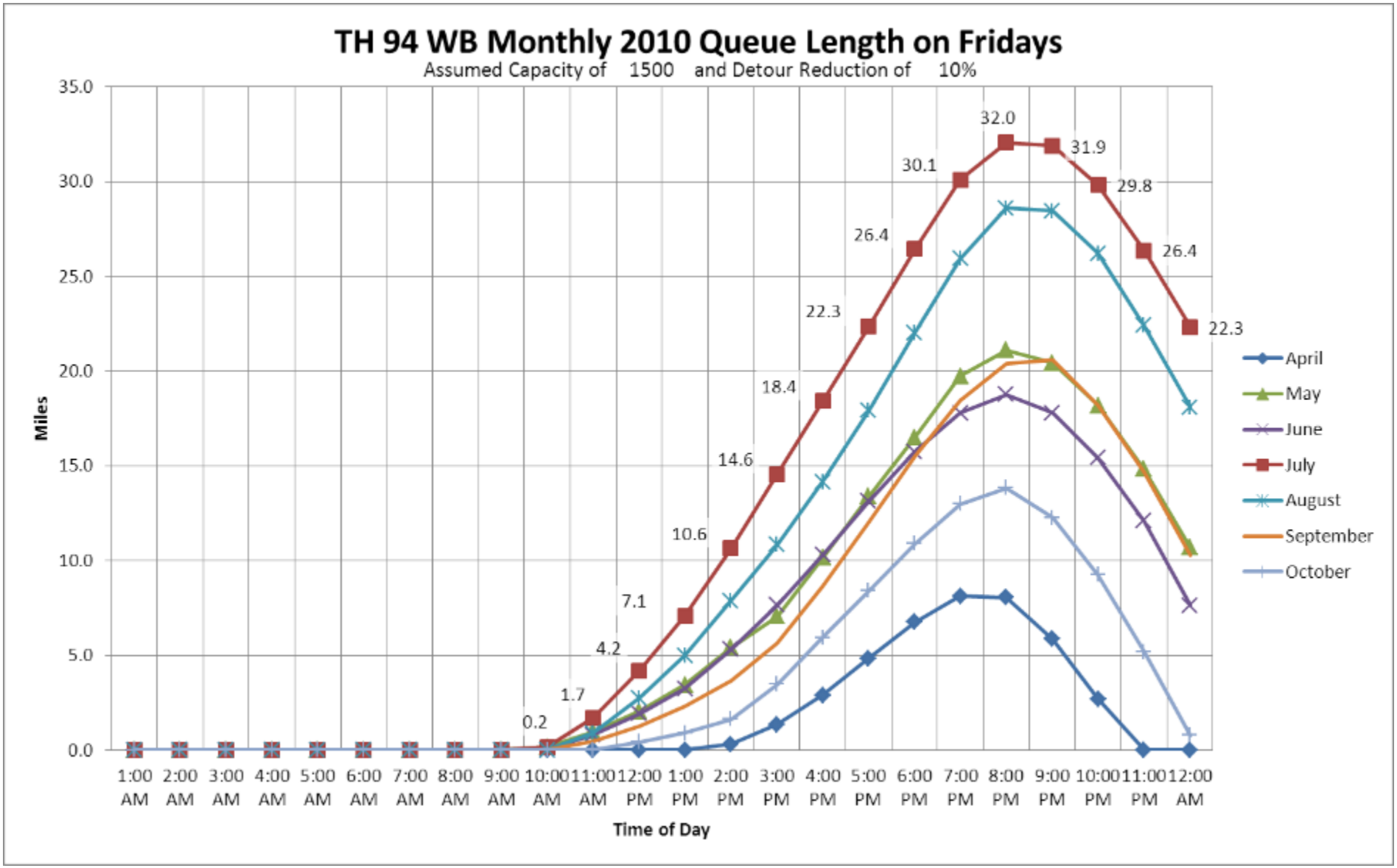
❖Significant Delays/Backups

- Traffic Management Plan

Traffic Management Plan

- Significant Impact Project
- Traffic Management Plan (TMP)
  - 1 – Traffic Control Plans
  - **2 – Traffic Operations Plan**
  - **3 –** Public Information Plan
- TMP – revisit scope of project
  - Concrete – due to material life span


TH 94 WB Monthly Averages on Fridays
Assumed Detour Reduction of 10%
Vehicles
Time of Day
3000
2500
2000
1500
1000
500
0
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
12:00 AM
1095
1238
1538
1860
2088
2174
2336
2421
2401
2426
2457
2360
1959
1461
1016
April
May
June
July
August
September
October
Single Lane Capacity


TH 94 WB Monthly 2010 Queue Length on Fridays
Assumed Capacity of 1500 and Detour Reduction of 10%
Miles
Time of Day
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
12:00 AM
0.2
1.7
4.2
7.1
10.6
14.6
18.4
22.3
26.4
30.1
32.0
31.9
29.8
26.4
22.3
April
May
June
July
August
September
October

Traffic Control Plans

- Crossover/one lane traffic
  - Head-to-head
- Ramp closures/detours
  - Ramps/loops/TH 24
- Hwy 24 Dynamic Detour

Staging

- Fall of 2012 prep work
  - Under lane closures (restricted times)
    - Crossovers
    - Emergency pull offs
    - Ramp gore work
- Spring 2013
  - Main construction – concrete un-bonded
  - Head-to-head

Staging

2013

- Stage 1 – EB closed (Traffic on WB lanes)
  - April to Memorial (Memorial weekend open)
- Stage 2 – WB closed (Traffic on new EB lanes)
  - Memorial to July 4th (July 4th weekend open)
- Stage 3 – Clean up and removals

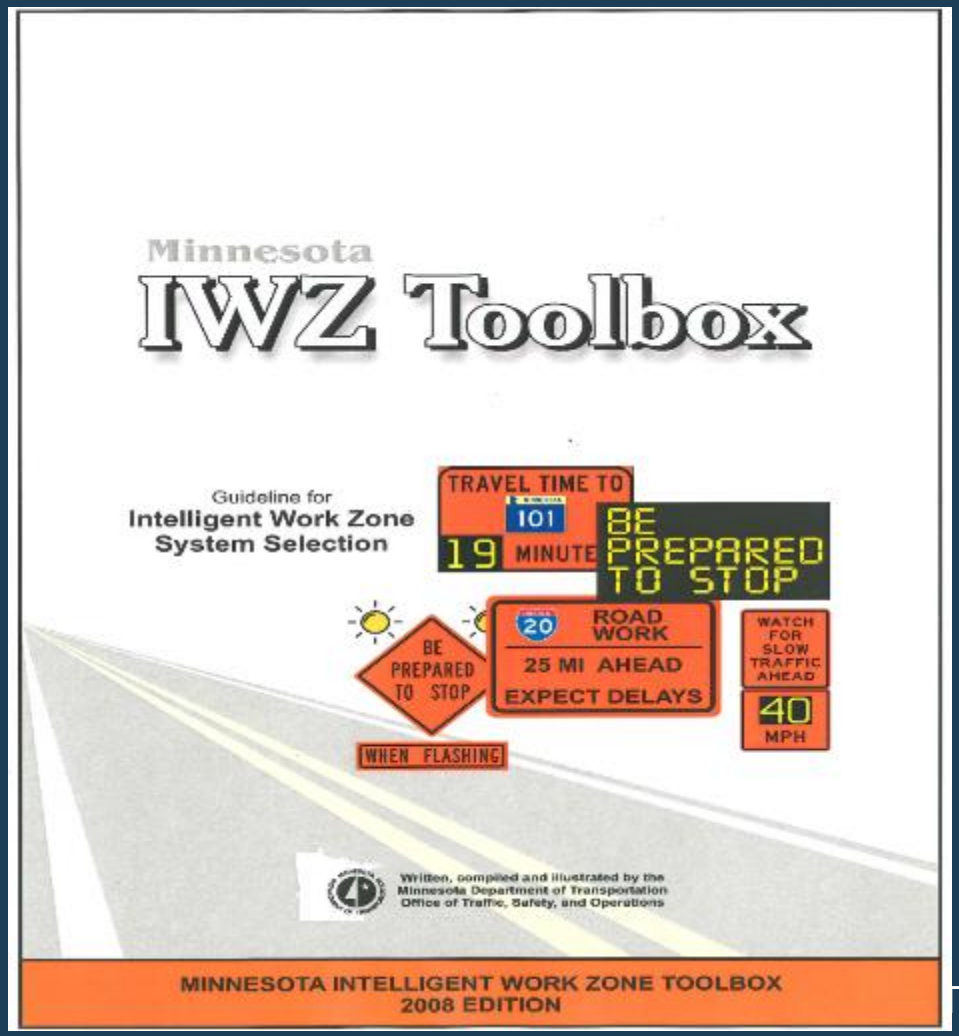
❖ Incentives for Stage completion

IWZ Project
SP 8823-260
Traffic Operations

IWZ – Separate from construction project

IWZ Tool Box

I. Travel Time Info
II. Stopped Traffic
III. TH 24 Detour -
- Dynamic
- I-94 WB traffic 30% exit TH 24 CSAH 75 detour

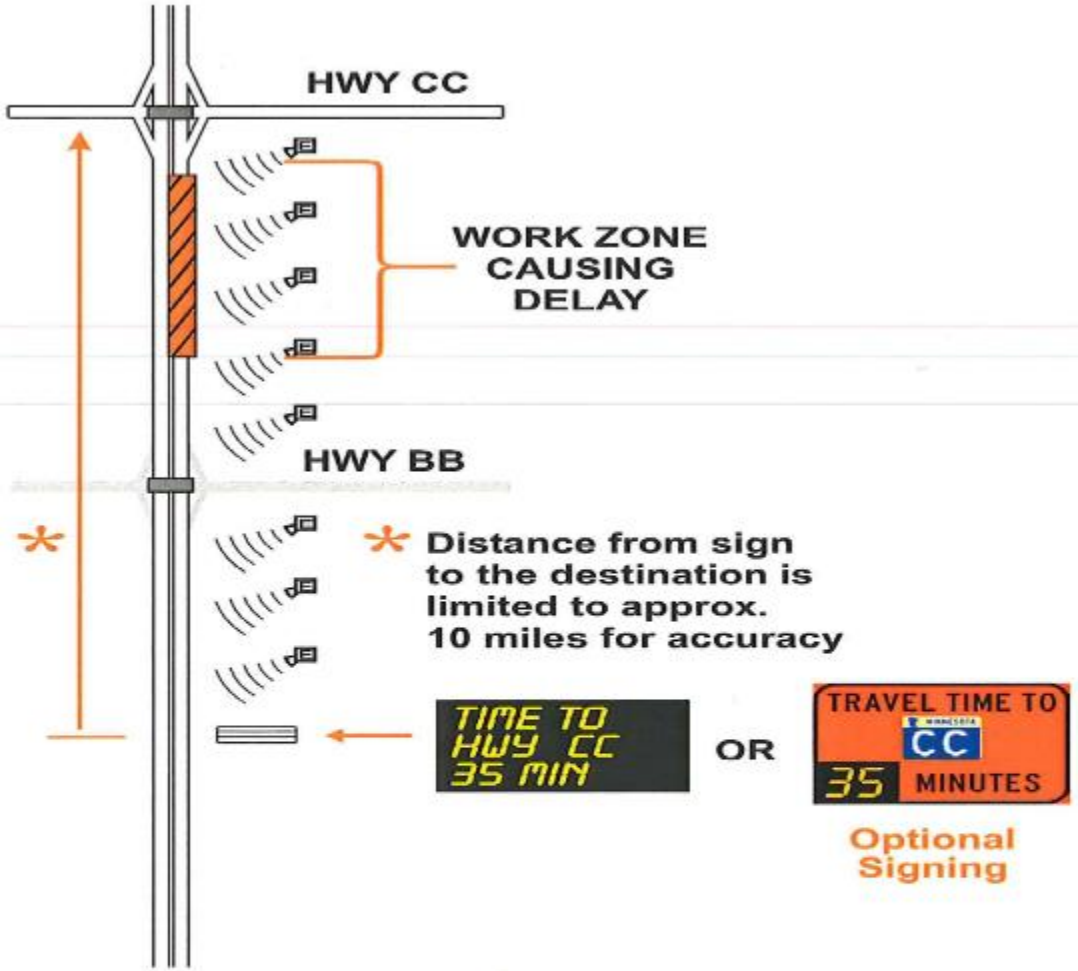


IWZ Contract Procurement

Why?

- Better management of IWZ application - Disincentives
- Time for Integration with RTMC
- Operational checks prior to construction
- Technical IWZ expertise

ESTIMATED TRIP TIME

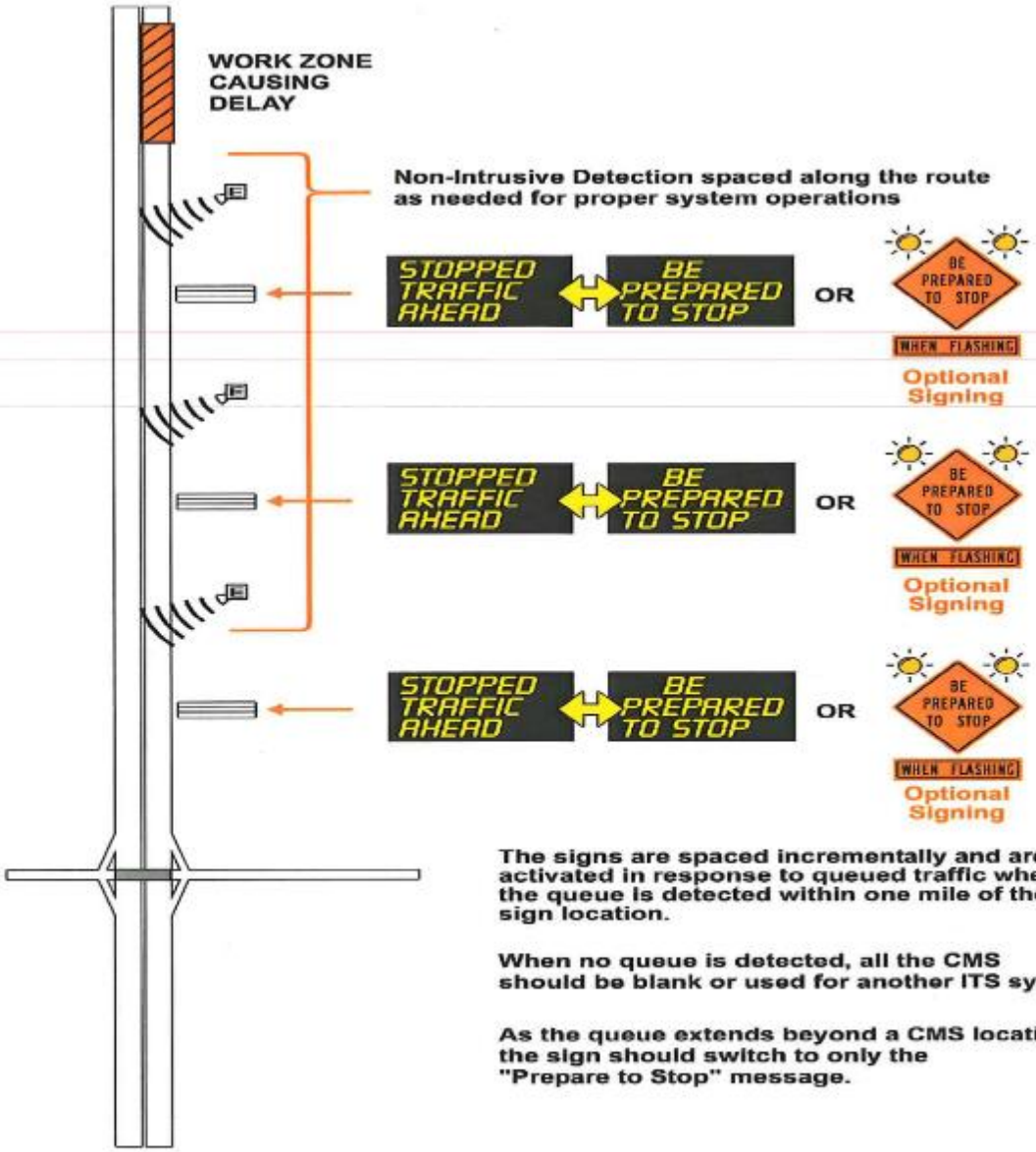


Consideration should be given to posting an alternate route and travel time for additional driver information.

- The CMS may be replaced with static warning signs equipped with two (2) CMS characters in dynamic mode. The characters would display the real-time travel time in the work zone downstream.
- Consideration should be given to posting an alternate route and travel time for additional driver information.
- The CMS may be supplemented with other informational devices such as Highway Advisory Radio (HAR).

NOTES

- Advance warning signs and other standard temporary traffic control devices have not been shown on this figure. Refer to the MN MUTCD including the 2007 Field Manual or the TTC Layout Templates for typical layout examples.
- All IWZ Guide Signs and CMS should be reviewed by the Mn/DOT Office of Traffic Safety, & Operations for design and message approval.
- Approved CMS messages should be listed in the Special Provisions, and approx CMS locations should shown on the TTC plans. All CMS displays should be blank when messages are not warranted.
- Refer to the Toolbox Definitions Section fo graphic symbols and terms.



The signs are spaced incrementally and are activated in response to queued traffic when the queue is detected within one mile of the sign location.

When no queue is detected, all the CMS should be blank or used for another ITS system.

As the queue extends beyond a CMS location, the sign should switch to only the "Prepare to Stop" message.

- The CMS may be replaced with an appropriate warning sign equipped with dynamically automated flashing lights as shown below.
- The static signs are spaced incrementally and the individual flashers are activated in response to queued traffic when the queue is detected within one mile of the sign location.

OPTIONAL SIGN DESIGN

- When traffic queue lengths are reasonably predictable, warning motorists of stopped / slowed traffic may be accomplished with the use of typical TTC warning signs placed prior to the anticipated beginning of queue.
- The system may be combined with "Dynamic Merge" and "Stopped Traffic Advisory" systems

NOTES

- Advance warning signs and other standard temporary traffic control devices have not been shown on this figure. Refer to the MN MUTCD including the 2007 Field Manual or the TTC Layout Templates for typical layout examples.
- All IWZ Guide Signs and CMS should be reviewed by the Mn/DOT Office of Traffic, Safety, & Operations for design and message approval.
- Approved CMS messages should be listed in the Special Provisions, and approx CMS locations should shown on the TTC plans. All CMS displays should be blank when messages are not warranted.
- Refer to the Toolbox Definitions Section for graphic symbols and terms.

Existing ITS infrastructure

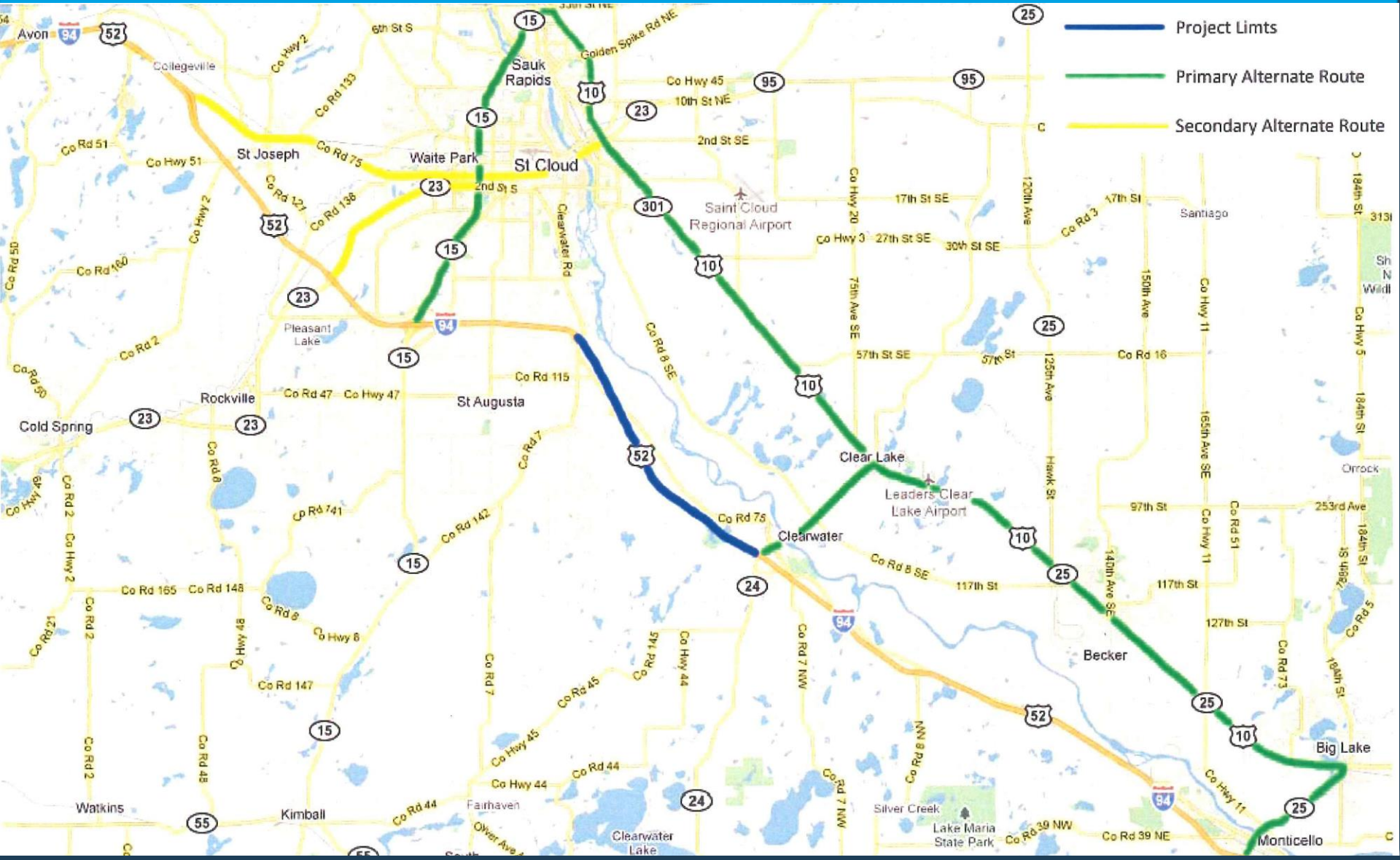
- Leverage existing ITS infrastructure
- St. Cloud east to Twin Cities
  - Fiber network
  - Connected to RTMC
  - Detectors/Cameras (1.5 mile spacing)
- St. Cloud west
  - No ITS infrastructure

IWZ Concept Plan Development

1. Travel Time
   A. MNDOT provided WB information
   B. IWZ contractor provided EB information
   - 2 signs each direction
   - 10 and 15 miles prior to project
   - Detector spacing every mile (20 total)
2. Stopped Traffic Advisory
   - CMS every 3 miles (8 total)
   - 2 boards active prior to slow/stop point
   - 40 mph slow & 15 mph stopped threshold

IWZ Concept Plan Development

3. Hwy 24 Dynamic Detour
   - 1 CMS prior to Hasty interchange
     - Use CSAH 75 alternate route WB
   - Approx. 5 miles east of project
   - Activated when backups started Hwy 24
   - 1000 vph less on I-94 WB peak times
4. Weekly IWZ meetings


Project Limts
Primary Alternate Route
Secondary Alternate Route
Avon
Collegeville
Sauk Rapids
St Joseph
Waite Park
St Cloud
Saint Cloud Regional Airport
Pleasant Lake
Rockville
St Augusta
Cold Spring
Clear Lake
Leaders Clear Lake Airport
Clearwater
Becker
Big Lake
Monticello
Watkins
Kimball
Fairhaven
Clearwater Lake
Silver Creek
Lake Maria State Park
Santiago
Orrock
Co Rd 75
Co Rd 8 SE
Co Rd 16
Co Rd 115
Co Rd 147
Co Rd 148
Co Rd 155
Co Rd 160
Co Rd 741
Co Rd 142
Co Rd 145
Co Rd 7 NW
Co Rd 39 NW
Co Rd 39 NE
Co Hwy 45
Co Hwy 44
Co Hwy 11
Co Hwy 20
Co Hwy 3
Co Hwy 8
Co Hwy 47
Co Hwy 51
Co Hwy 2
Co Rd 133
Co Rd 121
Co Rd 138
Co Rd 75
Co Rd 47
Co Rd 51
Co Rd 2
Co Rd 8
Co Rd 48
Co Rd 45
Co Rd 44
Co Rd 7
Co Rd 3
Co Rd 5
Co Rd 73
Golden Spike Rd NE
Clearwater Rd
6th St S
2nd St S
2nd St SE
10th St NE
17th St SE
27th St SE
30th St SE
57th St SE
57th St
97th St
117th St
127th St
253rd Ave
75th Ave SE
125th Ave
140th Ave SE
150th Ave
165th Ave SE
120th Ave
Hawk St
184th St
313t
Oliver Ave
Sh N Wildl

Concept ITS Plan

concept plan.pdf - Adobe Reader

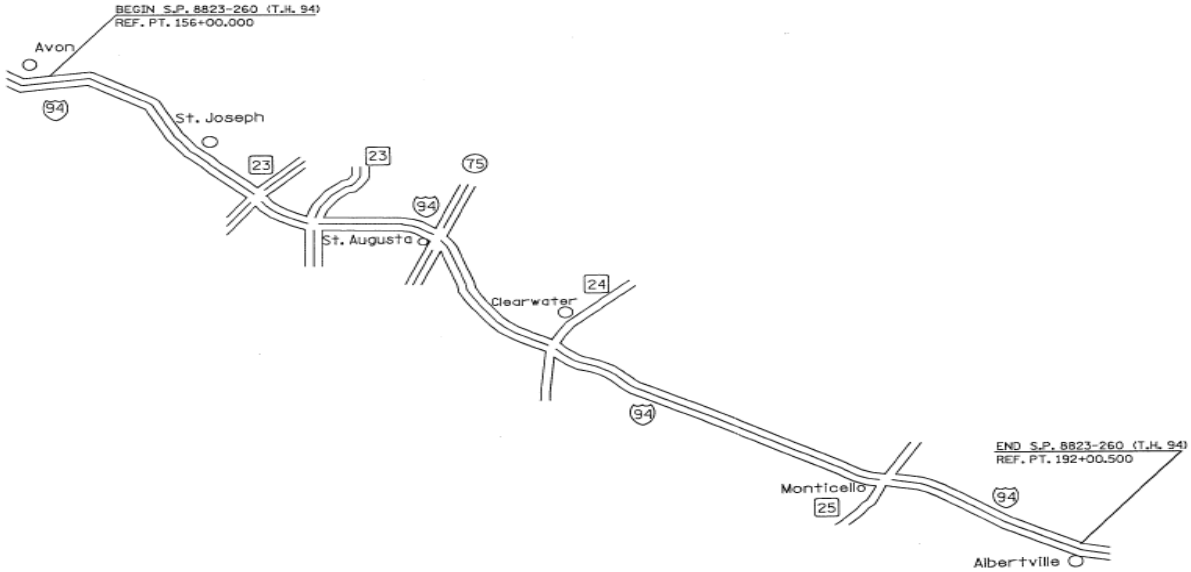
File Edit View Window Help

MINNESOTA DEPARTMENT OF TRANSPORTATION

CONSTRUCTION PLAN FOR INTELLIGENT WORK ZONE SYSTEM

LOCATED ON T.H. 94 FROM R.P. 156+00.000 TO R.P. 192+00.500

STATE PROJ. NO. 8823-260 (T.H. 94)
GROSS LENGTH 192720.00 FEET 36.500 MILES
BRIDGES-LENGTH N/A FEET N/A MILES
EXCEPTIONS-LENGTH N/A FEET N/A MILES
NET LENGTH 192720.00 FEET 36.500 MILES
REF. POINT 156+00.000 TO REF. POINT 192+00.500



PLAN REVISIONS

DATE	SHEET NO.	APPROVED BY

PROJECT LOCATION
COUNTY : STEARNS AND WRIGHT
DISTRICT #038 ST CLOUD

FED. PROJ. NO. STATE FUNDS

GOVERNING SPECIFICATIONS
THE 2005 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION", SHALL GOVERN.

INDEX

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATED QUANTITIES
3 - 5	SIGNING PLAN
6	SIGN INSTALLATION SHEETS

THIS PLAN CONTAINS 6 SHEETS

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: LICENSE #
DATE: SIGNATURE:
DESIGN SQUAD

I HEREBY CERTIFY THAT THE FINAL FIELD REVISIONS, IF ANY, WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
PRINT NAME: LICENSE #
DATE: SIGNATURE:

STATE PROJ. NO. 8823-260 (T.H. 94) SHEET NO. 1 OF 6 SHEET

PLOTTED/REVISED: 06-SEP-2012

PATH & FILENAME: Projects/D1.BAI/999/8823/260/Traffic/T8823260_SIGN.DGN

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Concept ITS Plan

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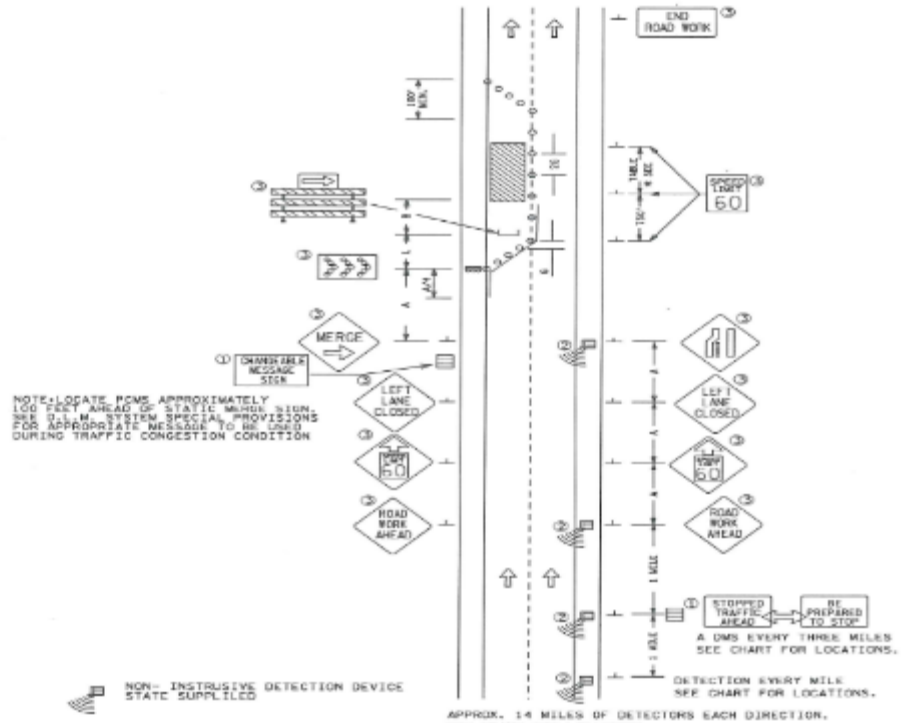

DYNAMIC STOPPED TRAFFIC ADVISORY
LEFT LANE CLOSURE
MULTI-LANE DIVIDED ROAD

POSTED SPEED LIMIT PRIOR TO WORK STARTING (MPH)	SPACING OF ADVANCE WARNING SIGNS (A) FEET	TAPER LENGTH (L) FEET	SPACING OF CHANNELIZING DEVICES (C) FEET	BUFFER SPACE (B) FEET	DECISION SIGHT DISTANCE FEET
0 - 30	250	200	25	85	550
35 - 40	325	350	25	170	700
45 - 50	600	600	50	280	900
55	750	700	50	335	1200
60 - 65	1000	800	50	485	1400
70 - 75	1200	900	50	670	1600

NOTE:
NOT ALL INFORMATION IN THIS BOX MAY APPLY TO THIS DETAIL.

Number and Location of Dynamic Message Signs and Mobile Detectors

Eastbound Ref. Pt.	DMS	Detector	Westbound Ref. Pt.	DMS	Detector
154.83	1	0	178.0	0	0*
156.00	0	1	179.5	0	0*
157.00	0	1	180.7	0*	0*
158.00	0	1	181.5	0	0*
159.00	1	1	182.5	0	0*
160.00	0	1	183.5	1	0*
161.00	0	1	184.5	0	0*
161.50	0	1	185.5	0	0*
162.00	0	1	186.5	0*	0*
163.00	0	1	187.5	0	0*
164.00	0	1	188.5	0	0*
165.00	1	1	189.5	1	1
166.00	0	1	190.5	0	1
167.00	0	1	191.5	0	1
168.00	1	1	192.5	1	0*
169.00	0	1	195.8	0*	0
170.00	0	1	206.7	0*	0
171.00	0	1	210.65	0*	0
Totals	4	16		3	3

Within Construction Area			Within Construction Area		
171.75	0	0*	171.75	0	0*
173.00	0	0*	173.00	0	0*
174.50	0	0*	174.50	0	0*
175.50	0	0*	175.50	0	0*
176.75	0	0*	176.75	0	0*
178.00	0	0*	178.00	0	0*

Notes:
* = Inplace devices

NOTES:
① FURNISH & INSTALL
② INSTALL STATE SUPPLIED NON-INTRUSIVE DETECTION MOBILE DETECTION. SEE SPECIAL PROVISIONS FOR CONTACT INFO.
③ INPLACE SIGNS
④ INPLACE DETECTORS

FILE NAME: Projects/03_BAX/999/8823/260/Traffic/TMS8260

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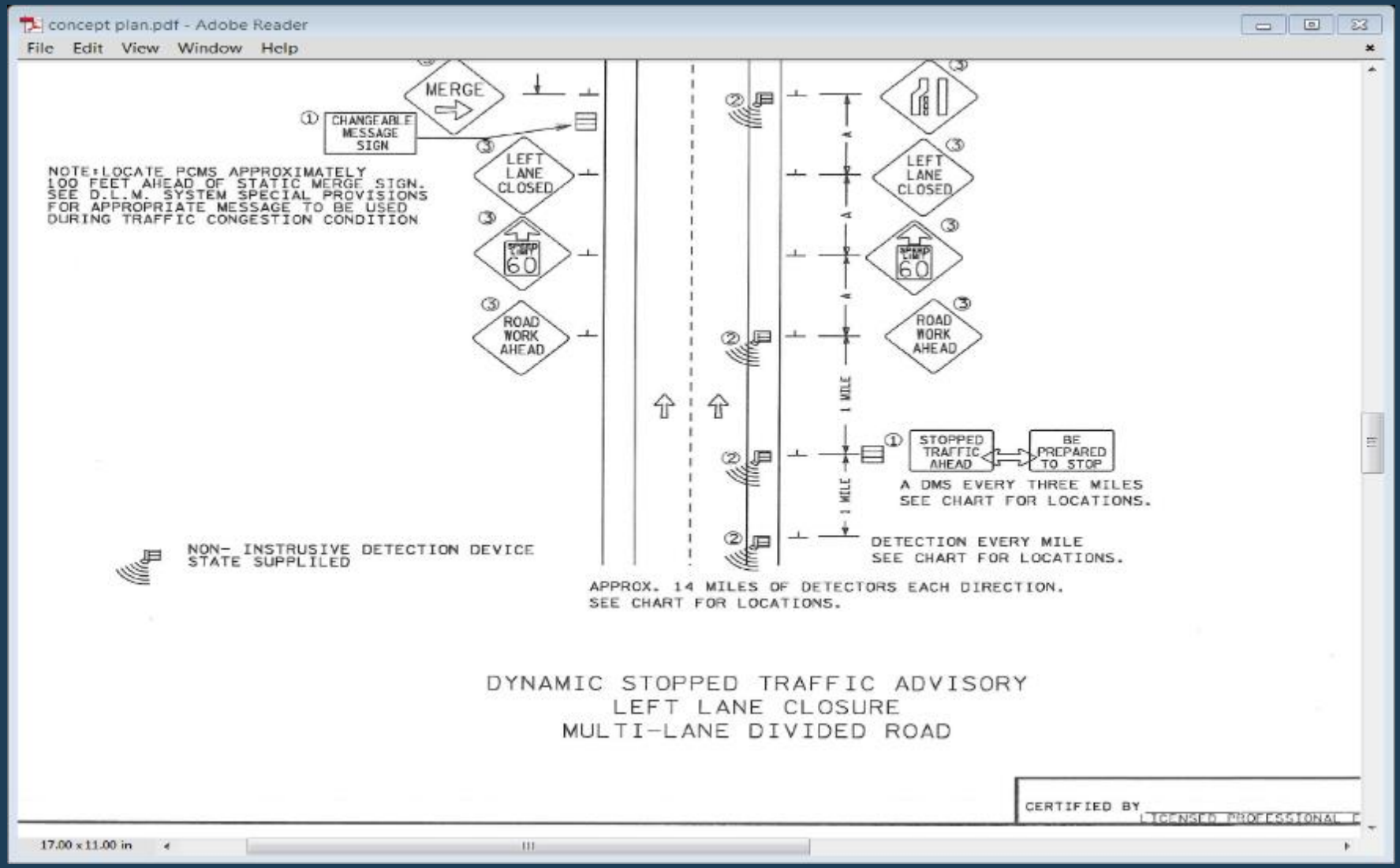
Concept ITS Plan



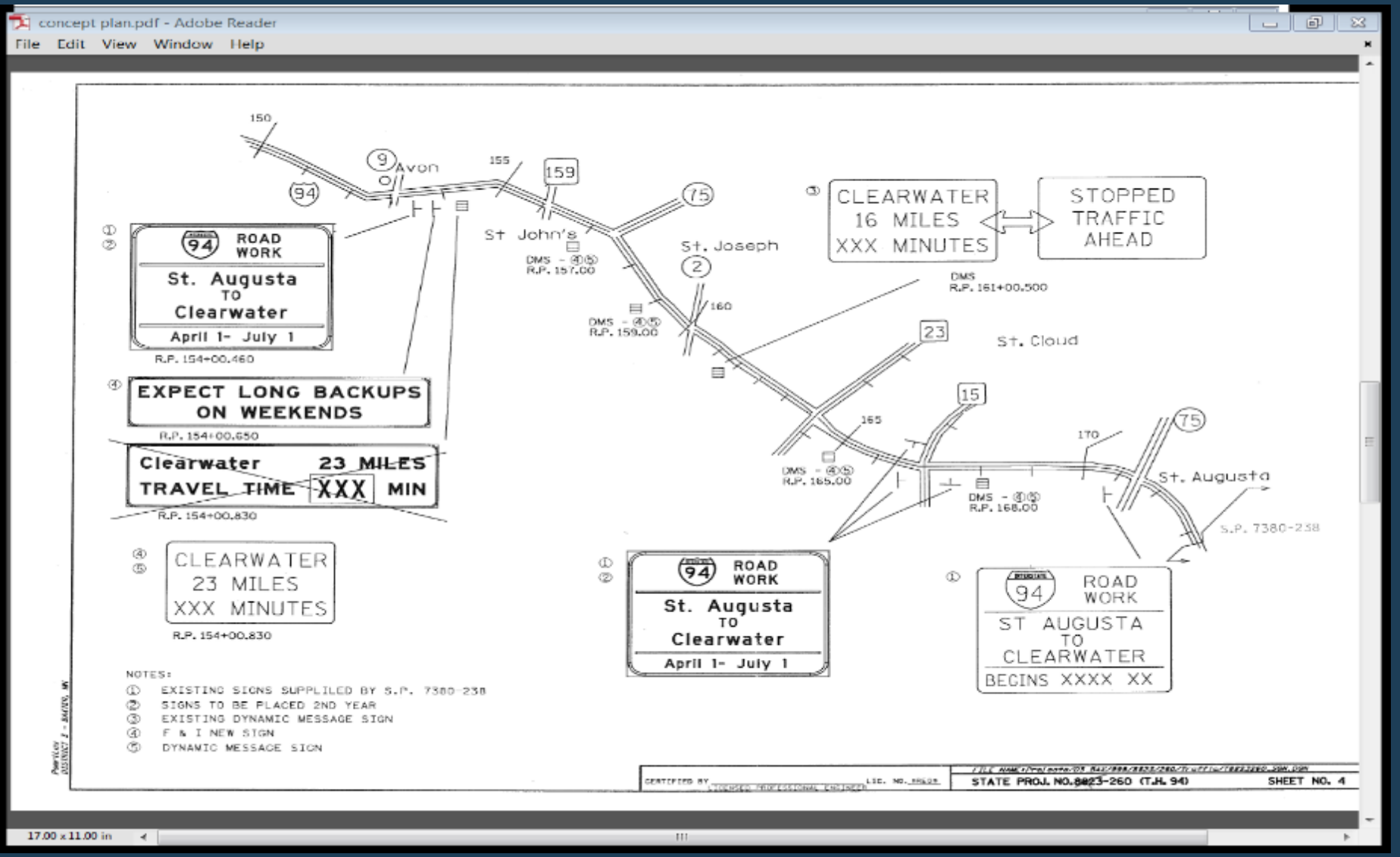
Location of DMS and Detectors

Number and Location of Dynamic Message Signs and Mobile Detectors					
Eastbound			Westbound		
Ref. Pt.	DMS	Detector	Ref. Pt.	DMS	Detector
154.83	1	0	178.0	0	0*
156.00	0	1	179.5	0	0*
157.00	0	1	180.7	0*	0*
158.00	0	1	181.5	0	0*
159.00	1	1	182.5	0	0*
160.00	0	1	183.5	1	0*
161.00	0	1	184.5	0	0*
161.50	0	1	185.5	0	0*
162.00	0 1	1	186.5	0 *	0*
163.00	0	1	187.5	0	0*
164.00	0	1	188.5	0	0*
165.00	1	1	189.5	1	1
166.00	0	1	190.5	0	1
167.00	0	1	191.5	0	1
168.00	1	1	192.5	1	0*
169.00	0	1	195.8	0*	0
170.00	0	1	206.7	0*	0
171.00	0	1	210.65	0*	0
Totals	4 5	16		3	3

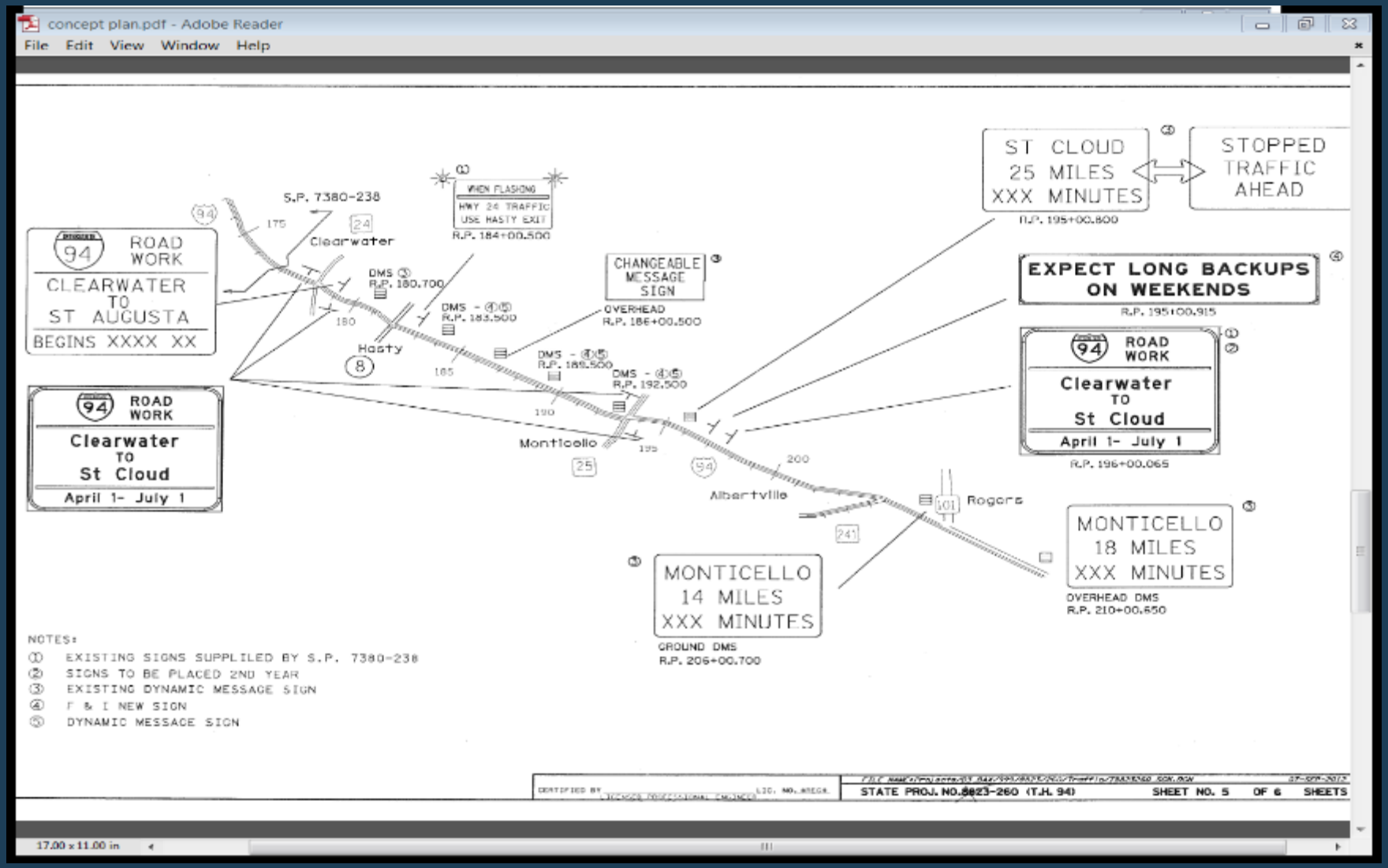
Within Construction Area			Within Construction Area		
171.75	0	0*	171.75	0	0*
173.00	0	0*	173.00	0	0*
174.50	0	0*	174.50	0	0*
175.50	0	0*	175.50	0	0*
176.75	0	0*	176.75	0	0*
178.00	0	0*	178.00	0	0*

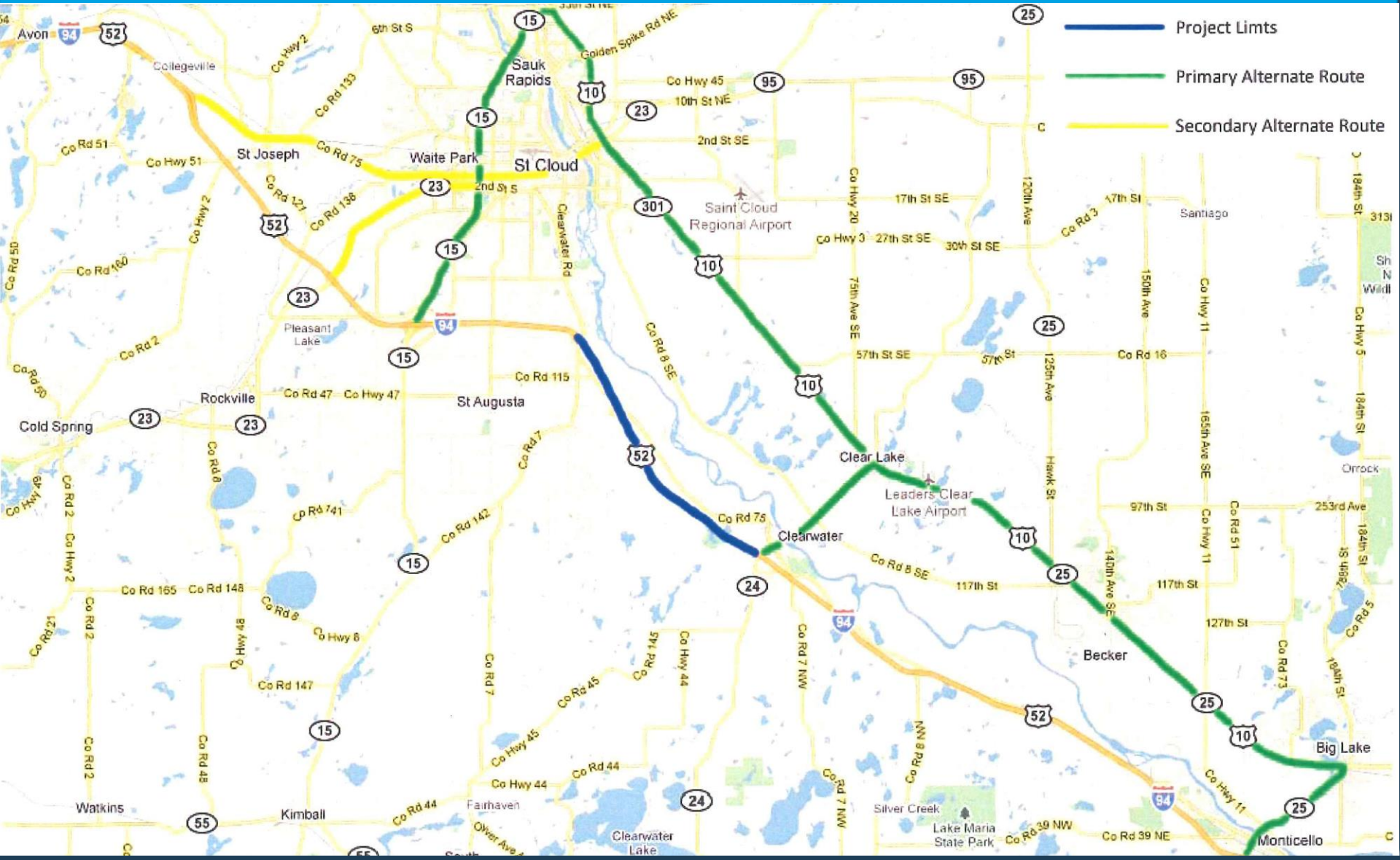
Notes:
* = inplace devices

Concept IWZ Plan



Concept IWZ Plan




Project Limts
Primary Alternate Route
Secondary Alternate Route
Avon
Collegeville
Sauk Rapids
St Joseph
Waite Park
St Cloud
Saint Cloud Regional Airport
Pleasant Lake
Rockville
St Augusta
Cold Spring
Clear Lake
Leaders Clear Lake Airport
Clearwater
Becker
Big Lake
Monticello
Watkins
Kimball
Fairhaven
Clearwater Lake
Silver Creek
Lake Maria State Park
Santiago
Orrock
Co Rd 75
Co Rd 8 SE
Co Rd 16
Co Rd 115
Co Rd 147
Co Rd 148
Co Rd 155
Co Rd 160
Co Rd 741
Co Rd 142
Co Rd 145
Co Rd 7 NW
Co Rd 39 NW
Co Rd 39 NE
Co Hwy 45
Co Hwy 44
Co Hwy 11
Co Hwy 20
Co Hwy 3
Co Hwy 8
Co Hwy 47
Co Hwy 51
Co Hwy 2
Co Rd 133
Co Rd 121
Co Rd 138
Co Rd 75
Co Rd 47
Co Rd 51
Co Rd 2
Co Rd 8
Co Rd 48
Co Rd 45
Co Rd 44
Co Rd 7
Co Rd 3
Co Rd 5
Co Rd 73
Golden Spike Rd NE
Clearwater Rd
6th St S
2nd St S
2nd St SE
10th St NE
17th St SE
27th St SE
30th St SE
57th St SE
57th St
97th St
117th St
127th St
253rd Ave
75th Ave SE
125th Ave
140th Ave SE
150th Ave
165th Ave SE
120th Ave
Hawk St
184th St
313t
Oliver Ave
Sh N Wildl

I-94 EB

17 miles to crossover (first static sign)

I-94 EB
2nd static sign

I-94 EB

3rd sign hybrid (17 miles to crossover)

I-94 EB

4th sign hybrid (10 miles to crossover)

Nonintrusive Detector

1 mile spacing

I-94 WB
Travel time (MnDOT)

I-94 WB
Travel time (MnDOT)

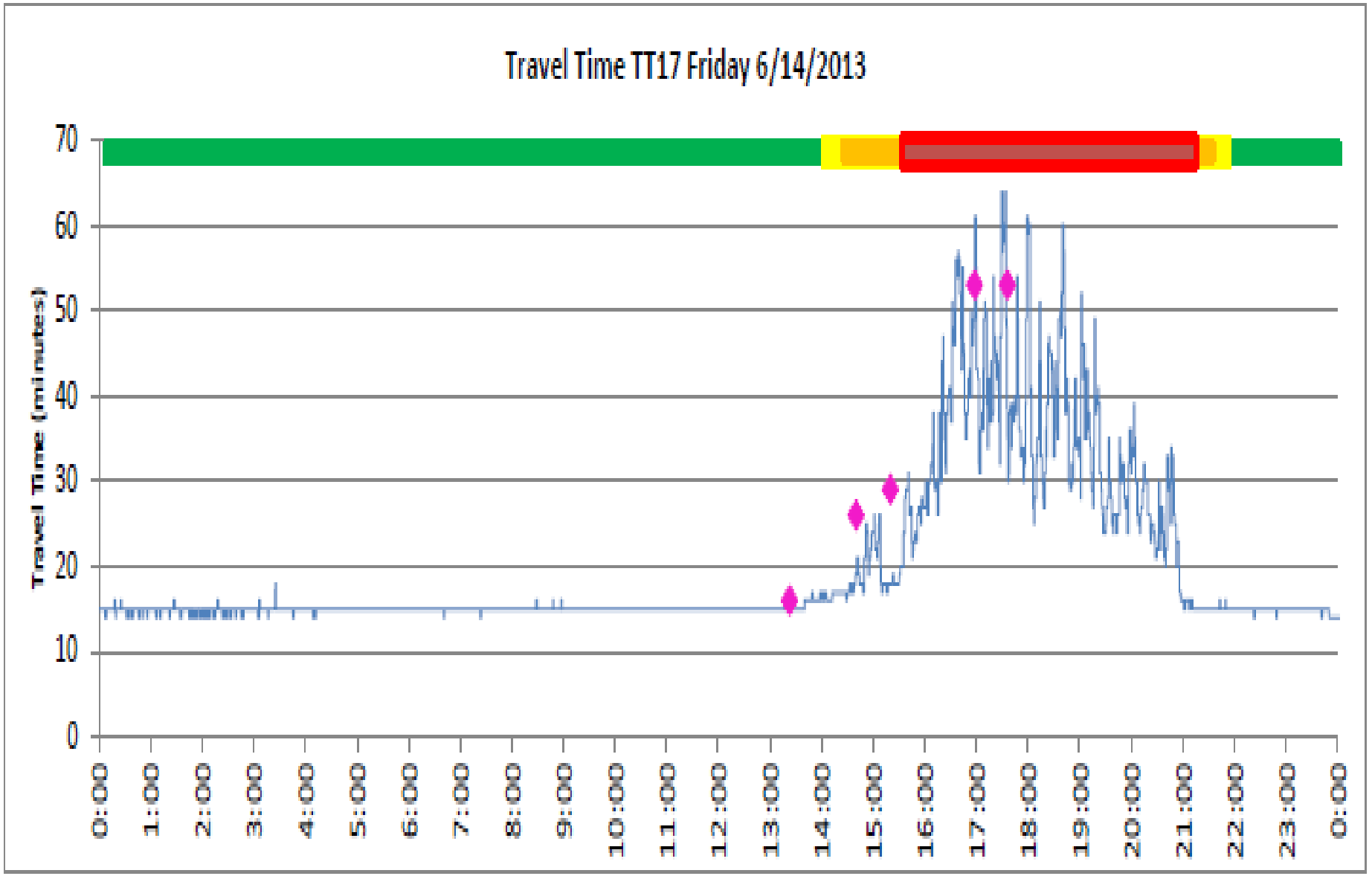
Data Collection

- Weekly data collected and meetings
  - Speeds
  - Travel times
  - Message content
    - Travel time postings
    - Stopped message posting
  - Compare to field information

Greater than 40 mph
Less than 40 mph, greater than 30 mph
Less than 30 mph, greater than 15 mph
Less than 15 mph

Eastbound Detector Speeds

	Avon				St Joseph				TH 23			TH 15				CSAH 75	
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q10
6/14/13 2:00 PM	73	69	73	74	76	69	67	73	71	70	72	74	70	20	46	57	59
6/14/13 2:15 PM	73	68	74	75	77	70	69	73	72	70	71	74	70	21	37	58	57
6/14/13 2:30 PM	74	69	75	75	76	70	68	73	72	71	72	75	46	19	36	57	57
6/14/13 2:45 PM	74	69	76	76	78	70	69	74	73	71	72	76	23	19	40	59	57
6/14/13 3:00 PM	73	68	75	75	78	71	69	74	73	71	72	75	27	16	48	59	58
6/14/13 3:15 PM	73	68	74	75	78	71	68	73	72	72	73	75	54	20	33	59	58
6/14/13 3:30 PM	73	67	74	74	78	70	68	73	73	71	71	75	16	15	32	60	47
6/14/13 3:45 PM	73	68	73	74	74	69	68	73	72	71	72	75	12	20	32	57	55
6/14/13 4:00 PM	72	67	73	74	76	69	67	72	72	71	72	73	13	13	24	50	50
6/14/13 4:15 PM	72	68	74	74	77	70	68	73	72	70	71	75	28	19	11	10	33
6/14/13 4:30 PM	73	68	74	74	73	70	68	73	72	70	71	74	7	8	14	16	33
6/14/13 4:45 PM	74	69	75	74	78	70	68	73	73	71	72	69	4	12	20	17	26
6/14/13 5:00 PM	74	69	75	75	76	70	68	73	72	72	72	51	9	13	22	19	32
6/14/13 5:15 PM	74	70	75	76	77	70	68	74	73	71	72	26	7	15	23	16	34
6/14/13 5:30 PM	74	69	74	75	77	70	68	73	73	71	73	28	10	14	27	23	32
6/14/13 5:45 PM	74	70	75	74	78	69	68	73	72	72	72	65	6	12	22	17	32
6/14/13 6:00 PM	74	70	76	76	80	70	69	73	74	71	73	50	7	17	35	28	33
6/14/13 6:15 PM	73	69	74	76	78	69	67	73	73	72	73	56	12	19	39	13	32
6/14/13 6:30 PM	74	70	76	73	76	70	70	73	71	71	72	68	5	12	40	12	31
6/14/13 6:45 PM	74	70	76	75	76	71	69	73	73	72	73	57	14	22	39	13	33
6/14/13 7:00 PM	74	70	75	76	77	71	69	73	72	72	72	74	19	10	32	14	33
6/14/13 7:15 PM	74	70	75	75	76	71	69	74	73	71	73	76	53	10	27	18	34
6/14/13 7:30 PM	74	70	75	77	78	70	69	74	74	72	74	75	64	15	39	18	33
6/14/13 7:45 PM	74	70	76	76	78	72	69	74	74	71	74	75	71	19	35	12	36
6/14/13 8:00 PM	74	70	76	76	76	71	68	73	73	72	72	74	71	11	43	15	34
6/14/13 8:15 PM	74	70	77	75	79	72	70	74	73	72	73	76	71	65	50	16	36
6/14/13 8:30 PM	74	70	75	74	76	71	70	74	74	72	75	75	73	65	50	14	37
6/14/13 8:45 PM	74	70	76	77	79	72	70	74	73	72	73	74	71	64	63	27	32
6/14/13 9:00 PM	74	68	75	75	77	71	69	74	73	72	72	74	71	64	72	64	36
6/14/13 9:15 PM	73	68	76	75	76	69	67	73	72	72	73	74	71	66	73	64	50
6/14/13 9:30 PM	74	68	74	75	76	70	69	73	72	71	72	75	71	66	72	62	46
6/14/13 9:45 PM	72	68	72	72	74	69	68	73	72	70	72	72	71	64	72	61	41
6/14/13 10:00 PM	72	68	74	75	75	70	68	71	70	71	72	74	70	66	74	59	59
6/14/13 10:15 PM	71	68	73	72	74	68	69	72	70	70	72	72	71	65	73	59	62
6/14/13 10:30 PM	72	69	74	76	78	69	68	73	71	70	71	74	71	65	72	60	63
6/14/13 10:45 PM	73	68	74	75	78	70	66	73	72	71	72	75	71	65	73	63	62
6/14/13 11:00 PM	71	68	74	74	75	67	68	72	70	71	72	73	70	67	72	62	63


Travel Time TT17 Friday 6/14/2013
Travel Time (minutes)
70
60
50
40
30
20
10
0
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

Concerns

- Costs – 20 detectors
  - I-35 Duluth 6 detectors/$395,000
  - $500,000 - ????
- Integration
- Accuracy of information – length

IWZ Costs

- Lower than expected
  - $250,000 range
- 2 Interested Bidders
  - Safety Signs – awarded contract
    - ASTI subcontractor
    - Good to work with

Project Findings

- Integration – smoother than expected
- Contractor - open to improvements
- Backups less the expected (4-5 miles)
- Diversion of traffic – up to 1000 vph
  - TH 24 detour
  - TH 10 – good parallel route WB
  - CSAH 75 parallels I-94
  - Limited public complaints

Project Findings

- Weekly meetings were good
- Speed variations during hour
  - More averaging speed data – less jumping
- Contractor's web site
  - Good to monitor backups
  - Hybrid signs – Display

Questions

Iowa DOT Intelligent Work Zone Contracting and Experiences

Presenter: Tim Simodynes, Iowa DOT

IOWA DOT
SMARTER | SIMPLER | CUSTOMER DRIVEN

Traffic Critical Projects & Intelligent Work Zones in Iowa

for North/West Passage

Tim Simodynes
Office of Traffic Operations

April 26, 2017

Focus on Traffic Operations

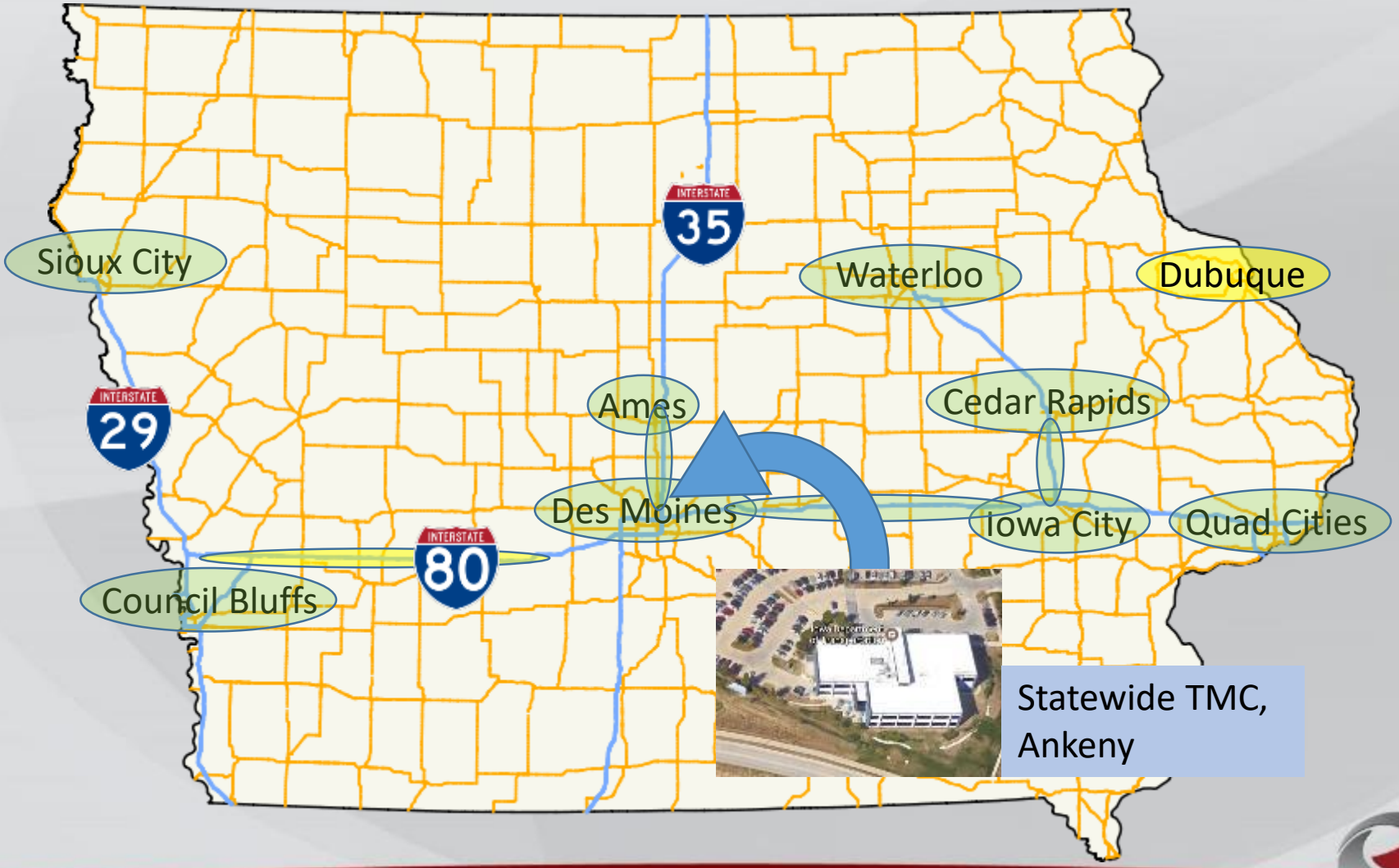
Address Sources of Congestion

- Recurring Congestion
- Incidents / Crashes
- Weather
- Special Events
- ***Construction***

"Traffic Critical Projects"

(2014)

Iowa Inventory
9 “Metro” Areas (over 50,000)



Iowa DOT Permanent ITS

380 PTZ Cameras

75 Overhead DMS

53 Side-Mount DMS

370 Side-Fire Radar Traffic Sensors

<u>Communications</u>
Fiber Optic + Wireless Radios or Cellular Modems

Highway Advisory Radio (HAR) Transmitters

Statewide
Traffic Management Center (TMC)

- Moved to Ankeny in 2015
- 24/7 Operation
- TransSuite ATMS software

TransSuite ATMS

- Controls Cameras, DMS & Sensors
- Capable of automated travel times and automated DMS messages
- Able to integrate portable devices

Intelligent WZ Team (2014-present)

- SRF Consulting: Writing contract and managing program
- Street Smart Rental: Statewide IWZ Device Services contract
- TransCore: ATMS Integration
- Digital Traffic Systems: ITS Maint.
- Kapsch (formerly Schneider/ Telvent): Traffic Management Center
- CTRE (Iowa State Univ.): Eval. & Analysis

Center for Transportation Research and Education

Portable Cameras

- Pan-tilt-zoom
- Great within reach of ITS Communications Network
  - Same as permanent Cameras
  - On 511ia.org

Video Streaming more difficult in rural areas (on Cellular Modems)

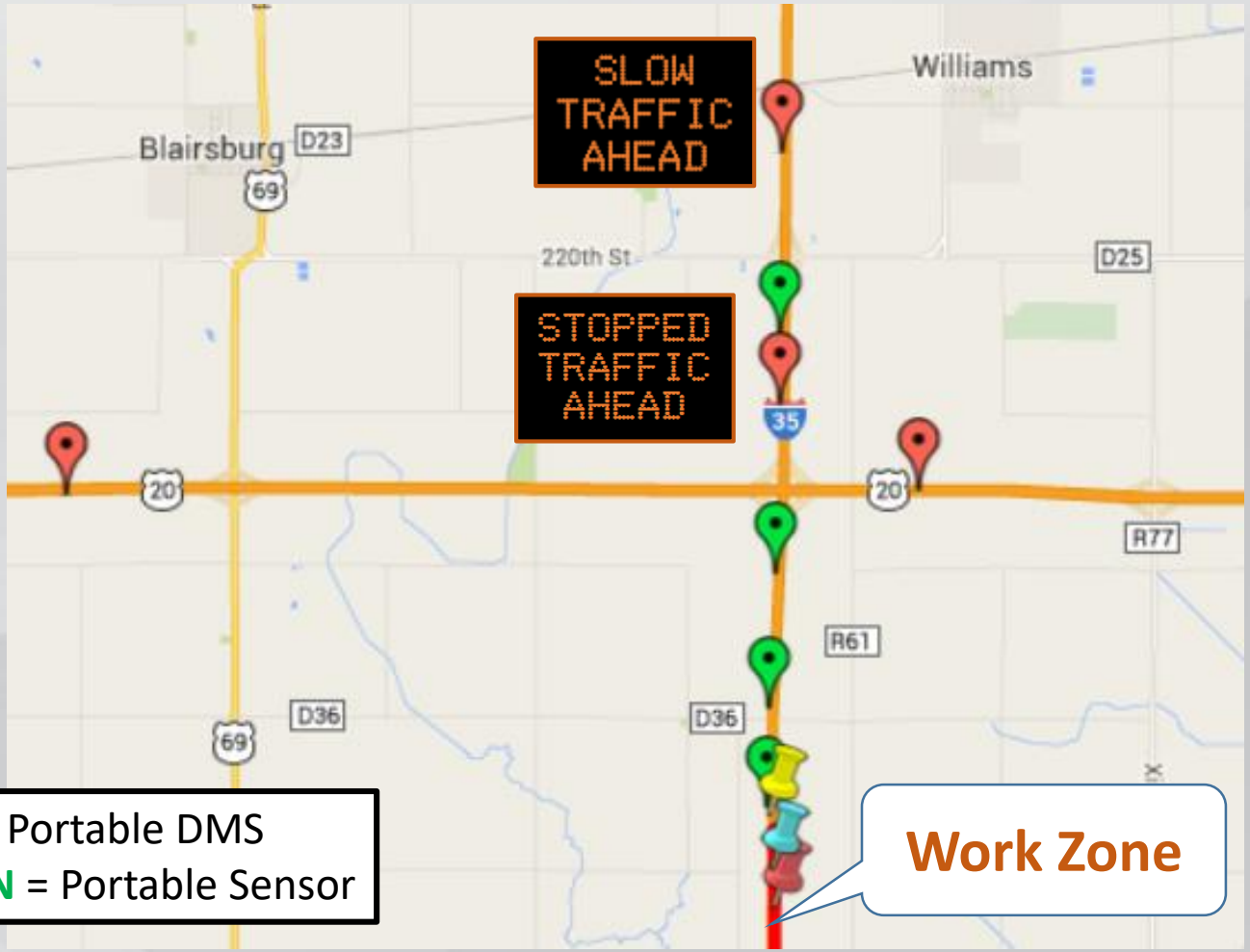
Portable Traffic Sensors

- Wavetronix, side-fire radar
- Same as our permanent Sensors
- Traffic counts & speeds every 20 seconds

Portable DMS

- ALL controlled by TMC since 2013

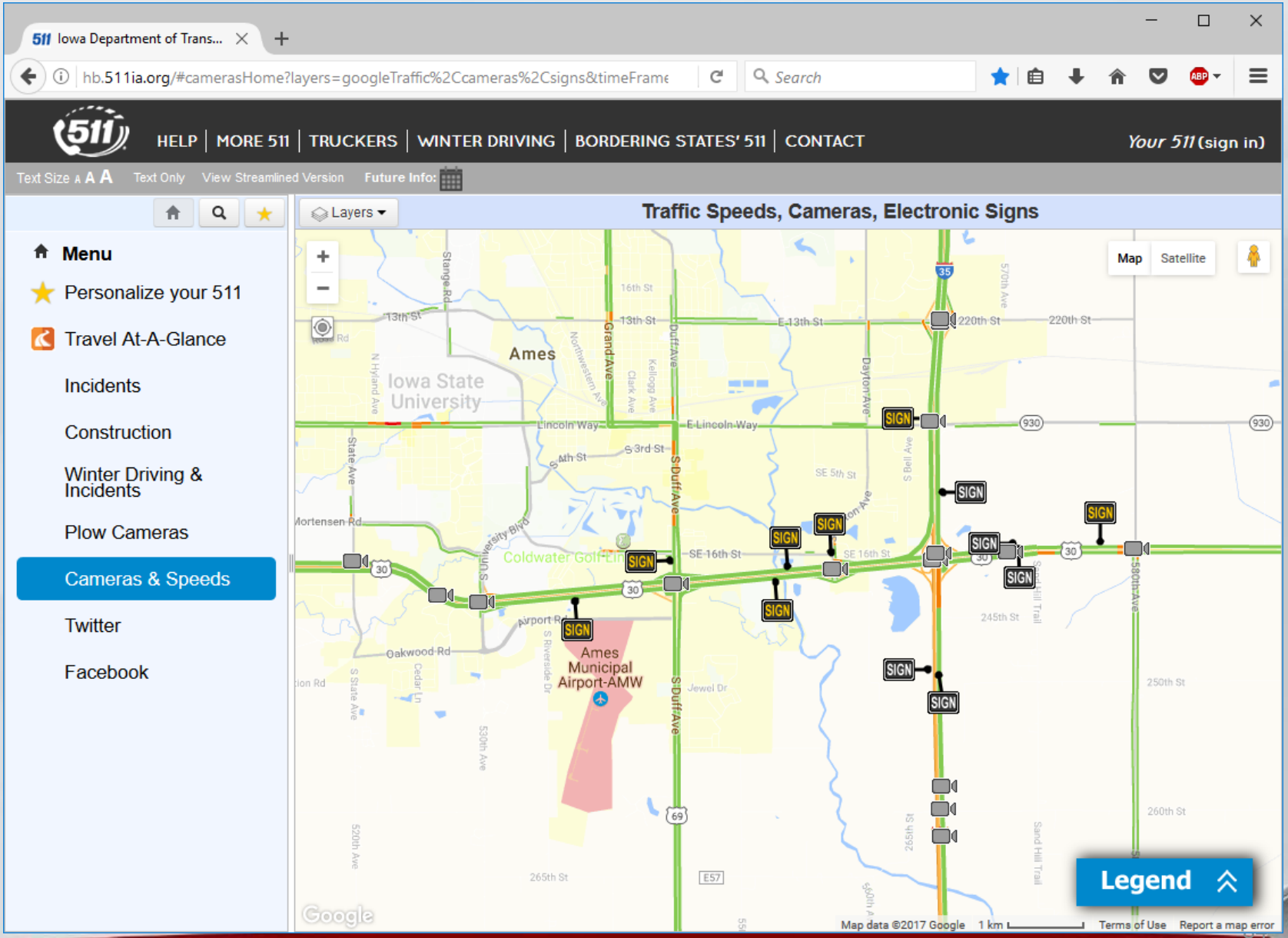
Queue Detection Systems
Southbound I-35



Interstate Ramp Monitoring

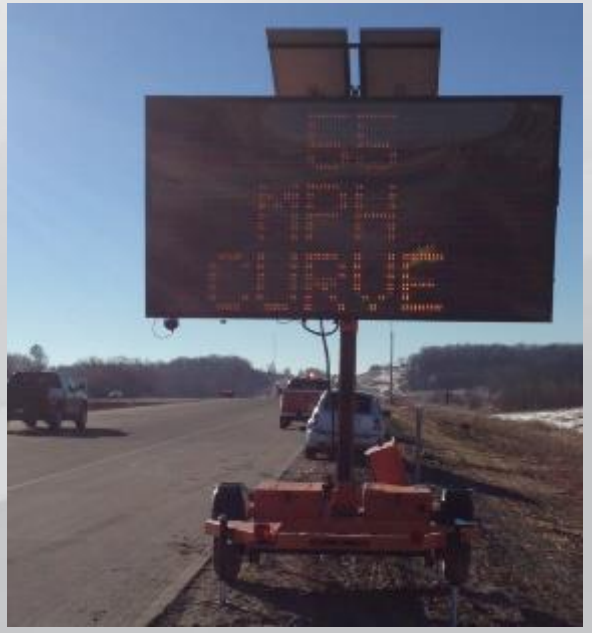
Council Bluffs

511ia.org & Mobile App



Additional IWZ Devices

- Portable DMS with Radar Detection



- Speed Feedback Trailers

Trucks Entering System

“Truck Entering” Warning

“Truck Entering” Warning

I-29 Council Bluffs

Looking South

Traffic Critical Projects

https://sites.google.com/site/iowatcp

IOWA DOT
SMARTER | SIMPLER | CUSTOMER DRIVEN

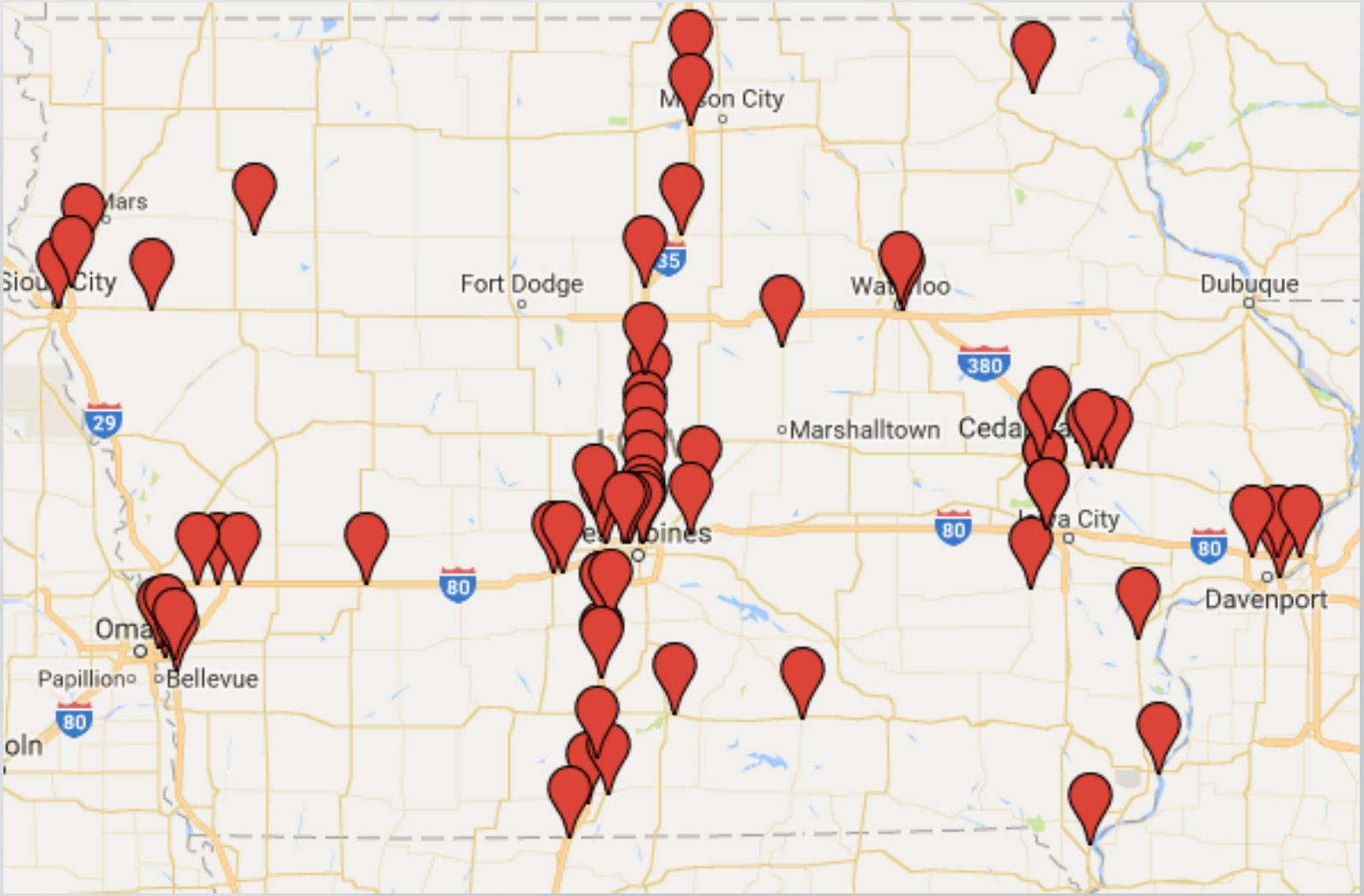
TRAFFIC CRITICAL PROJECTS
OFFICE OF TRAFFIC OPERATIONS

HOME | 2017 | FUTURE | ARCHIVES | CONTACTS | RESOURCES

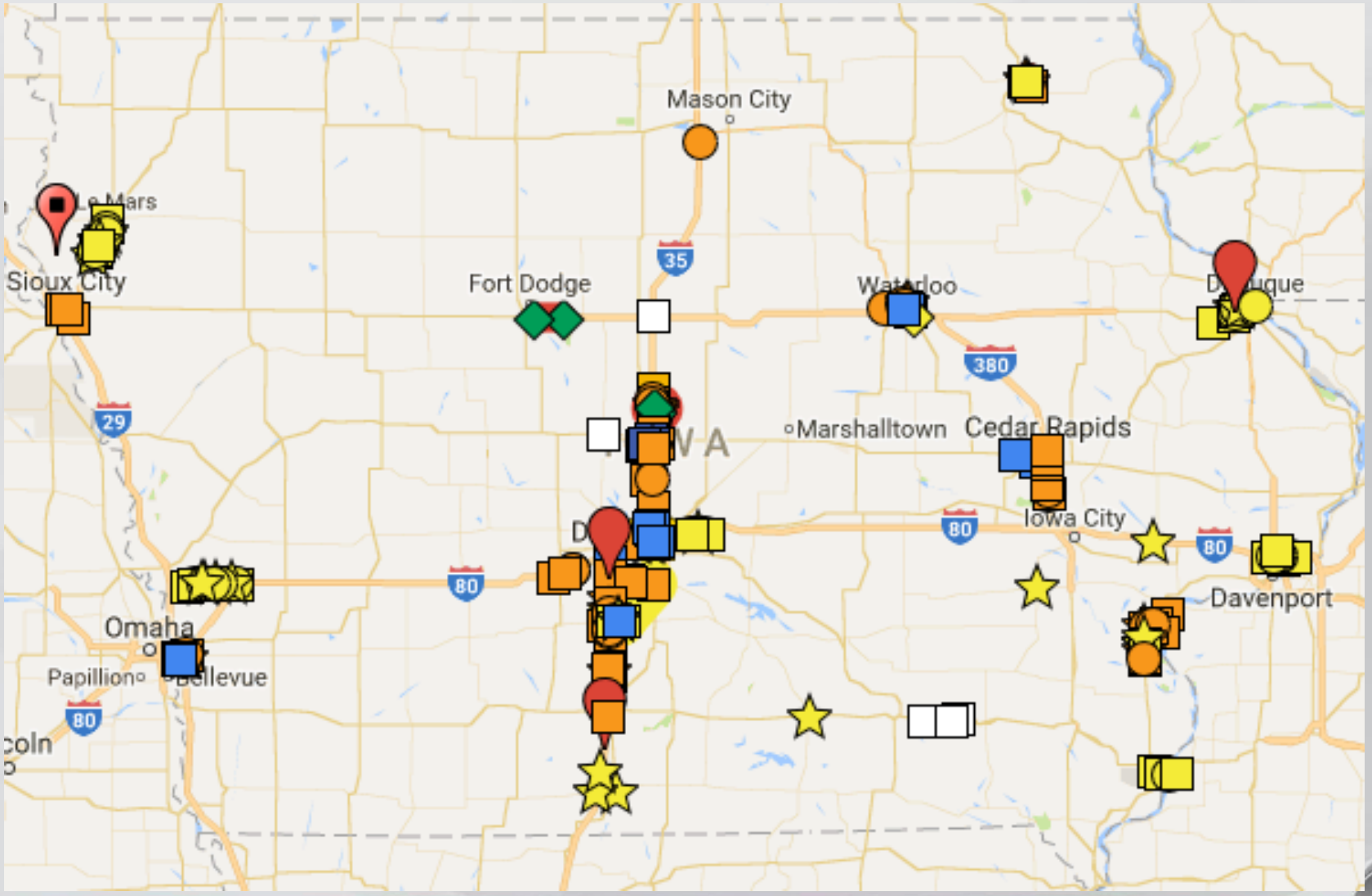
About the Traffic Critical Projects Program:

The Traffic Critical Projects (TCP) program identifies key construction projects across the state that may cause significant safety or mobility issues to the traveling public. Using various mitigation methods, the TCP program works to reduce or eliminate any potential safety or mobility concerns.

Potential 2017
Traffic Critical Projects



2017
IWZ Device Map



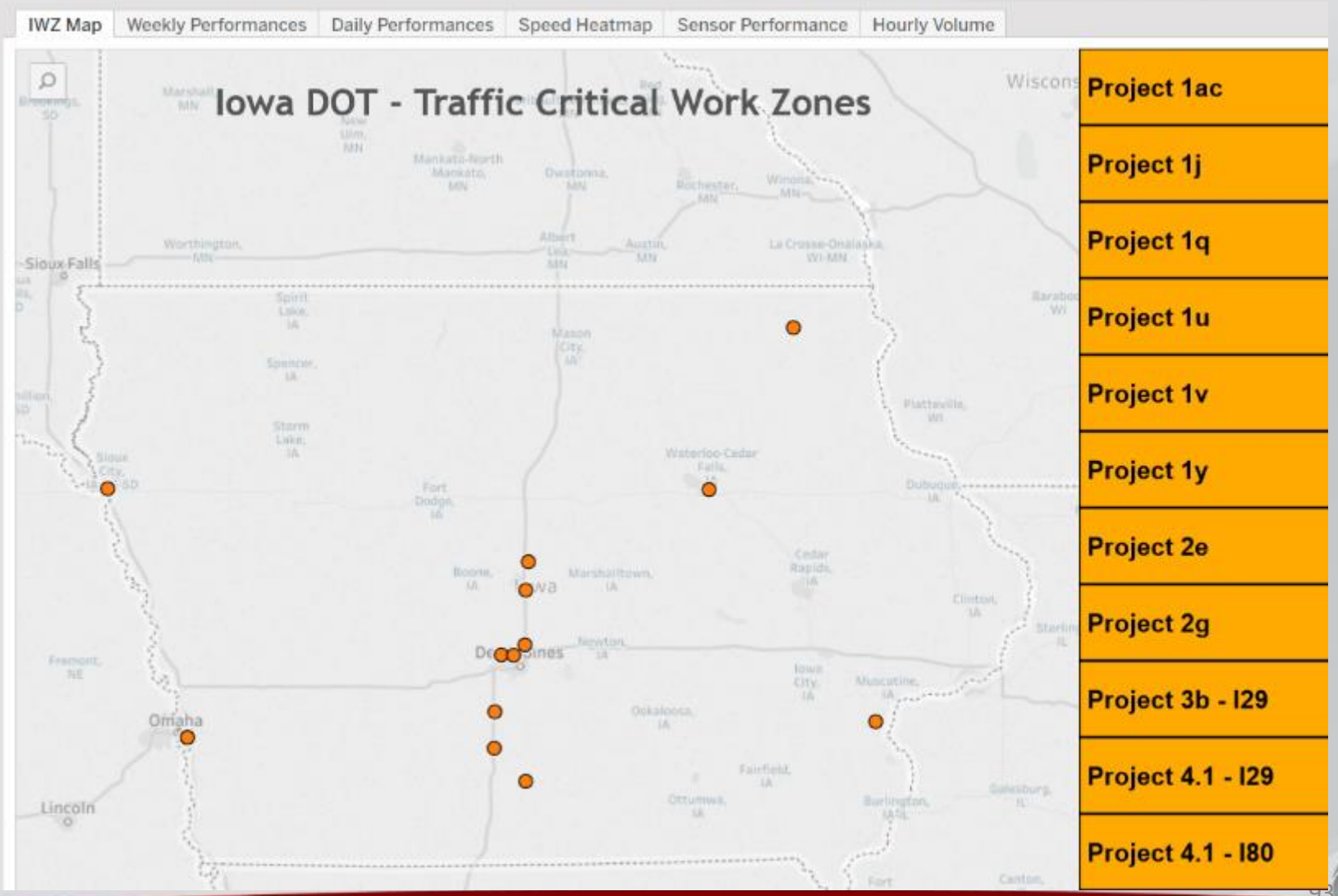
Traffic (BIG) Data Analysis by Iowa State University

Center for Transportation Research & Education (CTRE)

at the

Institute for Transportation (InTrans)

REACTOR Web Site
https://reactor.ctre.iastate.edu/



https://reactor.ctre.iastate.edu/

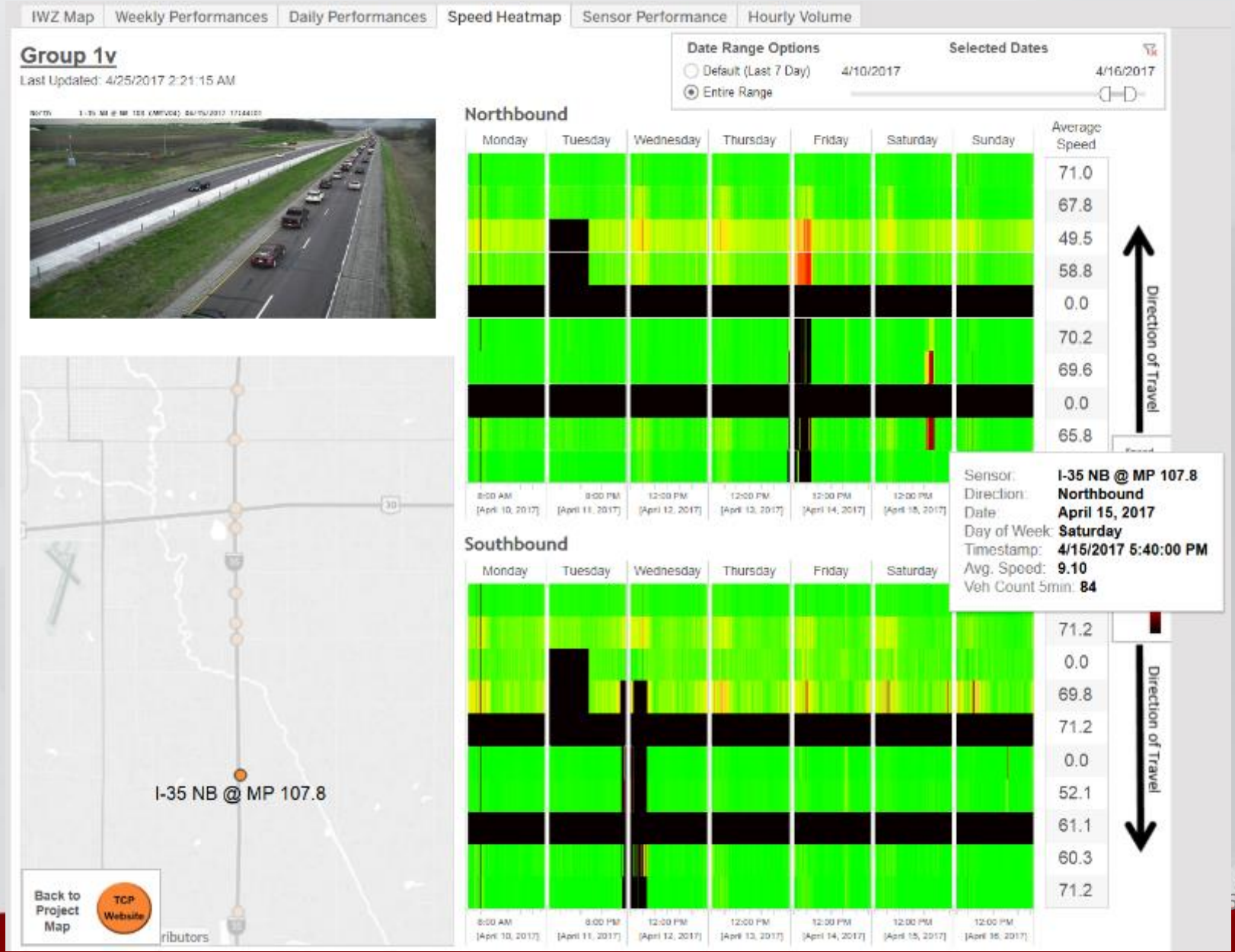
Weekly Performance

https://reactor.ctre.iastate.edu/

Daily Performance

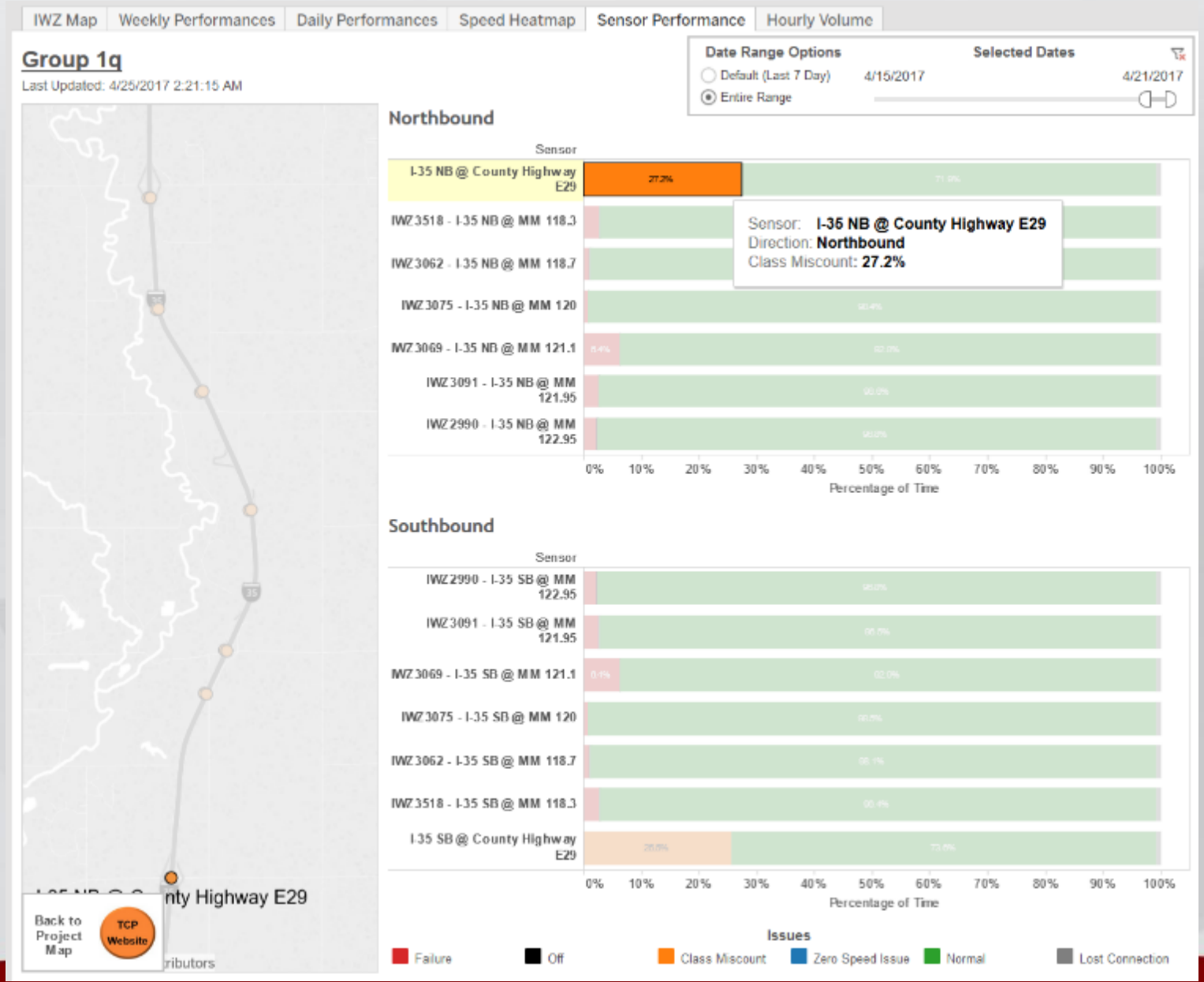
https://reactor.ctre.iastate.edu/

Speed Heatmap



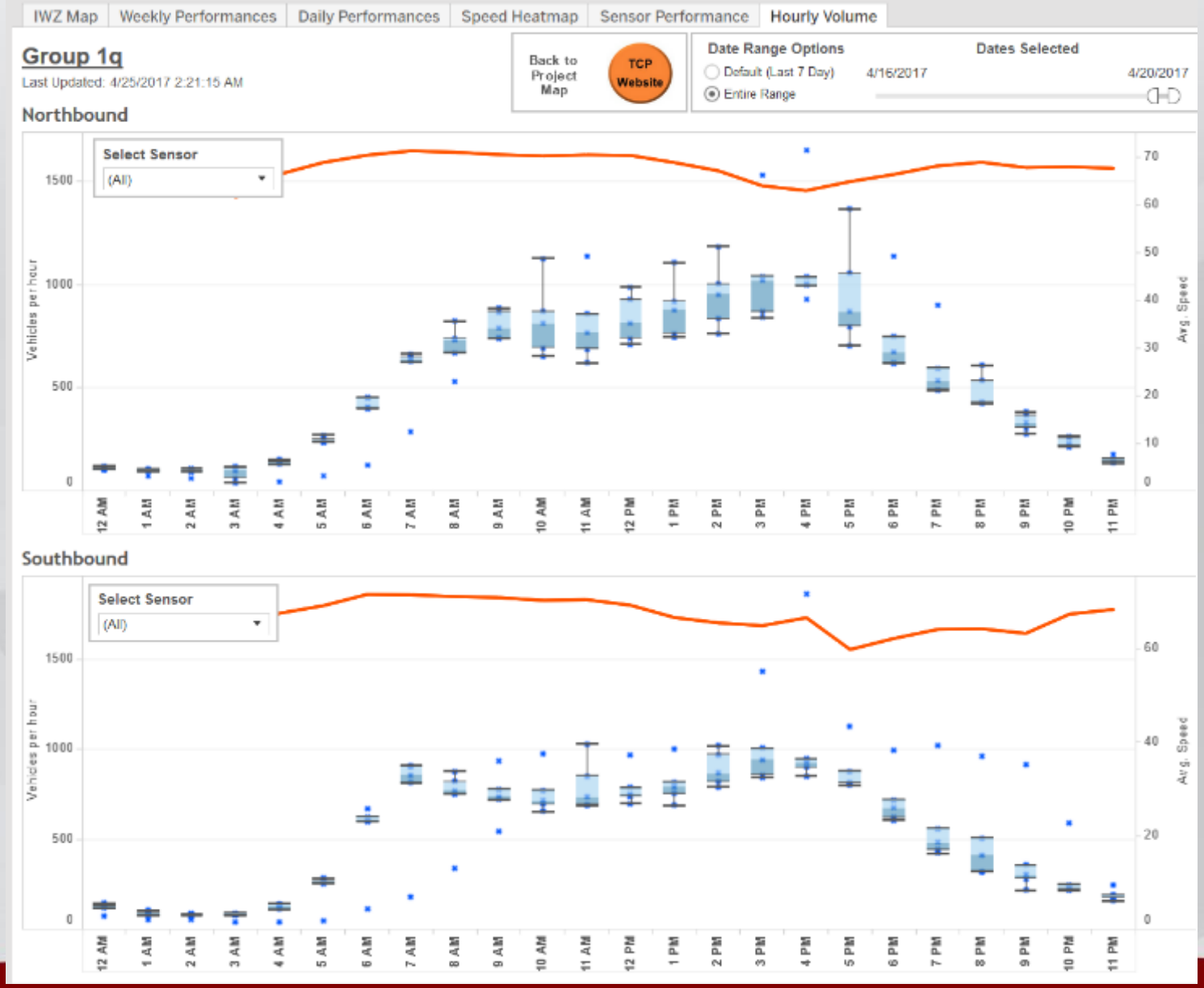
https://reactor.ctre.iastate.edu/

Sensor Performance



https://reactor.ctre.iastate.edu/

Hourly Volumes



Traffic Critical Projects Expansion

Traffic Critical Projects Strategies

Design

- Accommodate future Maint. & Constr.
- Staging to minimize disruptions
- Restrict lane closures to low-volume times

Traffic Incident Management (TIM) Planning

- ***Law enforcement, emergency responders, DOT, city/county***

TIM Planning on TCPs

- Reinforce Relationships among Engineering, Enforcement, Emergency Responders
- Share information and awareness
- Have contingency/diversion plans in place

Traffic Critical Projects Strategies

On-Site Monitoring

- Traffic Control Monitoring
- Highway Helper-like, Traffic Monitoring

Speed Harmonization

- Speed Feedback Trailers
- Portable DMS with Radar
- ***Enhanced Enforcement***

Enhanced Enforcement

I-35, Hamilton County, 2014

Questions?

Tim Simodynes, P.E.
ITS Engineer
Office of Traffic Operations
tim.simodynes@iowadot.us
515.239.1606

Closing

- Presenter contact information
  - Brandon Beise, NDDOT, bbeise@nd.gov
  - Tina Roelofs, Athey Creek, roelofs@acconsultants.org
  - Tom Dumont, MnDOT, tom.dumont@state.mn.us
  - Tim Simodynes, Iowa DOT, tim.simodynes@iowadot.us
- Additional project information
  - Available at www.nwpassage.info under Projects