APPROVED

By Samuel Sorensen, PE at 11:11 am, Aug 04, 2015

NB I-75 Monroe Co Queue Warning System Logic

6/16/2015

NB I-75 MM 10.0 PCMS 06 (S of Rest Area) M-106

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
3 MILES AHEAD	X MILES AHEAD	X MILES AHEAD

Route 06 10.0

Q Sensors:	MM	Act Dist	X =	
S01	11.0	1.0	1	WATCH FOR BACKUPS
S02	11.5	1.5	1	(change to 1.5)
S03	12.0	2.0	2	
S04	12.5	2.5	2	(Change to 2.5)
S05	13.0	3.0	3	

NB I-75 MM 10.5 PCMS 05 (N of Rest Area) M-184

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
TRUCKS USE LEFT LANE	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
THROUGH WORK ZONE	X MILES AHEAD	X MILES AHEAD

Route 05 10.5

Q Sensors:	MM	Act Dist	X =	
S01	11.0	0.5	WATCH FOR BACKUPS	
S02	11.5	1.0	1	
S03	12.0	1.5	1	(Change to 1.5)
S04	12.5	2.0	2	
S05	13.0	2.5	2	change to 2.5)

NB I-75 MM 11.0 PCMS 04 (S of Exit 11) M-154

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
2 MILES AHEAD	X MILES AHEAD	X MILES AHEAD

Route 04 11.0

Q Sensors:	MM	Act Dist	X =	
S02	11.5	0.5	WATCH FOR BACKUPS	
S03	12.0	1.0	1	
S04	12.5	1.5	1	change to 1.5)
S05	13.0	2.0	2	

NB I-75 MM 11.5 PCMS 03 (N of Laplainance Rd) M-154

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
TRUCKS USE LEFT LANE	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
THROUGH WORK ZONE	X MILES AHEAD	X MILES AHEAD

Route 03 11.5

Q Sensors:	MM	Act Dist	X =	
S03	12.0	0.5	WATCH FOR BACKUPS	
S04	12.5	1.0	1	
S05	13.0	1.5	1	(Change to 1.5)

NB I-75 MM 12.0 PCMS 02 (S of E Dunbar Rd) M-111

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
1 MILES AHEAD	X MILES AHEAD	X MILES AHEAD

Route 02 12.0

Q Sensors:	MM	Act Dist	X =
S04	12.5	0.5	WATCH FOR BACKUPS
S05	13.0	1.0	1

NB I-75 MM 12.5 PCMS 01 (N of E Dunbar Rd) M-188

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
TRUCKS USE LEFT LANE	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
THROUGH WORK ZONE	X MILES AHEAD	X MILES AHEAD

Route 01 12.5

Q Sensors:	MM	Act Dist	X =
S05	13.0	0.5	WATCH FOR BACKUPS

Logic Notes:

* Each PCMS will use all sensors in their route.

* PCMS use nearest sensor below each threshhold (Slow or Stopped).

* Distances "X" are rounded down to the nearest 1.0 mile increment. If > 1 mile, "X MILES" is eliminated from text to just say "AHEAD".

* Quick in / Slow out - 1 min msg period to go down a threshhold (from Freeflow to Slow - From Slow to Stopped) and 3 periods to go up a threshhold.

* Free Flow messages only used on even mile makers (1.0, 2.0, etc.)

* 1/2 mile marker messages to be TRUCKS USE LEFT LANE THROUGH WORK ZONE(0.5,1.5,etc..)

SB I-75 Monroe Co Queue Warning System Logic

6/16/2015

SB I-75 MM 26.5 PCMS 14 (N of Exit 26) M-119

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
TRUCKS USE LEFT LANE	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
THROUGH WORK ZONE	X MILES AHEAD	X MILES AHEAD

Route 14 — 26.5

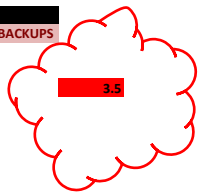
Q Sensors:	MM	Act Dist	X =
S10	24.0	2.5	WATCH FOR BACKUPS
S09	23.7	2.8	3
S08	23.0	3.5	3.5
S07	22.5	4.0	4
S06	22.0	4.5	4.5
S11	20.0	6.5	6.5

SB I-75 MM 26.0 PCMS 13 (N of Ready Rd) M-149

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
4 MILES AHEAD	X MILES AHEAD	X MILES AHEAD

Route 13 — 26.0

Q Sensors:	MM	Act Dist	X =
S10	24.0	2.0	WATCH FOR BACKUPS
S09	23.7	2.3	2.5
S08	23.0	3.0	3
S07	22.5	3.5	3
S06	22.0	4.0	4
S11	20.0	6.0	6



SB I-75 MM 25.5 PCMS 12 (S of Ready Rd) M-120

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
MOTOR-CYCLES USE	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
LEFT LN THROUGH WORKZONE	X MILES AHEAD	X MILES AHEAD

Route 12 — 25.5

Q Sensors:	MM	Act Dist	X =
S10	24.0	1.5	WATCH FOR BACKUPS
S09	23.7	1.8	2
S08	23.0	2.5	2.5
S07	22.5	3.0	3
S06	22.0	3.5	3.5
S11	20.0	5.5	5.5

SB I-75 MM 24.7 PCMS 11 (N of Sigler Rd) M-148

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
3 MILES AHEAD	X MILES AHEAD	X MILES AHEAD

Route 11 — 24.7

Q Sensors:	MM	Act Dist	X =
S10	24.0	0.7	WATCH FOR BACKUPS
S09	23.7	1.0	1
S08	23.0	1.7	1.5
S07	22.5	2.2	2
S06	22.0	2.7	2.5
S11	20.0	4.7	4.5

SB I-75 MM 24.5 PCMS 10 (N of Sigler Rd) M-84

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
TRUCKS USE LEFT LANE	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
THROUGH WORK ZONE	X MILES AHEAD	X MILES AHEAD

Route 10 — 24.2

Q Sensors:	MM	Act Dist	X =
S10	24.0	0.2	WATCH FOR BACKUPS
S09	23.7	0.5	WATCH FOR BACKUPS
S08	23.0	1.2	1
S07	22.5	1.7	1.5
S06	22.0	2.2	2
S11	20.0	4.2	4

SB I-75 MM 23.7 PCMS 09 (Btw Sigler & Labo Rd) M-151

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
2 MILES AHEAD	X MILES AHEAD	X MILES AHEAD

Route 09 — 23.7

Q Sensors:	MM	Act Dist	X =
S08	23.0	0.7	WATCH FOR BACKUPS
S07	22.5	1.2	1
S06	22.0	1.7	1.5
S11	20.0	3.7	3.5

SB I-75 MM 23.2 PCMS 08 (N of Labo Rd) M-90

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
TRUCKS USE LEFT LANE	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
THROUGH WORK ZONE	X MILES AHEAD	X MILES AHEAD

Route 08 — 23.2

Q Sensors:	MM	Act Dist	X =
S08	23.0	0.2	WATCH FOR BACKUPS
S07	22.5	0.7	WATCH FOR BACKUPS
S06	22.0	1.2	1
S11	20.0	3.2	3

SB I-75 MM 22.5 PCMS 07 (0.5 mi N of Exit 21) M-152

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
AHEAD	X MILES AHEAD	X MILES AHEAD

Route 07 — 22.5

Q Sensors:	MM	Act Dist	X =
S06	22.0	0.5	WATCH FOR BACKUPS
S11	20.0	2.5	2.5

Logic Notes:

* Each PCMS will use all sensors in their route.

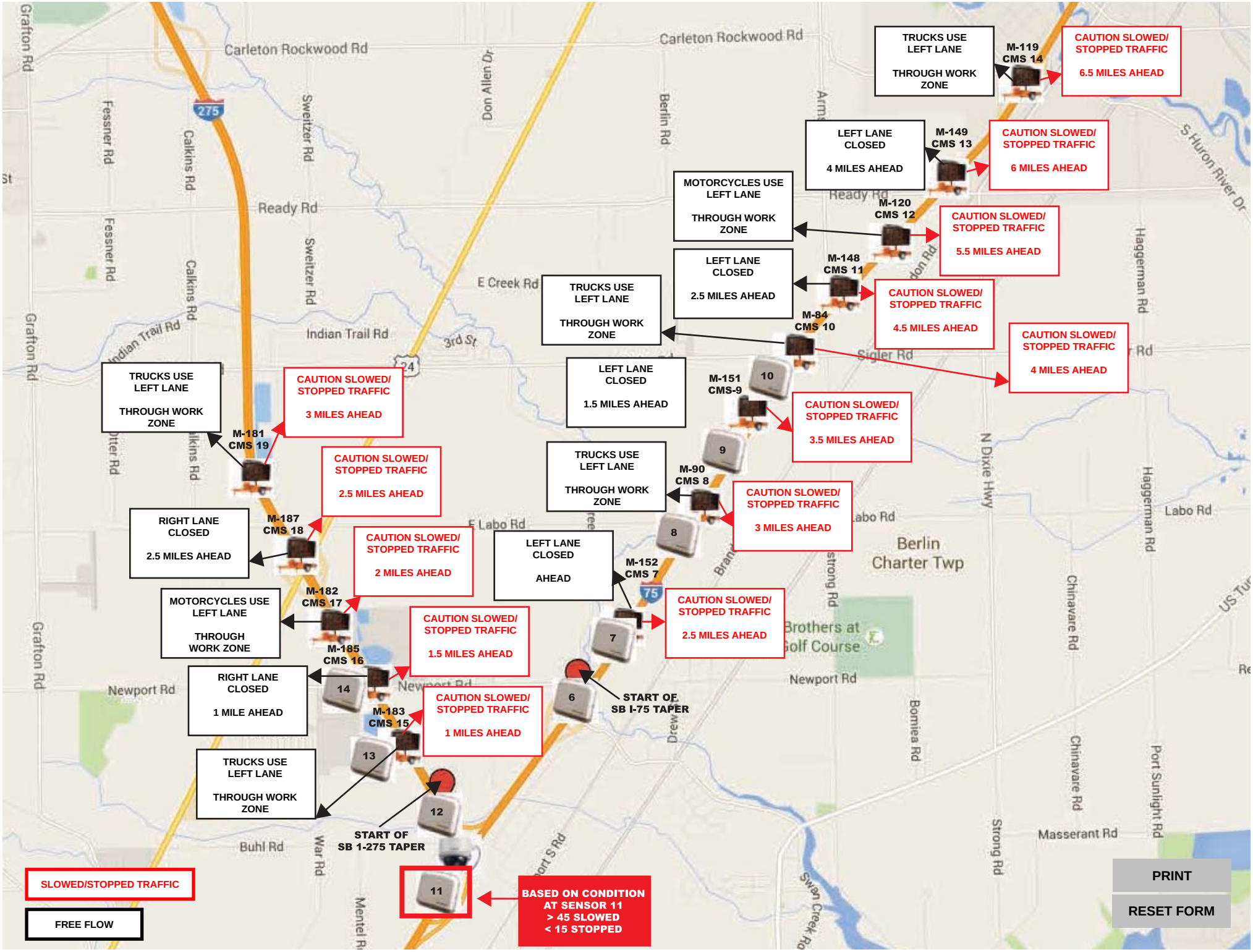
* PCMS use nearest sensor below each threshhold (Slow or Stopped).

* Distances "X" are rounded down to the nearest 1.0 mile increment. If > 1 mile, "X MILES" is eliminated from text to just say "AHEAD".

* Quick in / Slow out - 1 min msg period to go down a threshhold (from Freeflow to Slow - From Slow to Stopped) and 3 periods to go up a threshhold.

* Free Flow messages only used on even mile makers (1.0, 2.0, etc.)

* 1/2 mile marker messages to be TRUCKS USE LEFT LANE THROUGH WORK ZONE (0.5,1.5,etc..)


TRUCKS USE LEFT LANE THROUGH WORK ZONE
M-119 CMS 14
CAUTION SLOWED/ STOPPED TRAFFIC 6.5 MILES AHEAD
LEFT LANE CLOSED 4 MILES AHEAD
M-149 CMS 13
CAUTION SLOWED/ STOPPED TRAFFIC 6 MILES AHEAD
MOTORCYCLES USE LEFT LANE THROUGH WORK ZONE
M-120 CMS 12
CAUTION SLOWED/ STOPPED TRAFFIC 5.5 MILES AHEAD
LEFT LANE CLOSED 2.5 MILES AHEAD
M-148 CMS 11
CAUTION SLOWED/ STOPPED TRAFFIC 4.5 MILES AHEAD
TRUCKS USE LEFT LANE THROUGH WORK ZONE
M-84 CMS 10
CAUTION SLOWED/ STOPPED TRAFFIC 4 MILES AHEAD
LEFT LANE CLOSED 1.5 MILES AHEAD
M-151 CMS-9
CAUTION SLOWED/ STOPPED TRAFFIC 3.5 MILES AHEAD
TRUCKS USE LEFT LANE THROUGH WORK ZONE
M-181 CMS 19
CAUTION SLOWED/ STOPPED TRAFFIC 3 MILES AHEAD
TRUCKS USE LEFT LANE THROUGH WORK ZONE
M-90 CMS 8
CAUTION SLOWED/ STOPPED TRAFFIC 3 MILES AHEAD
CAUTION SLOWED/ STOPPED TRAFFIC 2.5 MILES AHEAD
RIGHT LANE CLOSED 2.5 MILES AHEAD
M-187 CMS 18
CAUTION SLOWED/ STOPPED TRAFFIC 2 MILES AHEAD
LEFT LANE CLOSED AHEAD
M-152 CMS 7
CAUTION SLOWED/ STOPPED TRAFFIC 2.5 MILES AHEAD
MOTORCYCLES USE LEFT LANE THROUGH WORK ZONE
M-182 CMS 17
CAUTION SLOWED/ STOPPED TRAFFIC 1.5 MILES AHEAD
M-185 CMS 16
RIGHT LANE CLOSED 1 MILE AHEAD
CAUTION SLOWED/ STOPPED TRAFFIC 1 MILES AHEAD
M-183 CMS 15
TRUCKS USE LEFT LANE THROUGH WORK ZONE
START OF SB I-75 TAPER
START OF SB 1-275 TAPER
BASED ON CONDITION AT SENSOR 11 > 45 SLOWED < 15 STOPPED
SLOWED/STOPPED TRAFFIC
FREE FLOW
PRINT
RESET FORM
Carleton Rockwood Rd
Ready Rd
Indian Trail Rd
E Creek Rd
E Labo Rd
Labo Rd
Sigler Rd
Newport Rd
Buhl Rd
Masserant Rd
Berlin Charter Twp
Brothers at Golf Course
Grafton Rd
Fessner Rd
Calkins Rd
Sweitzer Rd
Don Allen Dr
Berlin Rd
S Huron River Dr
Haggerman Rd
N Dixie Hwy
Strong Rd
Chinavare Rd
Bomiea Rd
Port Sunlight Rd
War Rd
Otter Rd
3rd St
275
75
24


START OF
NB I-75 TAPER
5
BASED ON CONDITIONS
AT SENSOR 5
> 45 SLOWED
< 15 STOPPED
TRUCKS USE
LEFT LANE
THROUGH WORK
ZONE
M-188
CMS 1
CAUTION SLOWED/
STOPPED TRAFFIC
.5 MILES AHEAD
4
WATCH FOR
BACKUPS
LEFT LANE
CLOSED
1 MILE AHEAD
M-111
CMS 2
CAUTION SLOWED/
STOPPED TRAFFIC
1 MILE AHEAD
3
TRUCKS USE
LEFT LANE
THROUGH WORK
ZONE
M-154
CMS 3
CAUTION SLOWED/
STOPPED TRAFFIC
1.5 MILES AHEAD
2
LEFT LANE
CLOSED
2 MILES AHEAD
M-154
CMS 4
CAUTION SLOWED/
STOPPED TRAFFIC
2 MILES AHEAD
1
TRUCKS USE
LEFT LANE
THROUGH WORK
ZONE
M-184
CMS 5
CAUTION SLOWED/
STOPPED TRAFFIC
2.5 MILES AHEAD
LEFT LANE
CLOSED
3 MILES AHEAD
M-106
CMS 6
CAUTION SLOWED/
STOPPED TRAFFIC
3 MILES AHEAD
E Elm Ave
E Front St
E Elm Ave
E Dunbar Rd
Hull Rd
E Albain
Alton Rd
Lake Dr
Shady Ln
Gerdau Ameristeel
SLOWED/STOPPED TRAFFIC
FREE FLOW

DAN'S EXCAVATING, INC.
Phone: 586-254-2040 ● Fax: 586-254-5840
12955 23 Mile Road ● Shelby Township, Michigan 48315

SUBMITTAL

5.60 mi of concrete reconstruction, grading, drainage and geometric improvements, traffic signals, ITS, signing, pavement markings, lighting, landscaping, bridge reconstruction and widening on 5 structures, riprap, and slope protection on I-75 from Dixie Highway to I-275, Monroe County.

PROJECT INFORMATION	
State Job Number	110616A
Control Section	IM 58152
Fedral Aid Number	IM 1558(009)

Submittal Number		**SD 018**	1st Re-Submittal		**5/18/2015**
Original Submittal Date		**4/29/2015**	2nd Re-Submittal		**7/6/2015**
Reviewing Party			3rd Re-Submittal		

Enclosures	Item Description	Quantity
Give 'Em A Brake	Submittal List With Links to individual Files	1
Give 'Em A Brake	Give 'Em A Brake	1
Give 'Em A Brake	Message Boards	3
Give 'Em A Brake	Sensors	4
Give 'Em A Brake	Trailer	1
Give 'Em A Brake	Camera	2
Give 'Em A Brake	Trailer	2
Give 'Em A Brake	CDN/camera interface	3
Give 'Em A Brake	Vermac Jam-Logic	3
Give 'Em A Brake	Itelligent Work Zone Types	1
Give 'Em A Brake	Streat Smart Rental	1
Give 'Em A Brake	Proposed Layout	3

MDOT Michigan Department of Transportation

Street Smart Rental

Give 'Em A BRAKE Safety

2610 Sanford Ave Grandville, MI 49418
Traverse City | Saginaw | Marquette

PROJECT SUBMITTALS

Company Information:

Give 'Em A Brake (service):
GEBS services

Street Smart Rental (hardware):
SSR services

Jam Logic (software):
Jam-Logic brochure

Proposed Layout:

Proposed Plan:

See current layout within Ver-Mac Jam-Logic

Proposed Logic:
See Attached PDF

User Access:

- Richard Myers myersR4@michigan.gov
- Channing Page PageC@michigan.gov
- Reid Hackworth HackworthR1@michigan.gov
- Craig Heidelberg HeidelbergC@michigan.gov
- Greg Losch LoschG@michigan.gov
- Andrew Hodges Hodgesa@michigan.gov

System Installation Proposed Time frame:

STA System should be installed during/ prior to Prestage 1. The taper locations for each stage are in the same location for Prestage 1, Prestage 2 and Stage 1A/ 1B.

Data Download:
JamLogic communicates with the Sensors and Signs every 1 minute. So the data will be available in 1 minunte intervals and can be downloaded from the site at any point in time.

Emergency Contacts:
Mike Heyboer
616-813-0176

Sam Ferrer
616-446-2175

Equipment:

Message boards:
http://www.ver-mac.com/en/products/portable_message_boards/pcms_1210.php
http://www.ver-mac.com/en/products/portable_message_boards/pcms_1500c.php

Sensors:
https://s3.amazonaws.com/com.wavetronix.www/uploads/download/file/272/smartsensor_manager_hd_datasheet-20140807144007.en.pdf
https://s3.amazonaws.com/com.wavetronix.www/uploads/download/file/397/smartsensor_hd_legacy_datasheet-20140807103327.en.pdf

Sensor Trailer:
https://drive.google.com/file/d/0Bww5Jh16YJu2SnpZdUtJRmtmM1k/view?usp=sharing

Camera (6044E or Axis 215):
http://www.axis.com/files/datasheet/ds_q60e_60196_en_1411_lo.pdf
http://classic.www.axis.com/files/datasheet/ds_215ptz_34462_en_0902_lo.pdf

Camera Trailer:
http://www.trafcon.com/portable_equipment_platform_new.php
https://drive.google.com/file/d/0Bww5Jh16YJu2RjdqbnFrRUZRYWc/view?usp=sharing

CDN/camera interface:
http://www.qvisiontechnology.com/implementation.aspx
https://drive.google.com/file/d/0Bww5Jh16YJu2V2kyY3p5MlhuekU/view?usp=sharing
https://drive.google.com/file/d/0Bww5Jh16YJu2WVl1cmlxYjJmY2M/view?usp=sharing

VerMac Jam-Logic:
http://www.ver-mac.com/en/smart_work_zone/traffic_responsive_systems.php
http://www.ver-mac.com/en/smart_work_zone/vehicle_responsive_systems.php
https://drive.google.com/file/d/0Bww5Jh16YJu2bl91bDZSVGd4OWc/view?usp=sharing

Give 'Em A BRAKE Safety
2610 Sanford Ave Grandville, MI 49418
Traverse City | Saginaw | Marquette

Give 'Em A Brake Safety

Overview

Give 'Em A Brake Safety has always been dedicated in introducing and providing the most current equipment to keep the Workers, and Motorist safe through road construction work zones. We pride ourselves on a never say no attitude, and to do what it takes to get the job done! GEBS in partnering with Street Smart Rental, and Ver-Mac Jam-Logic will deliver a quality product that will meet, or exceed your expectations.

Qualified Team Members

Mike Heyboer will be the main GEBS contact for the system. He will be coordinating the setup of the system and working directly with Street Smart Rental, and Ver-Mac Jam-Logic to make the process as smooth as possible. Mike has been working on ITS type projects for a number of years. He has previous experience working with system like the Indiana Lane Merge System, the Variable speed limit system, Real time information system, and Stopped traffic advisory system. Mike is our equipment manager in charge of the inventory and maintenance of all GEBS serialized equipment. He also keeps up with the changing technology to keep all of our equipment current with the changes in technology.

Sam Ferrer will be the #2 contact for this project if or when Mike Heyboer is not available. Sam has been in the traffic control business for a number of years and has been involved with projects like the Indiana Lane Merge, Variable speed system, Real time information system, and Stopped traffic advisory system.

Give 'Em A Brake Safety has been working on a number of ITS related projects since 2003. GEBS has on past projects partnered with companies such as Street Smart Rental, and Ver-Mac Jam-Logic, Traffic Technologies, and International Road Dynamics.

Our project list includes the following systems.

Real Time Information System on I-69 near Swartz Creek with Six S construction

Lane Merge System on I-94 near Paw Paw with Interstate Highway Construction.

Real Time Information System with Street Smart Rental, and Ver-Mac Jam-Logic on US-10 with Fisher Contracting.

Real Time Information System with Street Smart Rental, and Ver-Mac Jam-Logic on I-196 in Grand Rapids with Toebe Cobstruction.

Stopped Traffic Advisory System with Street Smart Rental, and Ver-Mac Jam-Logic on I-94 and Sargeant rd in Jackson County with Hoffman Brothers

Lane Merger System with Street Smart Rental, and Ver-Mac Jam-Logic on I-96 in Muskegon County with K&R

Give 'Em A Brake Safety has also been involved with supplying latest technology to MDOT with NTCIP Full Matrix Portable Changeable Message Signs (PCMS) which has given MDOT the ability to remotely change the message on the PCMS' GEBS supplied.

A list of these jobs are as follows.

Six S
I-75 Bay County
0801-84072
Louis Taylor was the MDOT contact. His number is 989-671-1535.
4- Wanco message boards were used.

CA Hull
I-675 Saginaw County
0904-102691
10- Addco message boards were used.
Louis Taylor is the MDOT contact. His number is 989-671-1535.

Dj Mcquestion
I-96 Lansing Ingham County
0908-45639
14- Solartech Message boards were used.
Robert Welch was the Mdot contact. His number is 517-324-2288.

Interstate
I-96 Lansing Ingham County
4- Solartech message boards were used.
Robert Welch was the Mdot contact. His number is 517-324-2288.

Project Management

Reporting Requirements

Give 'Em A Brake Safety (GEB) and *Street Smart Rental, and Ver-Mac Jam-Logic Transportation Systems, Inc.* will work with the Department of Transportation to develop a template to be used for the status reporting if desired by the DOT. *GEB* will have access to all system logs, *Street Smart Rental, and Ver-Mac Jam-Logic* will work with all parties to determine which system logs will be included in the reports. *Street Smart Rental, and Ver-Mac Jam-Logic* will work with the DOT to determine in what format the logs should be presented. *GEB* and *Street Smart Rental, and Ver-Mac Jam-Logic* will log all routine system maintenance, and repairs to the system. All field device malfunctions and communication outages will be logged to the system database automatically.

Status Update and Project Coordination Meetings

GEB would take the lead on this with the support and data provided by *Street Smart Rental, and Ver-Mac Jam-Logic*. *Street Smart Rental, and Ver-Mac Jam-Logic* would be available to join via a conference call, speaker phone or onsite if deemed necessary.

Street Smart Rental

"Turn-key" ITS Rental Solutions

Intelligent Transportation Systems

by: Street Smart Rental, Inc

Street Smart Rental has been providing Intelligent Transportation Systems for almost 10 years now. Our ITS rental solutions have been used on everything from large-scale road construction projects (e.g. I-75/ I-696 Detroit, MI Interchange Project), to high-visibility events (e.g. the Vancouver Olympics) and even during the most unpredictable catastrophe's (e.g. the I-35W Bridge Collapse).

Street Smart Rental offers a service that combines technological innovation with reliable products; combined with a management team that has decades of industry experience. Street Smart Rental has one of the **largest fleets of portable ITS equipment** in the country; this allows us to **respond quickly and economically** to our customers' needs. Whether you're looking for pricing estimates, design work, or general insight into ITS systems; our engineering and sales team will work with you to help design your next ITS project. Whether you design the project with or without us, our technical support team can help with deployment, maintenance, troubleshooting and repair of your project - anywhere in the U.S.

Travel/ Delay Time

Queue Warning

Variable Speed Limit

Camera Trailer

Traffic Sensors

Google Mapping

Alternative Routes

Hazard Warning

Dynamic Merge System

Highway Advisory Radio

Street Smart Rental, Inc.
Nationwide
"Sales, Rentals, and Service"
888-653-6800
mikeir@streetsmartrental.com

Street Smart Rental, Inc.

www.itsrentalsolutions.com

Street Smart Rental

"Turn-key" ITS Rental Solutions

Intelligent Transportation Systems

by: Street Smart Rental, Inc

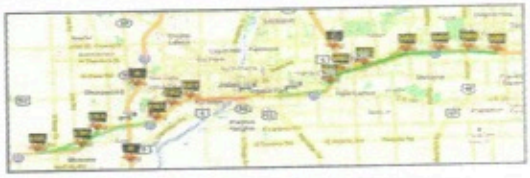
'Smart' Incident Management Solution

Rapid deployment of remotely controlled devices such as: **Portable Camera Trailers -** to monitor traffic, weather, and other extraneous conditions. **Portable Data Collection Devices -** to monitor traffic speed, volume, and weight Classification. **Changeable Message Signs -** to alert motorists of changing road conditions and capacity. **Portable Traffic Signals –** designed to work with or without existing signals

'Smart' Event Management Solution

Large or small scale deployments for events that require traffic , pedestrian and parking management . System can be automated or remotely controlled with an easy-to-use GUI; allowing for remote event management. **Portable Camera Trailers -** to monitor traffic, weather, parking conditions, and pedestrians. **Portable Data Collection Devices -** to monitor traffic volume and parking lots **Changeable Message Signs -** to alert motorists of changing parking conditions, to guide pedestrians. **Portable Traffic Signals –** designed to work with or without existing signals

'Smart' Work Zone Solution



A smart work zone should be portable, automated and reliable. It should analyze traffic flow in real time and provide updated information to drivers. ITS in work zones is designed to relieve congestion and keep motorists safe by providing vital information and features, including: Alternative Routes, Real-Time Traffic Conditions, Excessive Speed, Dynamic Merge Systems, Variable Speed Limit, Travel and Delay Time, and Queue Warning Systems.

Street Smart Rental, Inc.
Nationwide
"Sales, Rentals, and Service"
888-653-6800
mikeir@streetsmartrental.com

Street Smart Rental, Inc.

www.itsrentalsolutions.com

Street Smart Rental

"Turn-key" ITS Rental Solutions

Noteworthy Projects using our Products and Services:

Detroit, MI (Feb-Sep 2007)
M-10 "The Lodge" Major Reconstruction
Traveler Information & Travel Time
4 PCMS's, 20 Travel Time Signs, 75 Traffic Sensors, 8 Cameras

Minneapolis, MN (Aug 2007 – Aug 2008)
35W Bridge Collapse-Rapid Deployment
Alternative Route Info
4 Cameras, 4 Traffic Sensors

Vancuver, BC. Canada (Winter 2010)
2010 Winter Olympics
Remote Fleet Management, Traffic & Parking Mgmt.
37 PCMS

Lincoln, NE (Apr 2006 – Dec 2007)
I-80 Work Zone Management
Travel Time & Lane Management
6 PCMS's, 4 Traffic Sensors, 2 Cameras

Hastings, MN (Summer 2008)
TH 61 Hastings Bridge Repairs
Delay Time, Queue Warning
4 PCMS's, 1Delay Time Displays, 6 Traffic Sensors, 2 Cameras

Joliet, IL (May-Nov, 2011)
I-80 SW Will County
Travel Time & Queue Warning
19 PCMS's, 24 Traffic Sensors, 6 Camera Trailers

Effingham, IL (Dec. 2010 – Oct. 2012)
I-70/I-57 EFFINGHAM, IL
Delay Time/Alternate Routes , Queue Warnings
25 PCMS's, 25 Traffic Sensors, 20 Camera Trailers

Bloomington, MN (July 2012 – Nov 2013)
I-494/ Portable Data Collection
Travel Time, Route Management
12 Wavetronix HD Sensors, 1 Infinova PTZ 4G Camera

Minneapolis, MN (2008 & 2010)
I-35W/Crosstown WZ Enhancements
Excessive Speed Warning, ITS Camera & Loop Replacement
1 PCMS with Speed Radar, 11 Traffic Sensors

Fargo, ND/ Moorhead, MN (Summer/ Fall 2009)
I-94 Red River Bridge
Delay Time & Queue Warning
7 Static-Dynamic Signs, 3 Dynamic Delay Signs, 5 Traffic Sensors

Madison Co., IL (Nov 2010 – Jun 2012)
I-55 Madison County
Travel Time & Queue Warning
60 PCMS, 60 Traffic Sensors

Detroit, MI (Dec 2007 – Dec 2009)
I-75/Gateway Metro Reconstruction
Traveler Information, Travel Time, Route Mgmt.
27 Travel Time Displays, 10 PCMS's, 190 Traffic Sensors, 30 Cameras

Street Smart Rental, Inc.
Nationwide
"Sales, Rentals, and Service"
888-653-6800
mikejr@streetsmartrental.com

Street Smart Rental, Inc.

www.itsrentalsolutions.com

Street Smart Rental

"Turn-key" ITS Rental Solutions

Noteworthy Projects using our Products and Services:

Rock Island, IL (March 2009 – Sept. 2010)
I-80 Quad Cities Loop
Delay Time & Prepare to Stop System
20 PCMS, 10 Traffic Sensors

Northbrook, IL (July 2010 – Dec. 2010)
I-94 Spur - IL Toll Way (Chicago Area)
Delay Times & Prepare to Stop System
6 PCMS, 5 Traffic Sensors, 3 Camera's

Faribault, MN (June 2012)
I-35 Variable Speed Limit Signs
Managed Speed Advisory System
14 Static-Dynamic LED Displays

Oakdale, MN (Summer 2012)
I-694 Between TH 61 – Hwy 5
Dynamic Merge & Prepare to Stop System
3 PCMS, 5 PTS Trailers, 12 Traffic Sensors

Tulsa, OK (May 2011 – Dec. 2012)
I-244 Bridge Project (Tiger Bridge Job)
Traveler Information & Travel Time
33 PCMS, 2 Camera's

Oklahoma City, OK (Feb. 2009 – July 2009)
Turner's Turnpike Toll Road
Traveler Information & Travel Time
8 PCMS, 2 Traffic Sensor's

Oklahoma City, OK (Oct. 2010 – Oct. 2011)
I-40 Cross-town Expressway
Traveler Information & Travel Time
14 PCMS, 1 Camera

Rolla, MO (March 2011 – June 2011)
I -44 Reconstruction
Delay Times, Alt. Routes, & Queue Warning
12 PCMS, 2 Traffic Sensors, 8 Doppler Radars

Hinckley, MN (Summer 2012)
I-35 PTS System
Queue Warning System
16 Stopped Traffic Advisory Trailers

Denver, CO (Nov. 2012 – 2013)
C-470 Lower Loop
Traveler Information & Travel Time
12 PCMS, 12 Traffic Sensors

Tulsa, OK (Feb. 2012 – Feb. 2013)
Tulsa II Job
Traveler Information & Travel Time
29 PCMS, 2 Camera's

Tulsa, OK (June 2009 – Feb. 2011)
IDL Construction Project
Traveler Information & Travel Time
34 PCMS, 4 Camera's, 16 Traffic Sensors

Ardmore, OK (Dec. 2009 – Sept. 2010)
I-35 Carter County Job
Traveler Information & Travel Time
18 PCMS, 2 Camera's

Toronto, ON. Canada (Aug. 2009)
Stinson Equipment Job
4 Camera's, 7 PCMS, 8 Traffic Sensors

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Street Smart Rental

"Turn-key" ITS Rental Solutions

Noteworthy Projects using our Products and Services:

Port Huron, MI (April 2011 – Nov. 2012)
Port Huron Job
4 Camera Trailers

Duluth, MN (April 2010 – Oct. 2011)
Duluth I-35 Mega Project
Travel Time & Queue Warning
3 PCMS / 3 Travel Time Signs, 4 Prepare to Stop Flashers, 16 Traffic Sensors

South Plainfield, NJ (Dec. 2009 – March 2010)
Traffic Safety Services Job
8 Camera Trailers

Oklahoma (March 2011 – Dec. 2011)
Oak Creek County Job
Traveler Information & Travel Time
12 PCMS, 2 Camera Trailers

Houston, TX (March 2011)
2011 Houston Rodeo
Remote Fleet Management, Traffic & Parking Mgmt.
24 PCMS

Tulsa, OK (March 2010 – March 2011)
Tulsa County Job
Traveler Information
24 PCMS, 2 Camera Trailers

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Illinois Department of Transportation
Office of the Secretary
2300 South Dirksen Parkway / Springfield, Illinois / 62764
Telephone 217/782-5597

November 8, 2011

Ver-Mac
2650 Minnehaha Ave., Suite 500
Minneapolis, MN 55406

Dear Sir/Madam:

Congratulations on your recent nomination for Illinois Department of Transportation's Contractor of the Year Awards in the Work Zone Traffic Control category. The nomination was in recognition of traffic control provided during resurfacing on I-55 from north of I-70/270 to north of IL 140 in Madison County.

I am very pleased to announce the project was selected for the award. The department would like to publicly acknowledge your outstanding performance. A plaque will be presented to you or your firm's representative at the Associated General Contractors of Illinois' annual convention luncheon to be held at the Bloomington-Normal Marriott Hotel and Conference Center, located at 201 Broadway Street, Normal, Illinois on December 6, 2011.

Those persons on your staff who are interested in attending the awards ceremony are welcome. Photographs will be taken during this time. A PowerPoint presentation with photos of all nominations will be on display before the luncheon. The presentation provides everyone present an opportunity to see which contracts have been nominated for awards in nine different categories.

For additional information and tickets to the luncheon, you may contact Mr. Matt Davidson, Executive Director, Associated General Contractors of Illinois at telephone number (217) 789-2650.

Thank you for your interest in the Illinois transportation system. Once again, congratulations to you and your staff on this outstanding accomplishment.

Sincerely,

Ann L. Schneider
Acting Secretary

CITY OF VANCOUVER

ENGINEERING SERVICES
Peter Judd, P.Eng., General Manager

August 20, 2010

Inprotect Systems
202 - 20351 Duncan Way
Langley, B.C.
V3A 7N3

Dear Kevin Waddell:

RE: 2010 Olympic and Paralympic Winter Games

The service and expertise that Inprotect Systems provided to the City of Vancouver during the 2010 Olympic and Paralympic Winter games was integral in our implementation of a successful games time transportation plan. The Changeable Message Sign boards outfitted with modems that you supplied were easy to operate within the Ver-Mac software provided. This was key in allowing us to upload real time messaging updates remotely by City Staff at their workstations within the Traffic Signal Management Center (under the Vancouver Transportation Operations Center umbrella) and in conjunction with the Vancouver Operations Center. These messages were both pre-scheduled ahead of the planned closures, as well as responsive in regards to our ability to message any type of unforeseen incident affecting the network. Additional messages, unrelated to transportation, were added to congratulate medal winners and send out a Police communiqué regarding public behavior.

We identified the following reasons for CMS board placement, as the main desires we were looking to achieve were:

1) communication to commuters on major entry corridors into the City from other jurisdictions
2) communication to commuters on feeder arterials within the City that were going to be impacted by the localized closures
3) pedestrian and spectator notification near venues and livesites (responsive due to the popularity of some entertainment acts)

Exact physical locations of the CMS boards were determined prior to the delivery - as with the limited amount of street width in most areas there was a need to place them strategically as to not impact pedestrians, cyclists, transit or general purpose traffic. Most were located in left turn bays and medians where feasible and were marked with additional hi-vis flexible traffic drums.

City of Vancouver, Engineering Services
Mailing Address: 320-507 West Broadway
Vancouver, British Columbia V5Z 0B4 Canada
tel: 3-1-1, Outside Vancouver 604.873.7000 fax: 604.873.7200
website: vancouver.ca/engsvcs/

The CMS boards were used in the onset to message the commuter challenge (Walk, Bike, Transit) and the impending Downtown closures. Once closures were in place, the messaging was tailored to reflect the specific placements of the CMS boards relative to the expected direction/destination of road users. Additionally, the Opening Ceremony dress rehearsal, the Torch Relay, the Opening Ceremonies, the Closing Ceremonies, the Paralympic Torch Relay, and the Paralympic Opening Ceremonies were all messaged in advance of the their respective event date.

The City was extremely satisfied with the quality service and quick response time provided by Inprotect Systems staff leading up to, throughout, and upon completion of the 2010 Olympic and Paralympic Winter Games. We look forward to working with you again on the next big event!

Yours truly,

Joe Walls

City of Vancouver
Engineering Services
Transportation - Traffic Management
507 W. Broadway, Vancouver, BC V5Y 1V4
tel: 604.873.7689
fax: 604.873.7020
joe.walls@vancouver.ca

VER-MAC

JAMLOGIC

SMART WORK ZONE SOLUTIONS

JAMLOGIC

VER-MAC

WHY USE JAMLOGIC IN SMART WORK ZONES?

Statistics show that there are over 500 fatalities and 37,000 injuries in U.S work zones every year and more than 40% of fatal crashes are rear-end collisions.*

Smart Work Zones (SWZ) improve safety and mobility and save lives by providing useful driver information, improving traffic flow and reducing incidents. Data demonstrates that during the past 5 years, Smart Work Zones, along with other safety initiatives, have reduced fatalities in US work zones nearly 30%. Ver-Mac manufactures the equipment, developed the JamLogic software and provides the expertise to make work zones smarter.

SWZ EQUIPMENT

Ver-Mac is a leading manufacturer of NTCIP-compliant SWZ equipment:

- Portable changeable message sign (PCMS)
- Permanent dynamic message sign (DMS)
- Sensor and camera trailers
- Speed-Mac portable sensors
- Dynamic speed signs (DSS)
- Additional SWZ devices

JAMLOGIC SOFTWARE

Ver-Mac's JamLogic software provides transparent web-based access to all devices and data. The software analyzes traffic data and provides real-time information to the motoring public, project managers, agency traffic management centers (TMC) and public websites. Ver-Mac can provide the right technology and application to make your work zone smart.

- Queue detection and warning
- Work zone travel time / alternate route
- Dynamic speed advisory
- Weather condition alerts
- Custom applications

EXPERTISE

- Over 15 years and 150 successful SWZ deployments
- A team of engineers that designs detailed SWZ plans
- Trained technicians to implement the logic and deploy the equipment
- Software and staff to manage the project

* www.ops.fhwa.dot.gov/wz/resources/facts_stats/injuries_fatalities.htm
U.S. Department of Transportation/Federal Highway Administration (FHWA)

JAMLOGIC SYSTEM OVERVIEW

STEP 1

JamLogic software wirelessly **collects** data via high-speed modems from a variety of field sensing devices and/or third-party traffic flow data.

STEP 2

JamLogic server **analyzes** the data based on algorithms. The logic and messages are predetermined by the project engineer and/or agency.

STEP 3

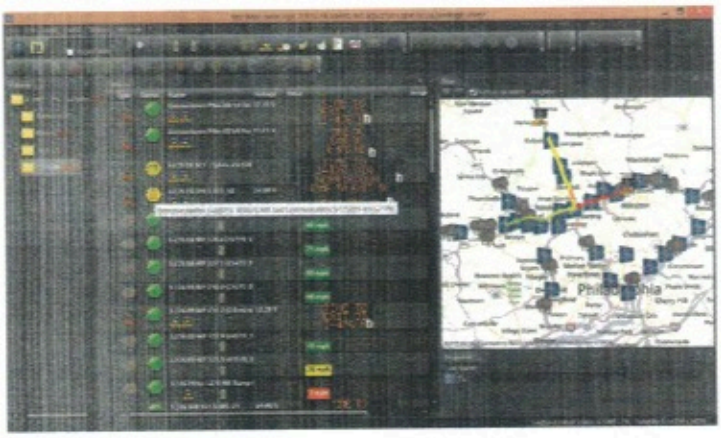
JamLogic **automates** the messages and provides real-time information to the motoring public. Project managers, agency TMC and public websites. Project managers and DOT representatives can be provided with email or text alerts of incidents.

JAMLOGIC FEATURES

- Scalable, flexible and customizable system
- Speed data from multiple sources
- Interactive GPS device mapping and listings
- Transparent logging and history data
- Streaming video with PTZ control
- Unlimited users / various levels of access
- Optional public website
- Optional automated email or text alerts

JAMLOGIC BENEFITS

- Increased traveler and worker safety
- Cost savings due to reduced incidents
- Better information to motoring public
- Quicker incident response and improved mobility
- Real-time project visibility
- Data analysis at your fingertips
- Better understanding of traffic conditions
- Meets the requirements in the FHWA's Section 1201 Final Rule



JAMLOGIC PROJECT LIST AND MAP VIEW

Interactive map

Color-coded speed data

Real-time message display

Communication and battery status diagnostic

JAMLOGIC DATA REPORTS

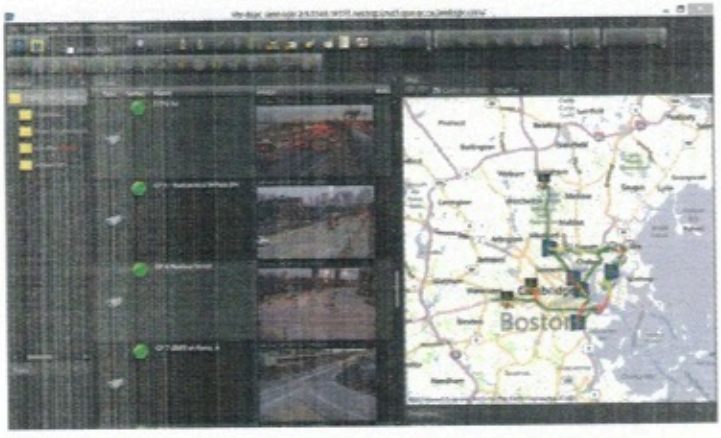
Sensor, sign and event history

Monthly, weekly, daily, hourly

Standard and custom

Reports instantly

Export to Excel



JAMLOGIC PTZ CAMERA

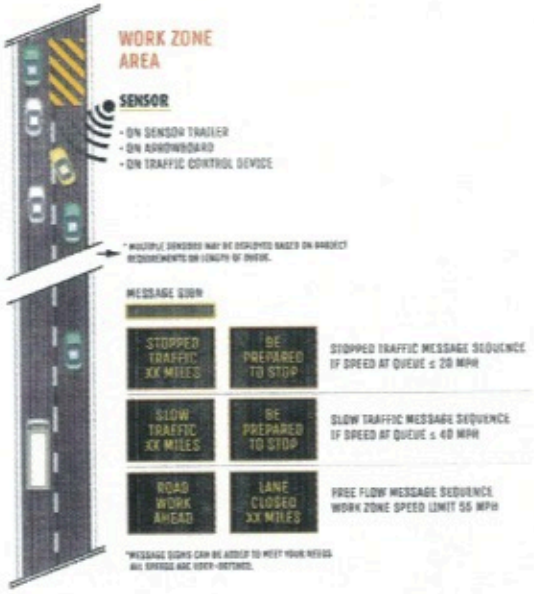
Stream live video of work zone

Pan, tilt and zoom (PTZ)

Multiple camera options

Record video option available

JAMLOGIC MOST COMMON APPLICATIONS



AQW (AUTOMATED QUEUE WARNING)

Based on real-time traffic data, Queue Detection and Warning Systems automatically inform travelers of the presence of downstream stop-and-go traffic with the use of message signs positioned upstream. The benefit is that motorists can anticipate the upcoming situation and the result is reduced rear-end collisions. Successful applications have seen a reduction of up to 70% in rear-end collisions.

TRAVEL TIME / ALTERNATE ROUTE

Travel Time and Alternate Route applications are continuously updated automatically to provide current travel time or length of delay time between the driver's location and a specific destination downstream. The benefit is the motoring public is informed and can make alternate route decisions. It also prevents long unexpected backups and potential rear-end collisions.

OTHER APPLICATIONS AVAILABLE TO MEET YOUR NEEDS

SPEED-MAC PORTABLE SENSOR

- Portable radar packaged in barricade light
- Robust/economical speed data gathering system
- Ideal for SWZ and traffic studies
- Attach to any traffic control device

PORTABLE QUEUE WARNING SYSTEM

Ver-Mac's Speed-Mac is designed to be set up quickly for daily lane closures or nighttime asphalt paving applications. Simply attach to any traffic control device with power and point towards traffic and the Speed-Mac instantly begins gathering speed data.

The Speed-Mac will automatically autolocate other Speed-Macs to begin to sequence speed data. With an algorithm preprogrammed into JamLogic, the system will instantly begin automating messages.

Speed-Mac combined with JamLogic is a quick and simple way to provide queue warnings and inform the motoring public of unexpected delays.

INVEST IN JAMLOGIC FOR THE SECURITY OF YOUR WORKERS AND MOTORISTS.

YOUR LOCAL DISTRIBUTOR

VER-MAC

CONTACT INFORMATION

1781 BRESSE STREET, QUÉBEC, QUEBEC G2G 2V2 CANADA
T: **418.654.1303** TF: **888.488.7446** F: **418.654.0517**
www.VER-MAC.COM

VER-MAC

MANAGING TRAFFIC. **MOVING PEOPLE.**

PCMS-1500C

PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

Ver-Mac's PCMS-1500C is our largest full-matrix trailer-mounted portable changeable message sign. PCMS-1500C is wider than our standard model and allows for more than 8 characters per line. PCMS-1500C features the NTCIP compliant V-Touch controller, Opti Power lens, Tilt-and-Rotate solar panels, JamLogic fleet management software (modem required), and optional Stealth Technology. This unit combines energy-efficient design and high-quality construction to provide the most reliable and cost-effective message sign on the market. PCMS-1500C is the perfect full matrix model to be used for highway construction.

V-TOUCH CONTROLLER

Ver-Mac's PCMS-1500C comes with our innovative V-Touch controller, the industries's most functional and easy-to-use controller!

- NTCIP compliant
- Easy-to-read - 7-inch (178 mm) color LCD pressure sensitive display screen
- User-friendly - one-click icon-based menu items
- Time-saving - create your own library of messages
- Simple to operate - the intuitive point-n-go icons ensure quick and easy commands to display or edit messages
- Additional functionalities - scheduling, sign diagnostics, pin protected security, and much more.

Click here for more information

JAMLOGIC FLEET MANAGEMENT SOFTWARE

Equip the PCMS-1500C with Ver-Mac's high-speed modem with GPS and maximize your productivity, efficiency and profitability - All remotely from your office or home ! The JamLogic software is free and you get all the updates at no charge!

SEGMENTS

- Highway construction
- Department of Transportation (DOT)
- Smart Work Zone
- Special events

DISPLAY

- Display panel: 83 in. x 145 in. (2100 mm x 3694 mm)
- Full Matrix of 30 x 56 pixels
- 4 LEDs per pixel
- Up to 3 lines of 12 characters per line
- Display sign rotates 360 degrees for perfect setting
- Plug & play display modules for simplified maintenance

DIMENSIONS & WEIGHT

- Overall length : 188 in. (4771 mm)
- Overall width : 86 in. (2178 mm)
- Traveling height: 117 in. (2971 mm)

- Monitor, maintain and manage your signs from any PC, laptop, tablet or smart phone
- View a list and a GPS map of your equipment
- Change a message on one or more signs simultaneously with a simple click
- View your messages and battery voltages
- Group your signs in folders (by customer, location, project...you choose!)
- Receive e-mail or text alerts - Optional (low battery, cellular failure, etc.)

Click here for more information

STEALTH TECHNOLOGY (OPTIONAL)

Ver-Mac's innovative Stealth Technology design will help you significantly reduce your battery maintenance and repair costs. This technology combines two great innovations:

- Cleverly hidden battery compartment - deter thieves from stealing batteries
- Long lasting sealed batteries - no maintenance required

Click here fore more information

ENERGY-EFFICIENT DESIGN

- OPTI POWER LENS - The encapsulated design maximizes each LED's output to create bolder and brighter characters while utilizing less energy
- TILT-AND-ROTATE SOLAR PANELS - Panel's tilt to a 45 degree angle to provide maximum solar recharging during all four seasons
- Designed to run 12 months in most regions without manual charging
- Various configurations of solar panels and batteries are available

HIGH-QUALITY CONSTRUCTION

- Powder coating superior finish - Impact, humidity, salt spray and rust resistant
- 4 leveling jacks - for stabilization and easy transportation
- Electro-hydraulic lift mechanism - for quick and effortless deployment
- Heavy duty plastic fenders - for durability and easy replacement
- Plastic battery boxes - to minimize battery corrosion
- Lockable control box - for security
- 2 in. (51 mm) coupler or 3 in. (76 mm) pintle eye - for easy towing

- Operating height : 202 in. (5132 mm)
- Weight (approx): 1161 kg (2,560 lb)
- Axle/suspension: 2495 kg (5,500 lb)

OPTIONS

- Modem
- Cell plan
- Battery charger
- Tongue wheel jack
- Radar
- Data logger
- Stealth Technology
- PTZ camera

*other options are available to meet your needs

WARRANTY

- 1-year warranty on complete trailer
- 2-year warranty on electronics manufactured by Signalisation Ver-Mac

TECH SUPPORT

- 24/7
- Please call : 888-488-SIGN (7446)

PCMS-1500C PRODUCT SHEET

MTO APPROVED PCMS-1500C*

*Province of Ontario, Canada

SmartSensor Manager HD

SmartSensor™ Manager HD is an easy-to-install program that gives you quick and easy access to your SmartSensor HD. Use the software to align and configure your sensor, to monitor current traffic conditions, to collect traffic data in real time, and to download stored traffic data.

Features

- Configuration utility for SmartSensor HD that provides complete access to sensor settings
- Operates on Windows® Mobile, XP, Vista, 7 and 8
- Features real-time visual representations of detected traffic
- User-intuitive and user-friendly software structure
- Point-and-click–based operation
- Virtual mode available for training
- Free upgrades to the newest version of the software
- Enables you to remotely upgrade the firmware of your SmartSensor
- Allows you to back up and restore sensor settings
- Automatic lane configuration and manual adjustment options
- Full documentation available

Technical Specifications

Software Functionality

- Configuration utility for SmartSensor HD that provides complete access to sensor settings
- Graphical user interface with traffic pattern display for traffic monitoring and sensor verification
- Pointing assistant for horizontal alignment
- Connectivity functionality:
  - Auto-find baud rate
  - Auto-find serial port
  - TCP/IP connectivity
  - Dial-up modem connectivity
- Sensor configuration back-up and restore
- Automatic and manual lane configuration
- Supports the configuration of interval data storage and download
- Accommodates the collection of event data and interval data in real time
- User-selectable English or metric units

Software Properties

- Supported operating systems:
  - Windows Mobile (Socket Mobile 650-M)
  - Windows XP
  - Windows Vista
  - Windows 7
  - Windows 8

Available Documentation

- User quick-reference guide
- Comprehensive user guide

Ordering Information

SmartSensor Manager HD
550-0002

Wavetronix
78 East 1700 South
Provo, UT 84606
801.734.7200
sales@wavetronix.com
www.wavetronix.com

SSR - Sensor Trailer platform:

General Specifications:

A. Operating Criteria

The Traffic Detection System collects and processes traffic data as programmed within the software provided as a service. The detection data is transmitted over a digital cellular network to a data center for aggregating with other detectors and where output logic is applied based on desired applications. With the use of both solar charging and deep cycle batteries the system provides a self contained, completely autonomous solution to traffic monitoring needs.

Color	Highway safety orange
Length	122"
Width	96"
Travel Height	90"
Operating Height	18 1/2'
Trailer Deck	1/8 Steel Tubing
Lifting Mechanism	Cable Winch
Battery Box	16 Ga Steel, Hinged Telescoping Door Support, Battery Lock Down Assy., Battery Access Panel, Vented, Lockable
Dimensions	38" x 24" x 16" (L x W x H)
Stabilizers	(4) 27-inch adjustable outriggers
Mast	(18 1/2)-foot retractable mast
Axle	2,000 lb. Capacity
Leaf Springs	1,000 lb. Capacity
Roller Bearings	Yes
Hubs	Yes
Tires	P185 70R14
Fenders	Heavy Duty Plastic
Hitch	2" Ball
Safety Chains	¼ Inch with 2,500 lb. Slip Safety Hooks
Tongue	.250" thick x 2 ½" Square Tubing
Overall Length	60"
Removable	Yes
Trailer Lighting	Class A Trailer Lights with license bracket.
Reflectors	1-on each side, 2-amber front, 2 red- rear
Finish	Highway Safety Orange.

1. Power Supply:

Solar assisted battery banks with the following specifications for operating the Wavetronix Sensor and Communications equipment. The photovoltaic system will have the following minimum requirements. Four 6 Volt Deep Cycle batteries wired in a series parallel configuration.

Nominal Voltage:

Nominal capacity at 20 hours	Rated 464 amp hour
Hours of discharge at 5 amps	54.5 Hours
Dimensions	10 ¼" x 7 1/8" x 11 ¼" (L x W x H)
Weight	62 lbs. Ea.
Terminals	Threaded Post with Wing Nut

Charge Controller:

Operating voltage	12 VDC
Maximum voltage	25 VDC
Minimum voltage	1.5 VDC
Input current	18 amps maximum
Battery voltage	0 VDC minimum
Charge stop voltage	14.35 VDC (+/- 1%)
Current consumption	(+/- 5%)
Charging	55 mA
Analyzing	9 mA
Idle	<1 mA
Operating temperature	-40 F to +150 F
Operating Humidity	Up to 100%
Dimensions	2" x 2" x 1.5" (L x W x H)
Weight	5 oz. (114.7 g)

230 Watt Solar Panels

Dimensions	64" x 39" x 1.96" (L x W x H)
Weight	44.09 lbs.

Electrical Parameters:

Max power:	
Watts	230 W
Volts	29.49 V
Amperage	8.39 A

NB I-75 Monroe Co Queue Warning System Logic

6/16/2015

NB I-75 MM 10.0 PCMS 06 (S of Rest Area) M-106

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
3 MILES AHEAD	X MILES AHEAD	X MILES AHEAD

Route 06 — 10.0

Q Sensors:	MM	Act Dist	X =
S01	11.0	1.0	1
S02	11.5	1.5	1
S03	12.0	2.0	2
S04	12.5	2.5	2
S05	13.0	3.0	3

NB I-75 MM 10.5 PCMS 05 (N of Rest Area) M-184

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
* * * *	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
	X MILES AHEAD	X MILES AHEAD

Route 05 — 10.5

Q Sensors:	MM	Act Dist	X =
S01	11.0	0.5	WATCH FOR BACKUPS
S02	11.5	1.0	1
S03	12.0	1.5	1
S04	12.5	2.0	2
S05	13.0	2.5	2

NB I-75 MM 11.0 PCMS 04 (S of Exit 11) M-154

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
2 MILES AHEAD	X MILES AHEAD	X MILES AHEAD

Route 04 — 11.0

Q Sensors:	MM	Act Dist	X =
S02	11.5	0.5	WATCH FOR BACKUPS
S03	12.0	1.0	1
S04	12.5	1.5	1
S05	13.0	2.0	2

NB I-75 MM 11.5 PCMS 03 (N of Laplainance Rd) M-154

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
* * * *	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
	X MILES AHEAD	X MILES AHEAD

Route 03 — 11.5

Q Sensors:	MM	Act Dist	X =
S03	12.0	0.5	WATCH FOR BACKUPS
S04	12.5	1.0	1
S05	13.0	1.5	1

NB I-75 MM 12.0 PCMS 02 (S of E Dunbar Rd) M-111

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
1 MILES AHEAD	X MILES AHEAD	X MILES AHEAD

Route 02 — 12.0

Q Sensors:	MM	Act Dist	X =
S04	12.5	0.5	WATCH FOR BACKUPS
S05	13.0	1.0	1

Logic Notes:

* Each PCMS will use all sensors in their route.

* PCMS use nearest sensor below each threshhold (Slow or Stopped).

* Distances "X" are rounded down to the nearest 1.0 mile increment. If > 1 mile, "X MILES" is eliminated from text to just say "AHEAD".

* Quick in / Slow out - 1 min msg period to go down a threshhold (from Freeflow to Slow - From Slow to Stopped) and 3 periods to go up a threshhold.

* Free Flow messages only used on even mile makers (1.0, 2.0, etc.)

* 1/2 mile marker messages to be 4 corners with " * " (0.5,1.5,etc..)

SB I-75 Monroe Co Queue Warning System Logic

6/16/2015

SB I-75 MM 26.5 PCMS 14 (N of Exit 26) M-119

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
* * * *	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
	X MILES AHEAD	X MILES AHEAD

Route 14 — 26.5

Q Sensors:	MM	Act Dist	X =
S10	24.0	2.5	2
S09	23.7	2.8	2
S08	23.0	3.5	3
S07	22.5	4.0	4
S06	22.0	4.5	4
S11	20.0	6.5	6

SB I-75 MM 26.0 PCMS 13 (N of Ready Rd) M-149

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
4 MILES AHEAD	X MILES AHEAD	X MILES AHEAD

Route 13 — 26.0

Q Sensors:	MM	Act Dist	X =
S10	24.0	2.0	2
S09	23.7	2.3	2
S08	23.0	3.0	3
S07	22.5	3.5	3
S06	22.0	4.0	4
S11	20.0	6.0	6

SB I-75 MM 25.5 PCMS 12 (S of Ready Rd) M-120

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
* * * *	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
	X MILES AHEAD	X MILES AHEAD

Route 12 — 25.5

Q Sensors:	MM	Act Dist	X =
S10	24.0	1.5	1
S09	23.7	1.8	1
S08	23.0	2.5	2
S07	22.5	3.0	3
S06	22.0	3.5	3
S11	20.0	5.5	5

SB I-75 MM 24.7 PCMS 11 (N of Sigler Rd) M-148

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
LEFT LANE CLOSED	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
3 MILES AHEAD	X MILES AHEAD	X MILES AHEAD

Route 11 — 24.7

Q Sensors:	MM	Act Dist	X =
S10	24.0	0.7	WATCH FOR BACKUPS
S09	23.7	1.0	1
S08	23.0	1.7	1
S07	22.5	2.2	2
S06	22.0	2.7	2
S11	20.0	4.7	4

SB I-75 MM 24.5 PCMS 10 (N of Sigler Rd) M-84

FREE FLOW (Speeds > 45mph)	SLOW (Speeds < 45mph)	STOP & GO (Speeds < 15mph)
* * * *	CAUTION SLOWED TRAFFIC	CAUTION STOPPED TRAFFIC
	X MILES AHEAD	X MILES AHEAD

Route 10 — 24.2

Q Sensors:	MM	Act Dist	X =
S10	24.0	0.2	WATCH FOR BACKUPS
S09	23.7	0.5	WATCH FOR BACKUPS
S08	23.0	1.2	1
S07	22.5	1.7	1
S06	22.0	2.2	2
S11	20.0	4.2	4

Logic Notes:

* Each PCMS will use all sensors in their route.

* PCMS use nearest sensor below each threshhold (Slow or Stopped).

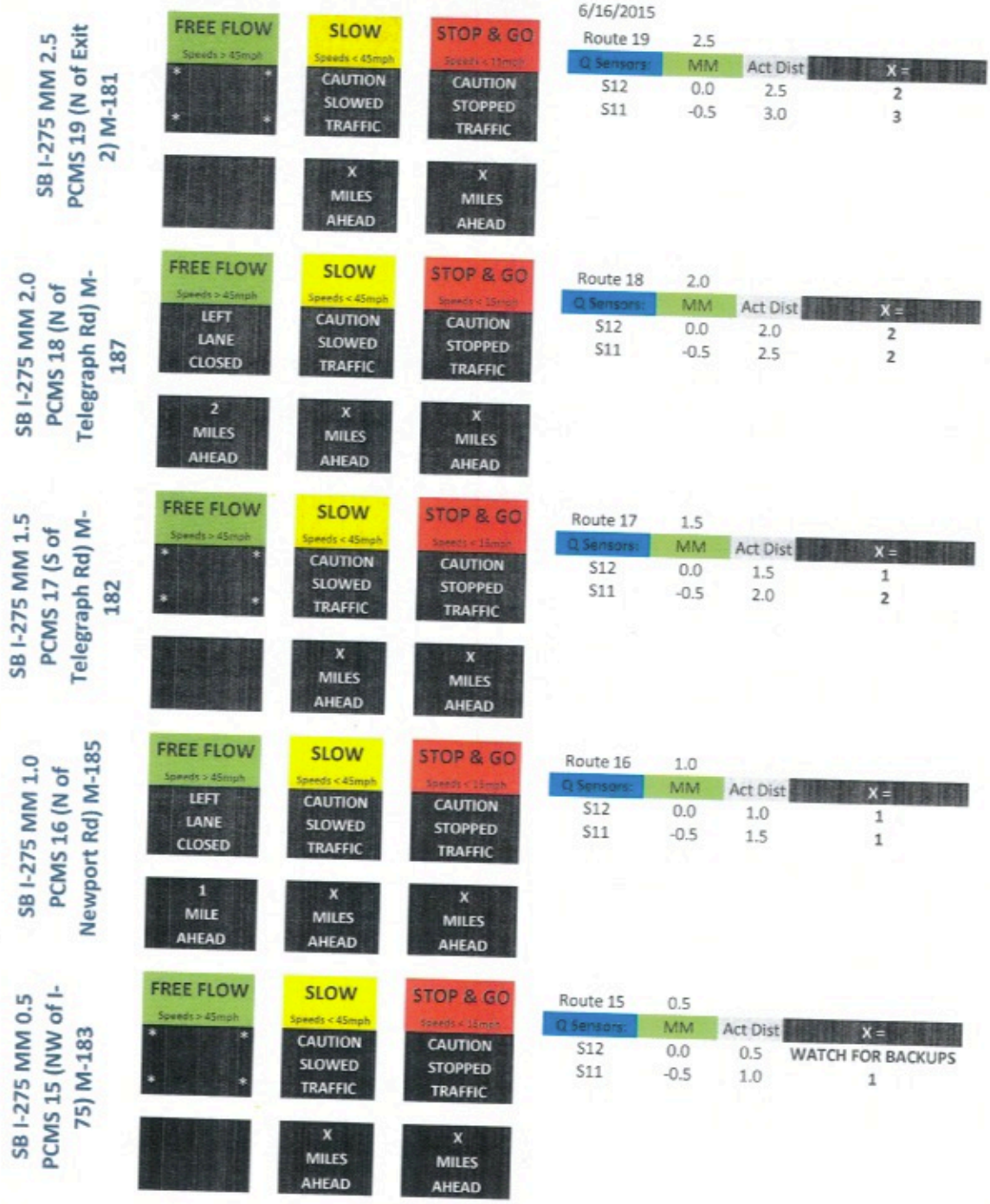
* Distances "X" are rounded down to the nearest 1.0 mile increment. If > 1 mile, "X MILES" is eliminated from text to just say "AHEAD".

* Quick in / Slow out - 1 min msg period to go down a threshhold (from Freeflow to Slow - From Slow to Stopped) and 3 periods to go up a threshhold.

* Free Flow messages only used on even mile makers (1.0, 2.0, etc.)

* 1/2 mile marker messages to be 4 corners with " * " (0.5,1.5,etc..)

SB I-275 Monroe Co Queue Warning System Logic



6/16/2015

Route 19	2.5		
Q Sensors:	MM	Act Dist	X =
S12	0.0	2.5	2
S11	-0.5	3.0	3

Route 18	2.0		
Q Sensors:	MM	Act Dist	X =
S12	0.0	2.0	2
S11	-0.5	2.5	2

Route 17	1.5		
Q Sensors:	MM	Act Dist	X =
S12	0.0	1.5	1
S11	-0.5	2.0	2

Route 16	1.0		
Q Sensors:	MM	Act Dist	X =
S12	0.0	1.0	1
S11	-0.5	1.5	1

Route 15	0.5		
Q Sensors:	MM	Act Dist	X =
S12	0.0	0.5	WATCH FOR BACKUPS
S11	-0.5	1.0	1

Logic Notes:

* Each PCMS will use all sensors in their route.

* PCMS use nearest sensor below each threshhold (Slow or Stopped).

* Distances "X" are rounded down to the nearest 1.0 mile increment. If > 1 mile, "X MILES" is eliminated from text to just say "AHEAD".

* Quick in / Slow out - 1 min msg period to go down a threshhold (from Freeflow to Slow - From Slow to Stopped) and 3 periods to go up a threshhold.

* Free Flow messages only used on even mile makers (1.0, 2.0, etc.)

* 1/2 mile marker messages to be 4 corners with " * " (0.5,1.5,etc..)

MI I-75 Monroe Co Queue Warning System - Device List (Ordered from North to South) 6/16/2015

Device List

VM #	SSR #	Poco #		Road	MM	Name on JL	Landmark	Type	Description
01		M-119	SB	I-75	26.5	SB I-75 MM 26.5 PCMS 14 (N of Exit 26) M-119	N of Exit 26		PCMS
EXIT 26 / S HURON RIVER DR									
02		M-149	SB	I-75	26.0	SB I-75 MM 26.0 PCMS 13 (N of Ready Rd) M-149	N of Ready Rd		PCMS
Ready Rd Underpass									
03		M-120	SB	I-75	25.5	SB I-75 MM 25.5 PCMS 12 (S of Ready Rd) M-120	S of Ready Rd		PCMS
04		M-148	SB	I-75	24.7	SB I-75 MM 24.7 PCMS 11 (N of Sigler Rd) M-148	N of Sigler Rd		PCMS
05		M-84	SB	I-75	24.2	SB I-75 MM 24.5 PCMS 10 (N of Sigler Rd) M-84	N of Sigler Rd		PCMS
Sigler Rd Underpass									
06	3511		SB	I-75	24.0	SB I-75 MM 24.0 Sensor 10 SSR 3511	S of Sigler Rd	Wavetronix HD	Sensor
07		M-151	SB	I-75	23.7	SB I-75 MM 23.7 PCMS 09 (Btw Sigler & Labo Rd) M-15	Btw Sigler & Labo Rd		PCMS
08	3508		SB	I-75	23.5	SB I-75 MM 23.5 Sensor 09 SSR 3508	Btw Sigler & Labo Rd	Wavetronix HD	Sensor
09		M-90	SB	I-75	23.2	SB I-75 MM 23.2 PCMS 08 (N of Labo Rd) M-90	N of Labo Rd		PCMS
Labo Rd									
10	3510		SB	I-75	23.0	SB I-75 MM 23.0 Sensor 08 SSR 3510	S of Labo Rd	Wavetronix HD	Sensor
11	3509		SB	I-75	22.5	SB I-75 MM 22.5 Sensor 07 SSR 3509	0.5 mi N of Exit 21	Wavetronix HD	Sensor
12		M-151	SB	I-75	22.5	SB I-75 MM 22.5 PCMS 07 (0.5 mi N of Exit 21) M-152	0.5 mi N of Exit 21		PCMS
13	3515		SB	I-75	22.0	SB I-75 MM 22.0 Sensor 06 SSR 3515	N of Newport Rd/Exit 21	Wavetronix HD	Sensor
EXIT 21 / NEWPORT RD / SWAN CREEK RD									
EXIT 20 / I-275									
14		M-181		I-275	2.5	SB I-275 MM 2.5 PCMS 19 (N of Exit 2) M-181	N of Telegraph Rd		PCMS
E Labo Rd Underpass									
15		M-187		I-275	2.0	SB I-275 MM 2.0 PCMS 18 (N of Telegraph Rd) M-187	N of Telegraph Rd		PCMS
EXIT 2 / US 24 / Telegraph Rd									
16		M-182		I-275	1.5	SB I-275 MM 1.5 PCMS 17 (S of Telegraph Rd) M-182	S of Telegraph Rd		PCMS
17		M-185		I-275	1.0	SB I-275 MM 1.0 PCMS 16 (N of Newport Rd) M-185	Newport Rd		PCMS
Newport Rd Underpass									
18		M-183		I-275	0.5	SB I-275 MM 0.5 PCMS 15 (NW of I-75) M-183	NW of I-75		PCMS
19	3504		SB	I-275	0.0	SB I-275 MM 0.0 Sensor 12 (Ramp to SB I-75) 3504	NW of I-75	Wavetronix HD	Sensor
North WZ Limits / Taper at MM 22.0					22.0				
20	3502		SB	I-75	20.0	SB I-275 MM 20.0 Sensor 11 SSR 3502	S of Device 12	Wavetronix HD	Sensor
EXIT 18 / NADEAU RD									
EXIT 15 / N DIXIE HWY / Rte 50									
South WZ Limits / Taper at MM 13.0					13.0				
EXIT 14 / E ELM AVE									
RIVER RAISIN									
EXIT 13 / E FRONT ST									
RR Underpass									
21	3512		NB	I-75	13.0	NB I-75 MM 13.0 Sensor 5 SSR 3512	S of Exit 13	Wavetronix HD	Sensor
22	3513		NB	I-75	12.5	NB I-75 MM 12.5 Sensor 4 SSR 3513	N of E Dunbar Rd	Wavetronix HD	Sensor
23		M-188	NB	I-75	12.5	NB I-75 MM 12.5 PCMS 01 (N of E Dunbar Rd) M-188	N of E Dunbar Rd		PCMS
24	2988		NB	I-75	12.0	NB I-75 MM 12.0 Sensor 3 SSR 2988	S of E Dunbar Rd	Wavetronix HD	Sensor
25		M-111	NB	I-75	12.0	NB I-75 MM 12.0 PCMS 02 (S of E Dunbar Rd) M-111	S of E Dunbar Rd		PCMS
26		M-186	NB	I-75	11.5	NB I-75 MM 11.5 PCMS 03 (N of Laplainance Rd) M-15	S of Exit 11		PCMS
27	3415		NB	I-75	11.5	NB I-75 MM 11.5 Sensor 2 (N of Laplaisance Rd) SSR 3	N of Laplaisance Rd	Wavetronix HD	Sensor
EXIT 11 / LAPLAISANCE RD									
28		M-154	NB	I-75	11.0	NB I-75 MM 11.0 PCMS 04 (S of Exit 11) M-154	S of Exit 11		PCMS
29	3501		NB	I-75	11.0	NB I-75 MM 11.0 Sensor 1 (S of Exit 11) SSR 3501	S of Exit 11	Wavetronix HD	Sensor
30		M-184	NB	I-75	10.5	NB I-75 MM 10.5 PCMS 05 (N of Rest Area) M-184	N of Rest Area		PCMS
31		M-106	NB	I-75	10.0	NB I-75 MM 10.0 PCMS 06 (S of Rest Area) M-106	S of Rest Area		PCMS

AXIS Q60-E PTZ Dome Network Cameras

Outdoor, high-speed PTZ domes

- > Up to HDTV 1080p
- > Up to 36x optical zoom
- > Outdoor-ready and Arctic Temperature Control
- > Vandal-resistant and shock detection
- > Automatic defog (AXIS Q6044-E, AXIS Q6045-E Mk II)
- > High PoE

AXIS Q60-E cameras are top-of-the-line, outdoor-ready pan/tilt/zoom (PTZ) domes that provide exceptional coverage of wide areas and great detail when zooming in. Designed for easy installation and reliable operation outdoors, they are ideal for city surveillance and airports, train stations, harbors and stadiums.

AXIS Q6045-E Mk II offers a rich viewing experience with HDTV 1080p and 32x optical zoom. AXIS Q6044-E provides HDTV 720p and 30x optical zoom. AXIS Q6042-E supports Extended D1 resolution and 36x optical zoom.

AXIS Q60-E cameras are vandal-resistant (IK10) and have shock detection, surge protection (railway standards), and protection against dust, rain and snow (IP66 and NEMA 4X). They can operate in temperatures ranging from -50 °C to 50 °C (-58 °F to 122 °F). The cameras' Arctic Temperature Control ensures safe start-up in extreme cold. AXIS Q6042-E and AXIS Q6044-E support electronic image stabilization-useful for getting smoother video in windy conditions. In fog, AXIS Q6044-E and AXIS Q6045-E Mk II can provide clearer video with its automatic defog functionality.

The PTZ domes support autotracking and Active Gatekeeper, and have substantial capacity for third-party intelligent video applications. AXIS Q6045-E Mk II offers additional built-in analytics such as highlight compensation, object removed and enter/exit detection.

AXIS Q60-E cameras have a built-in memory card slot for local storage of recordings. The cameras are powered by High Power over Ethernet using the supplied High PoE midspan.

Note: Mounting brackets are sold separately.

High-performance outdoor-ready PTZ domes

The robust AXIS Q60-E PTZ domes are designed for round-the-clock pan/tilt/zoom operation in outdoor environments. The cameras can be automatically directed to 256 preset positions using guard tour. With endless 360° pan, they enable surveillance of an extremely wide area. High zoom, in combination with high resolution, enables detailed surveillance at great distances. AXIS Q60-E cameras have fast and precise pan/tilt performance. They can also tilt 20° above the horizon, which makes it possible for the cameras to see higher than their mounting position. This can be useful, for example, at a stadium where there is a need to look up at the stands.

AXIS Q6042-E

AXIS Q6044-E

AXIS Q6045-E Mk II

The images above show the field of view and level of detail provided by the three AXIS Q60-E PTZ domes.

Snapshots of HDTV 1080p views from AXIS Q6045-E Mk II: at left, wide view; at right, 32x zoomed-in view where the license plate of a car 300 m (984 ft) away can be read.

Great detail with HDTV

Among the three cameras, AXIS Q6045-E Mk II provides the widest field of view-with a 62.8° horizontal angle of view. In addition, AXIS Q6045-E Mk II offers the highest level of detail as it delivers HDTV 1080p performance in compliance with the SMPTE 274M standard regarding a 1920x1080 pixel resolution, full frame rate at 25/30 frames per second, HDTV color fidelity and a 16:9 format.

AXIS Q6045-E Mk II has 32x optical zoom, the combination of the zoom factor and HDTV 1080p allows the license plate of a vehicle to be read some 300 m (984 ft) away- at a further distance than with AXIS Q6042-E, which has 36x optical zoom and standard resolution.

AXIS Q6044-E also offers a wide horizontal viewing angle at 62.9°. The camera's 30x optical zoom, in combination with HDTV 720p, provides superb zoomed-in views, enabling, for instance, the license plate of a vehicle to be read up to 245 m (800 ft) away. AXIS Q6042-E offers Extended D1 resolution (736x576 in 50 Hz, 752x480 in 60 Hz) and can enable a vehicle's license plate to be read some 190 m (620 ft) away.

All three PTZ domes support H.264 Main Profile for efficient compression of video that maintains image quality while at the same time minimizing bandwidth use and storage space. The cameras offer day/night functionality, enabling excellent color video during day time, and clear black and white video in low light.

Electronic image stabilization in AXIS Q6042-E and AXIS Q6044-E

Cameras with high zoom are sensitive to vibrations from wind and traffic. AXIS Q6042-E and AXIS Q6044-E support electronic image stabilization (EIS), which reduces the effects of camera vibration. In windy conditions, EIS provides clearer, more useful video and helps reduce the size of video files, which leads to lower bandwidth and storage use.

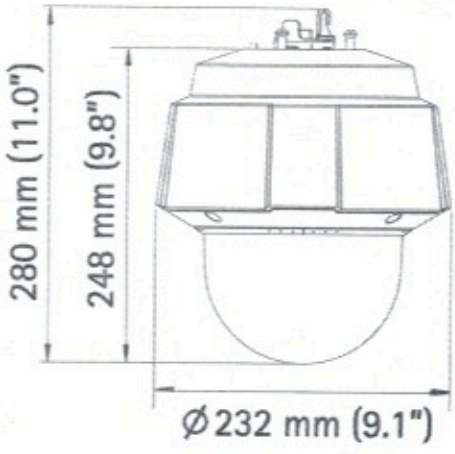
Under vibrating conditions: at left, image without EIS; at right, a snapshot from a vibrating AXIS Q6044-E with EIS activated.

Automatic defog

AXIS Q6044-E and AXIS Q6045-E Mk II support automatic defog, which when activated, automatically detects fog in the scene and digitally filters it out of view to provide clearer video.

Images from AXIS Q6044-E: at left, without automatic defog; at right, with automatic defog activated.

Dimensions



Optional accessories

1. AXIS T91A
2. Smoked Dome D
3. Axis High PoE midspans
4. AXIS T8129 PoE Extender
5. AXIS P8221 Network I/O Audio Module
6. AXIS T8310 Video Surveillance Control Board
7. RJ45 IP66-rated cables with premounted connector (CAT6)

Technical Specifications - AXIS Q60-E PTZ Dome Network Cameras

Models	AXIS Q6042-E 50 Hz, AXIS Q6042-E 60 Hz AXIS Q6044-E 50 Hz, AXIS Q6044-E 60 Hz AXIS Q6045-E Mk II 50 Hz, AXIS Q6045-E Mk II 60 Hz
Camera	
Image sensor	**AXIS Q6042-E:** 1/4" ExView HAD Progressive scan CCD **AXIS Q6044-E:** 1/3" Progressive scan CCD **AXIS Q6045-E Mk II:** 1/2.8" Progressive scan CMOS
Lens	**AXIS Q6042-E:** f=3.3-119 mm, F1.4-4.2, Autofocus, 57.2° – 1.7° view[a] **AXIS Q6044-E:** f=4.4-132 mm, F1.4-4.6, Autofocus, 62.9° – 2.2° view[a] **AXIS Q6045-E Mk II:** f=4.44-142.6 mm, F1.6-4.41, Autofocus, 62.8° – 2.23° view[a]
Day and night	Automatically removable infrared-cut filter
Minimum illumination	**AXIS Q6042-E:** Color: 0.5 lux at 30 IRE F1.4; B/W: 0.008 lux at 30 IRE F1.4 **AXIS Q6044-E:** Color: 0.2 lux at 30 IRE F1.4; B/W: 0.04 lux at 30 IRE F1.4 **AXIS Q6045-E Mk II:** Color: 0.3 lux at 30 IRE F1.6; B/W: 0.03 lux at 30 IRE F1.6
Shutter time	**AXIS Q6042-E:** 1/30000 s to 1.5 s (50 Hz), 1/30000 s to 0.5 s (60 Hz) **AXIS Q6044-E:** 1/10000 s to 1/4 s **AXIS Q6045-E Mk II:** 1/33000 s to 1/3 s (50 Hz), 1/33000 s to 1/4 s (60 Hz)
Pan/Tilt/Zoom	E-flip, 256 preset positions, Tour recording, Guard tour, Control queue, On-screen directional indicator, Set new pan 0° Pan: 360° endless, 0.05°–450°/s; Tilt: 220°, 0.05°–450°/s **AXIS Q6042-E:** 36x optical zoom and 12x digital zoom, total 432x zoom **AXIS Q6044-E:** 30x optical zoom and 12x digital zoom, total 360x zoom **AXIS Q6045-E Mk II:** 32x optical zoom and 12x digital zoom, total 384x zoom
Video	
Video compression	H.264 Main and Baseline Profiles (MPEG-4 Part 10/AVC) Motion JPEG
Resolutions	**AXIS Q6042-E:** Extended D1 736x576 to 176x144 (50 Hz), Extended D1 752x480 to 176x120 (60 Hz) **AXIS Q6044-E:** 1280x720 (HDTV 720p) to 320x180 **AXIS Q6045-E Mk II:** 1920x1080 (HDTV 1080p) to 320x180
Frame rate	**H.264:** Up to 25/30 fps (50/60 Hz) in all resolutions **Motion JPEG:** Up to 25/30 fps (50/60 Hz) in all resolutions **AXIS Q6045-E Mk II:** Up to 50/60 fps (50/60 Hz) in HDTV 720p
Video streaming	Multiple, individually configurable streams in H.264 and Motion JPEG Controllable frame rate and bandwidth VBR/CBR H.264
Image settings	Wide dynamic range (WDR), Manual shutter time, Compression, Color, Brightness, Sharpness, White balance, Exposure control, Exposure zones, Backlight compensation, Fine tuning of behavior at low light, Rotation, Text and image overlay, 32 individual 3D privacy masks, Image freeze on PTZ **AXIS Q6042-E:** Electronic image stabilization **AXIS Q6044-E:** Electronic image stabilization, Automatic defog **AXIS Q6045-E Mk II:** Highlight compensation, Automatic defog
Network	
Security	Password protection, IP address filtering, HTTPS[b] encryption, IEEE 802.1X[b] network access control, Digest authentication, User access log, Centralized certificate management
Supported protocols	IPv4/v6, HTTP, HTTPS[b], SSL/TLS[b], QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnP™, SNMPv1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS, SSH, NTCIP
System integration	
Application Programming Interface	Open API for software integration, including VAPIX® and AXIS Camera Application Platform; specifications at *www.axis.com* AXIS Video Hosting System (AVHS) with One-Click Camera Connection. ONVIF Profile S, specification at *www.onvif.org*
Intelligent video	Video motion detection, Autotracking, Active Gatekeeper, AXIS Camera Application Platform enabling installation of additional applications **AXIS Q6045-E Mk II:** Basic analytics (not to be compared with third-party analytics): Object removed, Enter/exit detector, Fence detector, Object counter, Highlight compensation
Event triggers	Video motion detection, Shock detection, Fan, Heater, Temperature, Manual trigger, Autotracking, Moving, PTZ preset, Edge storage events, AXIS Camera Application Platform **AXIS Q6045-E Mk II:** Enter/exit, Fence detector, Object removed
Event actions	File upload: FTP, HTTP, network share and email Notification: email, HTTP and TCP PTZ preset, Guard tour, Autotracking, Day/night mode, Video recording to edge storage, Pre- and post-alarm video buffering
Built-in installation aids	Pixel counter
General	
Casing	IP66-, NEMA 4X- and IK10-rated metal casing (aluminum), polycarbonate (PC) clear dome, sunshield (PC/ASA)
Memory	512 MB RAM, 128 MB Flash
Power	High Power over Ethernet (High PoE), max. 60 W Axis High PoE 60 W Midspan 1-port: 100–240 V AC, max. 74 W
Connectors	RJ45 for 10BASE-T/100BASE-TX PoE RJ45 Push-pull Connector (IP66) included
Edge storage	SD/SDHC/SDXC slot supporting memory card up to 64 GB (card not included); support for recording to network share (network-attached storage or file server)
Operating conditions	With 30 W: -20 °C to 50 °C (-4 °F to 122 °F) With 60 W*: -50 °C to 50 °C (-58 °F to 122 °F) Humidity 10-100% RH (condensing) ** Arctic Temperature Control enables camera start-up at temperatures as low as -50 °C (-58 °F)*
Storage conditions	-50 °C to 60 °C (-58 °F to 140 °F)
Approvals	EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, EN 61000-6-2, EN 55024, EN 50121-4, IEC 62236-4, FCC Part 15 Subpart B Class A, ICES-003 Class A, VCCI Class A, C-tick AS/NZS CISPR 22 Class A, KCC KN22 Class A, KN24, IEC/EN/UL 60950-1, IEC/EN/UL 60950-22, IEC/EN 60529 IP66, NEMA 250 Type 4X, NEMA TS-2-2003 v 02.06, subsection 2.2.7, 2.2.8, 2.2.9; IEC 62262 IK10, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-78, IEC 60068-2-14, IEC 60068-2-30, IEC 60068-2-6, IEC 60068-2-27, IEC 60068-2-60, ISO 4892-2 Midspan: EN 60950-1, GS, UL, cUL, CE, FCC, VCCI, CB, KCC, UL-AR
Weight	3.7 kg (8.2 lb.)
Included accessories	Axis High PoE 60 W Midspan 1-port, RJ45 Push-pull Connector (IP66), Sunshield, Installation Guide, Installation and Management Software CD, Windows decoder 1-user license
Video management software	AXIS Camera Companion (included), AXIS Camera Station and video management software from Axis' Application Development Partners (not included). For more information, see *www.axis.com/products/video/software*
Warranty	Axis 3-year warranty and AXIS Extended Warranty option, see *www.axis.com/warranty*

a. *Horizontal angle of view*
b. *This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (www.openssl.org), and cryptographic software written by Eric Young (eay@cryptsoft.com).*

More information is available at www.axis.com

AXIS COMMUNICATIONS

60195/EN/M4.4/112014

Implementation

Key Features Of Qvision Technology

Qvision Is Plug & Play

Qvision is literally "plug & play." If your current camera is compatible with our software, we just need the IP addresses and literally, in a few hours, live videos will be available on your website. If you require an adapter or decide to add new cameras, you simply connect power and Internet to your new hardware and the system will alert us. We then take a few minutes with you to make final adjustments remotely and you're in business!

If you utilize complex traffic management systems, Qvision interfaces with your cameras without any changes to your current system and our Enterprise software can even streamline your command center operations.

Qvision Works With Any Camera Anywhere in the World

Our technology allows us to connect to virtually any camera in the world. If a camera is not directly compatible, we have a low cost hardware solution that will get you online in no time.

Qvision will work even if you don't have a handy Internet connection available because we have designed it to work with wireless connections, long distance wireless, and cell connections. Our technicians can provide you with a fully programmed cell modem that is set up with the cellular provider of your choice. This means you can now have live loop video from virtually any location regardless of Internet availability.

Qvision Is Flexible

Our system lets you choose the optimal time between new video loops. You may also change the length of the loop. We have default settings for several typical scenarios but you can easily adjust settings to your preferences. We can assist you with solutions to camera needs, no matter the environment. Our network of top notch camera system providers can easily provide you with quality hardware to stand up to any situation.

We offer several options for viewing your images: the raw video file sent directly to your servers, a fully processed and formatted for desktop or mobile device sent to your server, a customized web page with your location map and clickable links to view your videos, or our Enterprise software that runs from your server and takes care of everything. We can even set up and program an entire website if you desire!

Qvision Is Reliable

Qvision software has been in operation successfully for over three years. We have refined and streamlined it so that we experience 99% uptime. We provide a three year warranty and free upgrades on all of our software products.

If you purchase hardware from our distribution network, you can be assured that you are buying the best in the industry. Recommended cameras come with a three year warranty. Our distributors have thousands of systems in use worldwide. They use only the best components and continually strive to improve performance and reliability.

Qvision Upgrades Are Hassle-Free

Installing Qvision on your cameras is very simple, even if your hardware isn't initially compatible. Due to the cost and technical headaches involved in setting up live video streaming, some customers find it hard to believe just how easy it is to get up and running with Qvision. There really is nothing like it!

It's simple to upgrade your Qvision video processing option from our basic service to a customized webpage to our Enterprise software. We are always available to create and program any or all of your website as well.

If you ever want to switch to live streaming on a particular camera, our live streaming partners can make the change remotely in just a few hours. There is no need to go to the remote camera or bring it into the shop.

Qvision Is Cost-Effective

With our system, you can inexpensively provide live updated video clips to one or 100,000 users. There is no longer any reason you can't have live updates for your specific situation. Bottom line…the savings speaks for itself!

We would be happy to provide a free consultation about how Qvision can be applied to your unique situation.

Request Free Consultation

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Applications

Implementation

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AXIS COMMUNICATIONS
APPLICATION DEVELOPMENT PARTNER

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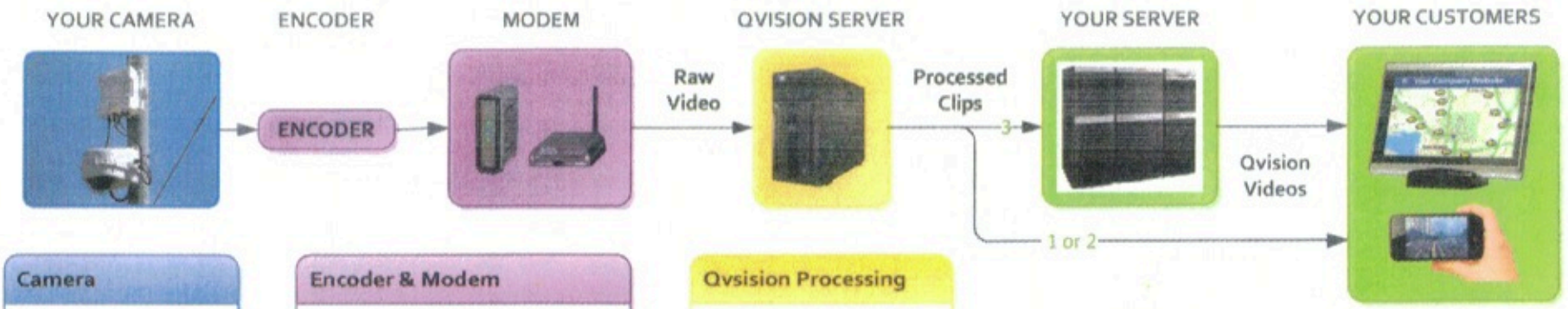
ITS AMERICA

QVISION TECHNICAL REVIEW FOR SYSTEM DEPLOYMENT



Camera

1. Make and model?
2. IP addressable?
3. PTZ? Number of views per PTZ?

Encoder & Modem

1. How is camera connected to network?
2. Ethernet, internal network, coax, cell modem, wireless, etc.
3. Encoder needed for analog or non IP addressable cameras.

Qvsision Processing

1. Qvision queries the camera.
2. This can be done directly, by DYNDNS, cell modem fixed IP, agency server NAT, etc.

Image Server Options

1. Qvision can serve images to your webpage when called by URL links from your map.
2. Qvision can host a linked webpage branded to your agency and serve the page and videos.
3. Qvision can FTP the video files to your server.

Important Notes

Qvision is designed to be light on resources, plug and play, reliable, and flexible. Even with the wide variety of legacy and new equipment and networks we are able to provide an economical and quality solution. We have the tools, experience, and skills to deliver a solution that will meet your needs and requirements. This document is provided as an outline for discussion and does not represent the full scope of possible ways to meet your requirements.

1. Qvision is designed to work on ANY camera in ANY location. Many situations are simply a matter of inputting IP addresses, querying the camera, and that is it.
2. If the camera is not immediately compatible a very easy fix of a small, inexpensive encoder that fits in the current housing allows Qvision to work with virtually any type of camera – analog or digital.
3. If there are any network issues of any type, solutions are available that are reliable and economical and will satisfy your particular requirements.

Video Stream Share

Qvision can easily be configured to share the live stream from the camera and allow full PTZ control for authorized users. There are multiple layers of security to ensure only authorized personnel can access these features. This feature is built into Qvision and requires only a simple setup.

Bandwidth Usage

Qvision places negligible bandwidth loads on your network. Even with strict cellular modem limits you will not typically exceed bandwidth allotments. If you choose to have your images served from the Qvision server to your webpage or have us host the page on our site then you will see no impact or even reduced web server bandwidth use.

QVISION TECHNOLOGY

SHOW TRAVELER INFO VIDEOS ON YOUR WEBSITE, PROVIDE FAST & EASY CAMERA MANAGEMENT FOR TMC'S, & SHARE LIVE VIDEO WITH PARTNER ORGANIZATIONS...

WITHOUT THE HEADACHES AND COST OF LIVE STREAMING!

Qvision is a revolutionary new way to transmit video over the Internet at savings of up to 80% - even if your system runs on a fiber optic network.

Qvision creates and manages traveler info videos for your website so you don't have to. Travelers get 24/7 access to accurate info that's formatted to work on virtually any computer or mobile device. Jpegs tell only half the story but Qvision lets viewers see traffic volume and speed, giving them a complete picture of conditions.

Qvision gives control room operators fast, easy, real-time camera access and PTZ control.

Qvision allows TMC's to securely share live streaming images with partner organizations without the need for expensive new hardware. Partners can even have PTZ permissions, if required.

Qvision is simple to install, light on system resources, places a negligible load on internal networks, works with legacy systems or the latest IP-enabled cameras, doesn't require integration with current C&C software, vastly reduces IT/hardware/service provider costs, and greatly simplifies overall TMC systems.

Qvision continues to work during high-demand periods without affecting the bandwidth and capabilities of TMC operations.

Qvision works on any camera anywhere. It can capture multiple videos from a single PTZ camera, making it resource efficient.

Qvision solves traveler information and control center traffic information gathering and sharing challenges. To find out more and/or sign up for a free demo, visit www.QvisionTechnology.com.

Finally an alternative to live streaming...

VISION

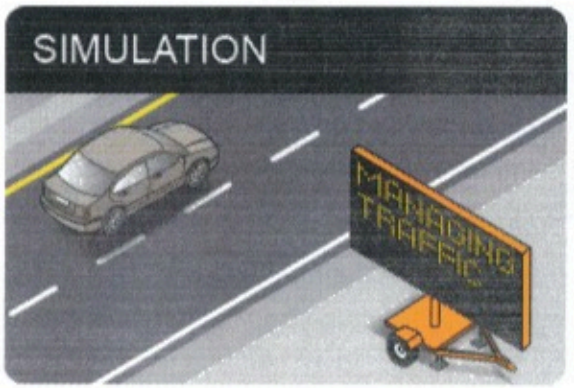
...without the cost and headaches

www.QvisionTechnology.com
591 Telegraph Canyon Rd. #449
Chula Vista, California 91910
Phone: 800-900-8180

SALES: 1-855-253-1772
SUPPORT: 1-888-488-7446

Traffic responsive systems

Traffic-responsive systems continuously monitor real-time traffic conditions and automatically respond with appropriate and dynamic messaging, such as driving instructions and traffic condition information. These systems are designed to manage work zone traffic control and to meet temporary traveler information needs. They include:



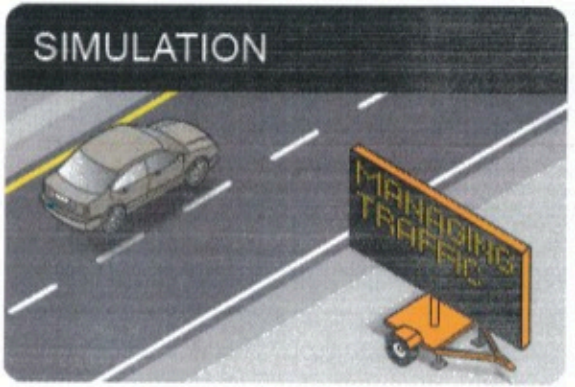
- **Travel Time Information** systems are continuously updated to provide current travel time between the driver's location and a specific destination downstream. This system automatically gives motorists real-time information bases on pre-programmed algorithms and current traffic conditions. In advance of a decision point, it provides route choice and may smooth traffic flow.
- **Delay Time Information** systems provide drivers with the current length of delay time to a particular downstream location. Delay Time Information systems are based on the current queue speed compared to normal travel speed.
- **Route Management Information** systems may be provided to various audiences based on their informational needs. For instance, public websites for extended projects and integration with Highway Advisory Radio networks are options that provide valuable, real-time route management information. Travel time, alternate route guidance, and updates on major construction (e.g., pending traffic changes or planned road closures) may be part of automated Route Management systems.
- **Stopped Traffic Warnings** automatically alert drivers to an upcoming traffic slow-down or stopped traffic and provide time to stop safely. This system may also provide time to choose alternate routes. Stopped Traffic Warnings are used when queue lengths are estimated to vary widely day to day and hour by hour and when queues are so extended that they go beyond drivers' reasonable expectations for stopped traffic.
- **Dynamic Speed Displays** automatically indicate the current speed and the posted speed limit to each passing driver. This application may be especially valuable when workers are adjacent to the open lane of traffic or when roadway conditions are especially hazardous.
- **Dynamic Lane Merge** systems alert drivers to upcoming traffic slowdowns or stopped traffic when two lanes of traffic merge to one lane. Dynamic Merge systems automatically provide specific direction to drivers about appropriate merge points and merge behavior, and continuously detect lane speeds and volumes to dynamically display accurate messages. Dynamic Lane Merge systems reduce queue length. Further, by reducing the speed differential between lanes, this system decreases travel time through the work zone and may reduce aggressive driving behaviors.

SALES: 1-855-253-1772
SUPPORT: 1-888-488-7446

Vehicle-responsive systems

Vehicle-responsive systems continuously evaluate individual vehicle characteristics and automatically produce warnings directed to those vehicles. Vehicle-responsive systems include:

- **Dynamic Speed Displays** automatically indicate the current speed and the posted speed limit to each passing driver. This application may be especially valuable when workers are adjacent to the open lane of traffic or when roadway conditions are especially hazardous part of the work zone.
- **Work Space Intrusion Warnings** automatically alert drivers and workers when a vehicle inadvertently enters a construction zone or work space. This system may be implemented if the truck exit is difficult to identify or when tailgating is associated with high roadway volume.
- **Over Dimension Warnings** are used when a minimal clearance condition exists. When a vehicle is over dimension, this system automatically alerts drivers in advance of the alternate route the driver should take. If the driver does not take the alternate route, the warning system directs the driver to stop.



ASK FOR A WEBINAR >

PROJECTS REFERENCES

I-35W/Crosstown WZ Enhancements

Minnesota DOT (MNDOT) asked us to provide temporary replacement sensors (via an XML feed into their Regional Traffic Management Center - RTMC) for all of the roadway loop detectors they lost during construction on one the Twin Cities busiest sections of roadway (250,000 ADT). The replacement sensors keep the RTMC's
regional travel time system in tact throughout this project. We provided a mixture of 11 sensors using G4 RTMS's and Doppler radars to replace lost loop detectors.

In addition, after the project started, MNDOT was experiencing speed related crashes in a lane transition area. We were able to rapidly deploy a speed activated PCMS that warned vehicles with excessive speed to "REDCUCE SPEED-CURVES AHEAD". Through our JamLogic server, MNDOT and their

consultants are able to monitor the system and loops.

Application: Vehicle Responsive – Excessive Speed Warning, ITS Camera & Loop Replacements
Location: Minneapolis, MN
Technology: 1 PCMS & Sensor, 11 WZ Sensors for RTMC
Duration: 2008-09

Project datasheet (397k)

School Bus Stop Flasher System

The Minnesota Department of Transportation(Mn/DOT) Studied and funded this rural ITS installation as part of Federally Funded ITS Rural Deployment Program. The goal of this installation was to help reduce near misses and crashes related to this rural highspeed (55mph) blind bus stop. The system was deployed along StateHwy 67 which is a Minnesota River Valley Scenic Byway with limited horizontal and vertical sight distance. JamLogic was chosen to develop and install this wireless solar powered rural bus stop fully automated warning system for use by the Bennett & Bennett Bus Company.

Application: Rural ITS Vehicle Responsive-Conflict Warning
Location: Granite Falls, MN
Technology: Wireless 900MHzComm. Bus Transmitter, Solar Flasher Receiver
Installed: 2007

Project datasheet (397k)

Projects references

Automated Queue Warning (AQW) System

Holiday Mall Traffic backs up onto the 805 and onto the 163 Highway and has been an issue in previous years. Steep hills and blind corners exacerbate the issue. Ver-Mac proposed two Queue Warning smart work zones to prevent rear end collisions. Traffic sensors were strategically placed along locations likely to experience the beginnings of the backups.

Application: Traffic Responsive Queue Warnings
Location: San Diego, CA
Technology: 5 PCMS, 5 Traffic Sensors
Duration: Nov 2012 - Jan 2013

Project datasheet (532k)

PA Turnpike I-476 (Montgomery Co., PA)

Ver-Mac is providing a turn-key temporary ITS travel time and queue warning system for the Pennsylvania Turnpike that warns motorists of delays and stopped traffic via both the Turnpike's existing older overhead DMS and 15 additional PCMS. This project will take almost three years to complete the I-476 reconstruction. All of the portable sensors and signs are monitored at the Turnpike Commission's TOC, but operate automatically based on actual real-time traffic conditions.

Application: Traffic Responsive, Delay Time/Alternate Routes & Queue Warnings
Location: Montgomery Co., PA
Technology: 15 PCMS / 6 DMS, 18 Traffic Sensors, 16 3rd Party Sensors
Duration: Feb 2011 (for 33 Months)

Project datasheet (548k)

NJ Turnpike 6-9 Widening (Trenton, NJ)

Ver-Mac provided a turn-key temporary ITS replacement system for the NJ Turnpike's old legacy system of VMS (variable message signs) and VSLS (variable speed limit signs) over a three year period during which a 25 mile segment of the Turnpike is being widened from 6 lanes to 12 lanes under 14 separate contracts. All of the temporary devices are managed from the NJTPA/NJDOT TMC headquarters, but operate in automatically based on prevailing downstream traffic conditions.

Application: Traffic Responsive, Delay Time/Alternate Routes & Queue Warnings
Location: Trenton, NJ
Technology:27 Portable VSL Signs, 31 PCMS, 25 Traffic Sensors
Duration: 2010 - 2013

Project datasheet (493k)

I-55 (I-70 to IL 140) (Madison Co, IL)

One umbrella "Real Time Traffic Monitoring System" (RTTM) covering three construction projects along I-55 in Southern Illinois. The original project covered just over 30 miles bi-directional mainline Interstate roadway with a six mile advanced lead-in utilizing 73 PCMS and 56 sensors. The goal for system functionality was queue detection with PCMS's spaced one mile apart along the route to warn motorist of "Stopped Traffic." Secondary function for the system is travel times, delay times along with a dynamic detour. The Department has utilized the system to automate lane future ramp closures during the project.

Application: Traffic Responsive, Delay Time/Alternate Routes & Queue Warnings
Location: Madison Co, IL
Technology:60 PCMS, 60 Traffic Sensors
Duration: 2010 - 2012

Project datasheet (493k)
IL I-55 Madison Co ILDOT Project of the Year Award (298ko)

I-70/I-57 EFFINGHAM, IL

Effingham, IL is located at the crossroads of two major freeways (I-70 & I-57) which accommodate very high heavy truck volumes (over 50% as shown above). The Illinois Governor directed DOT staff to utilize smart work zones and specifically queue warning systems after the state experienced two major fatalities on heavy truck routes in work zones the previous year.

Application: Traffic Responsive, Delay Time/Alternate Routes & Queue Warnings
Location: I-70/I-57 EFFINGHAM, IL
Technology:25 PCMS's, 25 Traffic Sensors, 20 Camera Trailers
Duration: 2010 - 2012

Project datasheet (443k)

I-80 SW Chicago, Will County

Imagine reducing I-80, just southwest of Chicago, down to one lane while accommodating very high heavy truck traffic. This forty mile segment of roadway consisting of four contracts did just that. Delays? You bet! Real-Time information upstream to warn motorists of actual delay times and queue warnings...essential. Typical free flow travel times of 20 minutes would typically double or triple every weekday for several hours. Smart traffic management systems cannot always eliminate delay, but they can provide advance warning at key decision points upstream of the problem areas.

Application: Traffic Responsive, Travel Time & Queue Warnings
Location: I-80 SW Chicago, Will County
Technology: 19 PCMS's, 24 Traffic Sensors, 6 Camera Trailers
Duration: May 2011 - November 2011

Project datasheet (361k)

Duluth I-35 Mega Project (Duluth, MN)

I-35 in Duluth MN was made up of many old bridges that were in desperate need to major reconstruction. This vital link between Minneapolis and Duluth and tourist destinations to the north had to be kept open to traffic during the reconstruction. Traffic was restricted to an 11 foot lane in each direction and significant delays were anticipated. MNDOT needed an automated system that would convey travel times as far as 30-90 miles in advance to allow for drivers to pick alternative routes. In addition the area south of the work zone, where traffic backed up was often prone to fog and bad visibility due to high speeds and limited vertical sight distance.

Application: Traffic Responsive, Delay Time/Alternate Routes & Queue Warnings
Location: Duluth, MN
Technology: 3 PCMS / 3 Travel Time Signs, 4 Prepare to Stop Flashers, 16 Traffic Sensors
Duration: April 2010 – Oct. 2011

Project datasheet (466k)

I-94 Red River Bridge (Fargo-Moorhead)

This busy freeway section provides a vital link between the twin cities of Fargo, ND and Moorhead, MN and the roughly 40,000 ADT which includes a higher than normal percentage of truck traffic. The regularly posted speeds at 70 mph, thus it was vital to convey delay times at the far limits of this work area and queue warning systems as vehicles enclosed on the work area.

Application: Traffic Responsive – Delay Time & Queue Warning
Location: Moorhead, MN/Fargo, ND

Technology: 7 Static-Dynamic Signs, 3 Dynamic Delay Signs, 5 Sensors
Duration: Summer/Fall 2009

Project datasheet (397k)

I-80 Mississippi Bridge Rehabilitation

This major Interstate bridge resurfacing project turned into a bridge structural repair project after it began. Our system was originally intended to provide stopped traffic warnings and alternate route management. As a result of the unanticipated bridge repairs all eastbound traffic was rerouted via our PCMS's to the I-280 Quad Cities bypass.

Application: Traffic Responsive Route Management & Queue Warning
Location: Rock Island, IL/Davenport, IA
Technology: 20 PCMS's 9 Traffic Sensors
Duration: 2008 - 2009

Project datasheet (361k)

I-96 Lansing-Detroit

This major Interstate route carries between 45,000 and 134,000 ADT between Lansing and the Detroit metropolitan area. JamLogic has provided travel times and delay times for this route and alternative routes as one enters the Detroit metro. JamLogic was incorporated many of the DOT's existing sensors and data from additional privately owned sensors. By combining all the available sensors we were able to provide accurate travel times along this approximate 20 mile segment of freeway throughout multiple reconstruction projects.

Application: Traffic Responsive – Travel Time-Delay Time-Route Mgt
Location: Lansing-Detroit, MI
Technology: 19 PCMS's, 131 Sensors, 6 Cameras
Duration: 2008 - 2009

Project datasheet (397k)

I-75/Gateway Metro Reconstruction

For this major highway and bridge reconstruction in metropolitan Detroit, the Michigan Department of Transportation required lane closures and traffic

rerouting. MDOT's goals include increased capacity, improved traffic flow at a major bridge crossing, and decreased traffic volume on city streets. Alternate travel route availability and guidance is invaluable in this work zone covering 14 lane miles and carrying 110,000 ADT.

JamLogic has been providing comprehensive, network-level data for management of this complex project, the largest single bid item undertaken to date by the Michigan DOT. This intelligent work zone system provides information to residents and visitors alike and helps to manage traffic at the Ambassador Bridge, the largest U.S.-Canada commercial crossing. Applications include travel times for alternate routes, web control of PCMS for contractors and DOT staff, and live camera images.

Application: Traffic Responsive – Traveler Information, Route Management & Travel Time
Location: Detroit, MI
Technology: 27 Travel Time Displays, 10 PCMSs' 190 Sensors, 30 Cameras, 120+ Solar Panels
Duration: December 2007 – December 2009

Project datasheet (397k)

TH 61 Hastings Bridge Repairs

The DOT initiated this bridge reconstruction soon after the collapse of the 35W Bridge in Minneapolis. This old steel truss structure also had weakened gusset plates and needed immediate repair. This two lane bridge along TH 61 crossing the Mississippi River was reduced to one lane of alternating traffic resulting in major delays for
the southeast of the Twin Cities metro area. The bridge is also located at the bottom of a hill with limited sight distance where queues of stopped vehicles would often wait at a temporary signal to cross the river.

JamLogic together with MnDOT designed and deployed an automated work zone that conveyed travel times, suggested alternate routes during major congestion and provided stopped traffic warnings to the traffic approaching the queued vehicles. Prepare to Stop static signs with flashers (shown below) were installed along the long southbound approach to the bridge to reduce the chance of rear end crashes. A combination of queue length and delay time determined automatic activation for Use Alternate Route messaging..

Application: Traffic ResponsiveDelay – Time-Alt. Routes, Queue Warning
Location: Hastings, MN
Technology: 4 PCMS, 1 Delay Time CMS, 6 Sensors, 2 Cameras
Duration: Summer 2008

Project datasheet (397k)

35W Bridge Collapse-Rapid Deployment

Following the collapse of the I-35W bridge over the Mississippi River in Minneapolis, MN, JamLogic deployed and maintained alternate route (TH 280)

and travel information signs while Mn/DOT developed a networklevel plan. The system consisted of 4 cameras and 4 sensors. Sensor data and camera feeds were integrated with Mn/DOT's Remote Traffic Management Center (RTMC). Our products were deployed and fully operational on August 5, 2007, four days after the bridge collapse.

Application: Traffic Responsive – Traveler Information, Alternate Route Info
Location: Minneapolis, MN
Technology: 4 Cameras, 4 Sensors, JamLogic Application Server
Duration: August 2007 – August 2008

Project datasheet (397k)

M-10 "The Lodge" Major Reconstruction

The Michigan Department of Transportation (MDOT) tackled major roadway reconstruction and bridge repair in Detroit. Highway M-10, known to residents as "The Lodge", connects downtown Detroit and its northwestern suburbs via 6 lanes with156,000 ADT. Since MDOT had to close multiple lanes of traffic, the real-time travel information services Traffic Technologies provided were instrumental for effective traffic management. With JamLogic, MDOT achieve project goals in the following key ways: Reliable and accurate travel time information allowed alternate travel routes to be established. Supplying travel time, rather than delay time, gave drivers added control and choice while creating real opportunities to reduce congestion. The JamLogic system supported MDOT's high standards for public communication.

Application: Traffic Responsive – Traveler Information, Travel Time
Location: Detroit, Michigan
Technology: 75 sensors, 4 PCMS, 8 cameras, 20 roadside displays, JamLogic Application Server, JamLogic Controller
Duration: February 2007 – September 2007

Project datasheet (397k)

I-80 Work Zone Management

The Nebraska Department of Roads (NDOR) performed reconstruction and bridge widening on Interstate 80, the busiest highway in Lincoln and primary connector with Omaha. NDOR required a temporary work zone traffic management system capable of communicating with their existing roadside signs. We designed, deployed, and maintained a JamLogic system for the project's duration with local project management and assistance from ITERIS, Inc. The JamLogic system and devices supplied travelers with real-time traffic information, including travel times, incident reports, and congestion reports.

Application: Traffic Responsive – Travel Time & Lane Management
Location: Lincoln, Nebraska
Technology: 4 Sensors, 6 PCMS, 2 Cameras, JamLogic Application Server
Duration: April 2006 – December 2007

Project datasheet (397k)

www.propage.com

Jam-Logic Server & Network architecture

Last update: February 2015

Table of Contents

1. Introduction

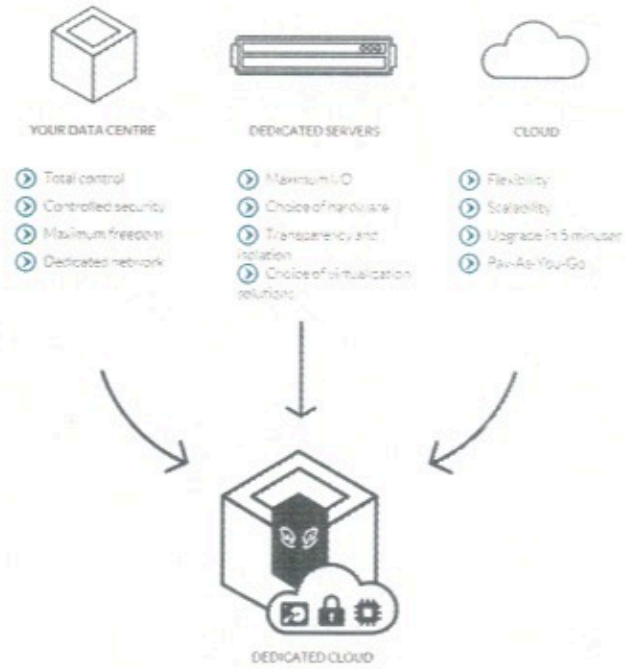
This document is intended to give a high level view of the JamLogic environment. This environment is used to communicate with networked devices such as VMS, sensors, cameras and other roadside equipment owned and operated by Ver-Mac clients.

JamLogic is not required for most day to day operations. VMS (Variable Message Sign) are autonomous for displaying messages, graphics or executing changes based on schedules. JamLogic is required for remote control of the VMS and execution of most of the Smart Work Zone. We currently have over 4000 user's accounts that can access JamLogic.

2. Infrastructure

We have a dedicated Cloud environment hosted in the OVH datacenter in Canada which is one of the most secure and vCloud Certified datacenter (the highest level of certification provided for Service Providers) in Canada. OVH is the number 3 internet hosting company in the world.

Dedicated Cloud is a unique service on the global market resulting from years of research with the leading virtualization software companies. Thanks to the OVH expertise, it combines the best features of 3 types of infrastructure and offers you a next generation cloud specifically designed for professionals.



The JamLogic solution is hosted a VMware platform which is one of the most stable virtualisation platforms in the industries. We are using the fault-tolerance (FT) and high-availabilities (HA) feature to achieve the highest SLA possible for our environment.

Our data is store on redundant dedicated storage

Our environment is protected against all types of DDoS attacks by a 160 Gbps anti-DDoS infrastructures.

All access to the OVH premises is strictly monitored. To prevent any intrusions or hazards, every boundary is secured using barbed-wire fencing. Video surveillance and movement detection systems are also in continuous operation. Activity within the data centres and outside the buildings is monitored and recorded on secure servers, while the surveillance team are on site 24/7

The OVH datacentres are powered by two separate electrical power supplies and are also equipped with UPS devices. Power generators have an initial autonomy of 48hrs to counteract any failure of the electricity supply network.

For more information about the Datacenter facilities can be found at:

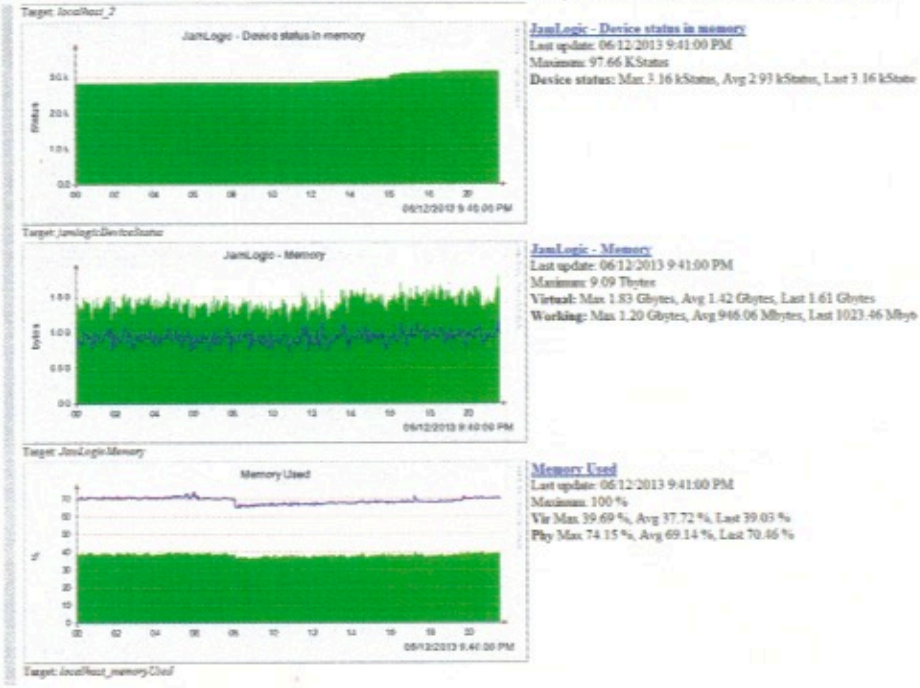
http://www.ovh.com/ca/en/about-us/security.xml

3. Periodic Maintenance

Very little maintenance is required on JamLogic as the environment has been highly automated. The following actions are performed on our server on a periodic basis

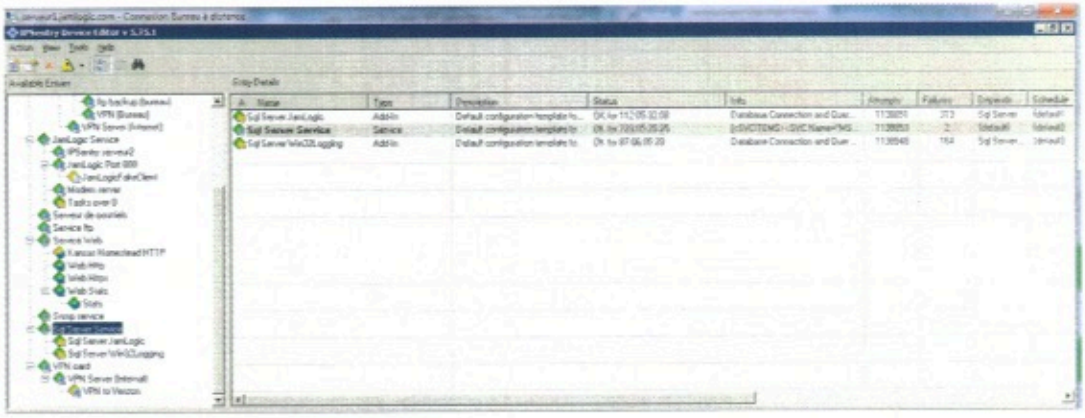
1. Monthly server security patches update. Patch are applied to development server and monitored 1 week before been approved for deployment on the production server.

2. Daily monitoring. Monitoring agents on the server provides over 75 performance counters. Those counters are reviewed each day to assure stable operation



3. Backup are performed each night automatically

4. An automated alerting system is in place monitoring specific conditions. Abnormal conditions trig email and SMS alerts.



5. Low level Windows log are cleaned automatically every other days

6. Low level automated action log are cleaned automatically every 8 days

7. Actions logs older than 1y are archived

8. Some manual cleanup are done when hard disk reach 80% of their capacity

9. Network maintenance is done by the ISP according to release of patches from the equipment manufacturer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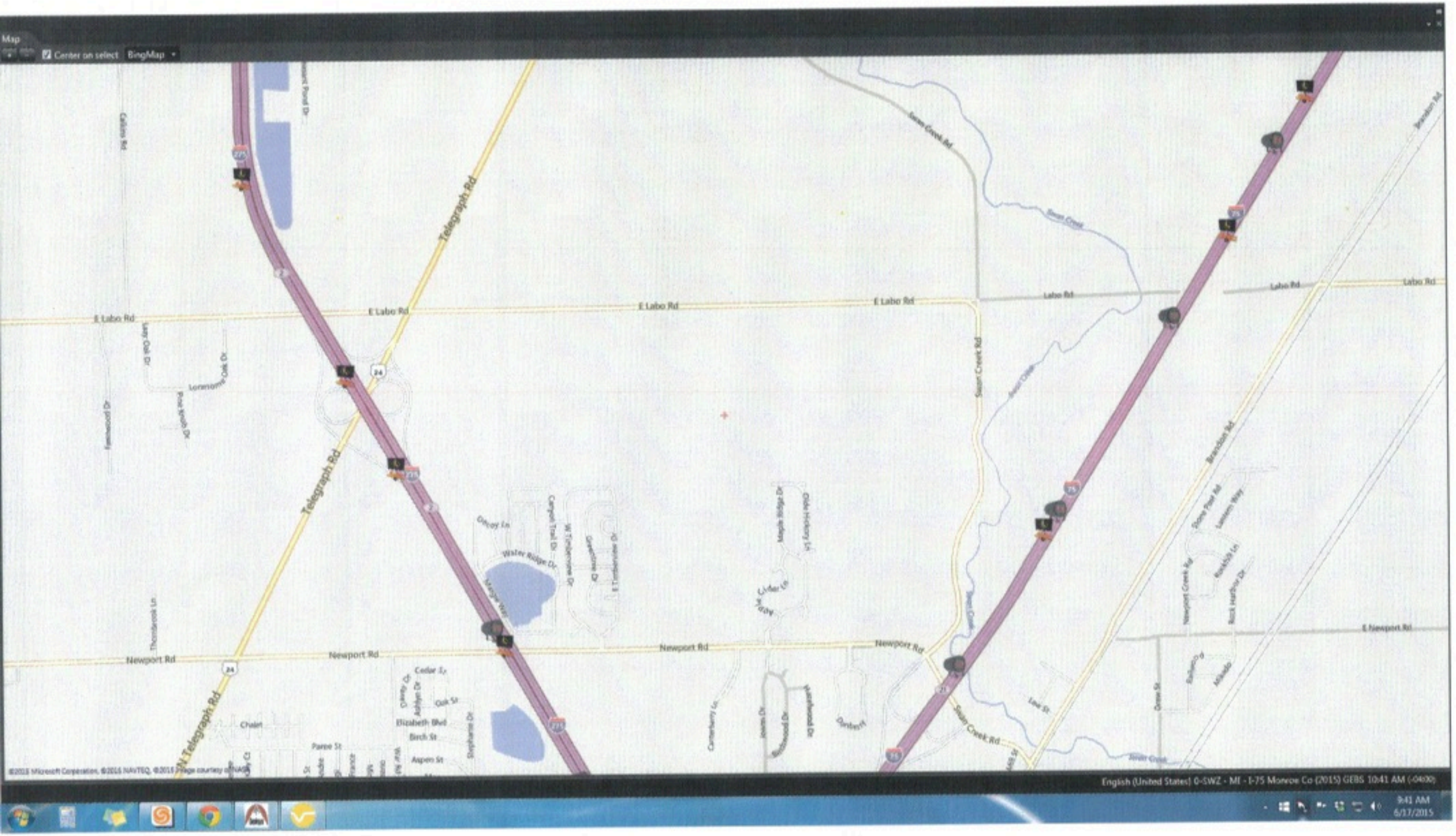
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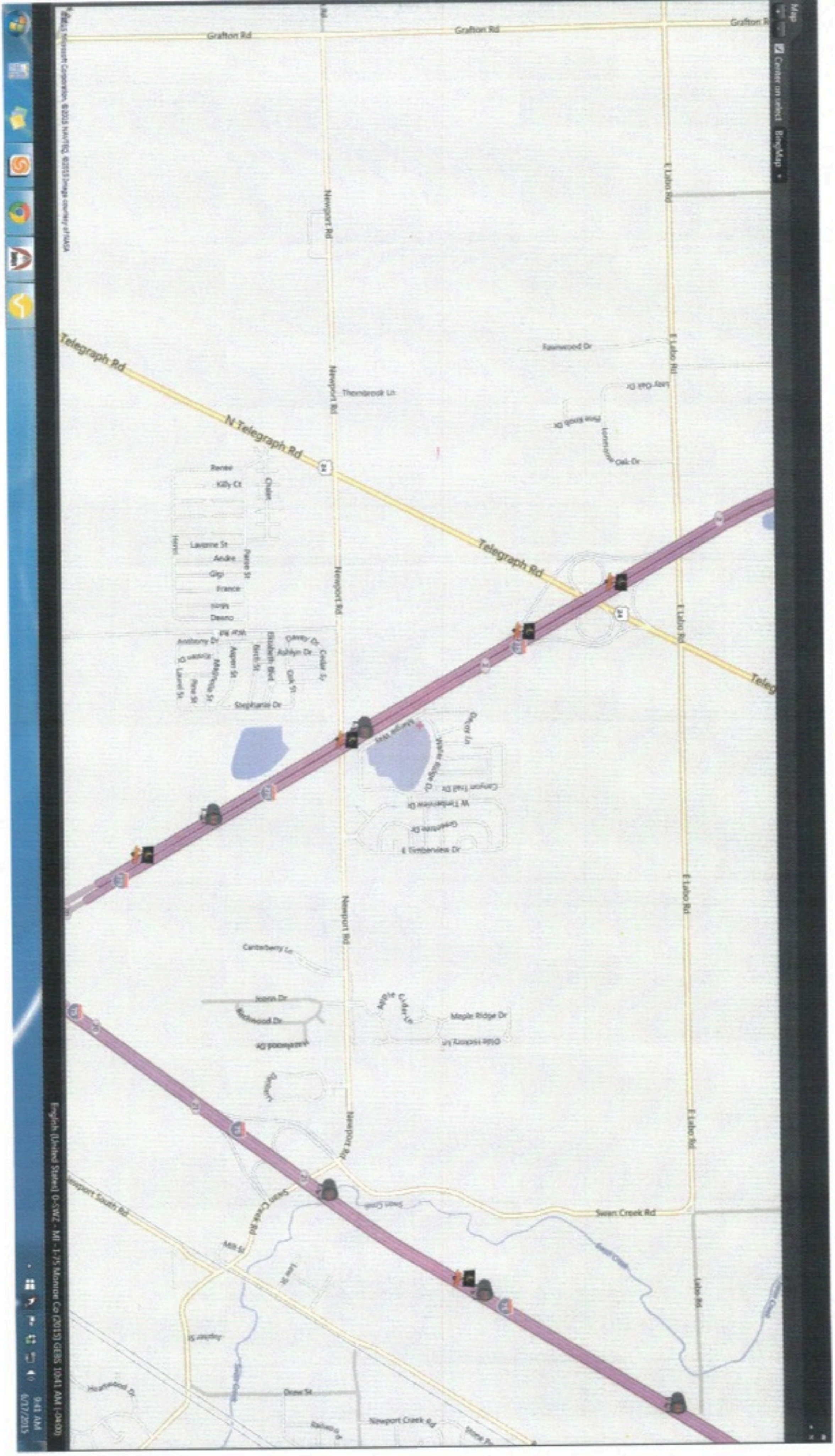
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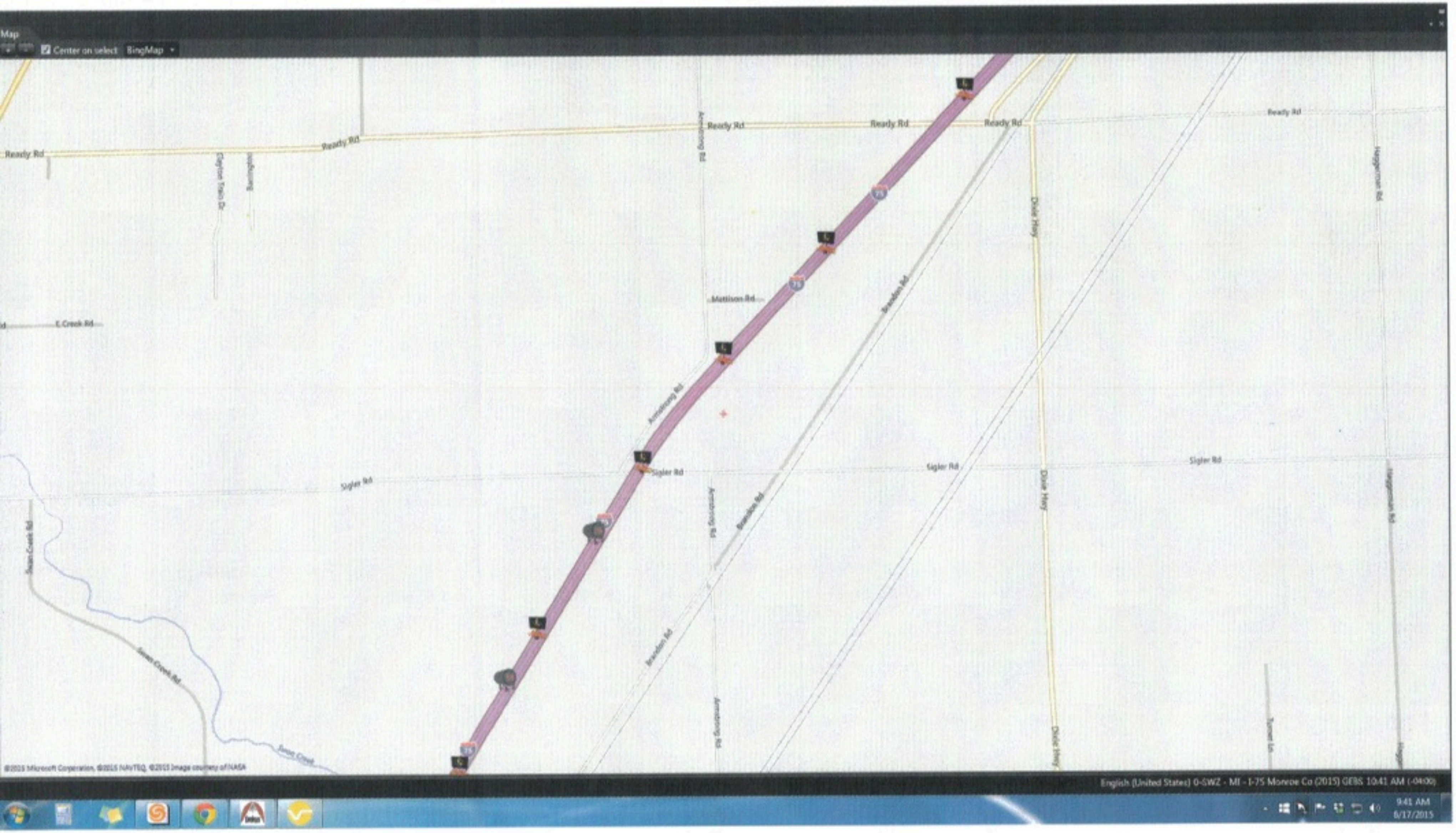
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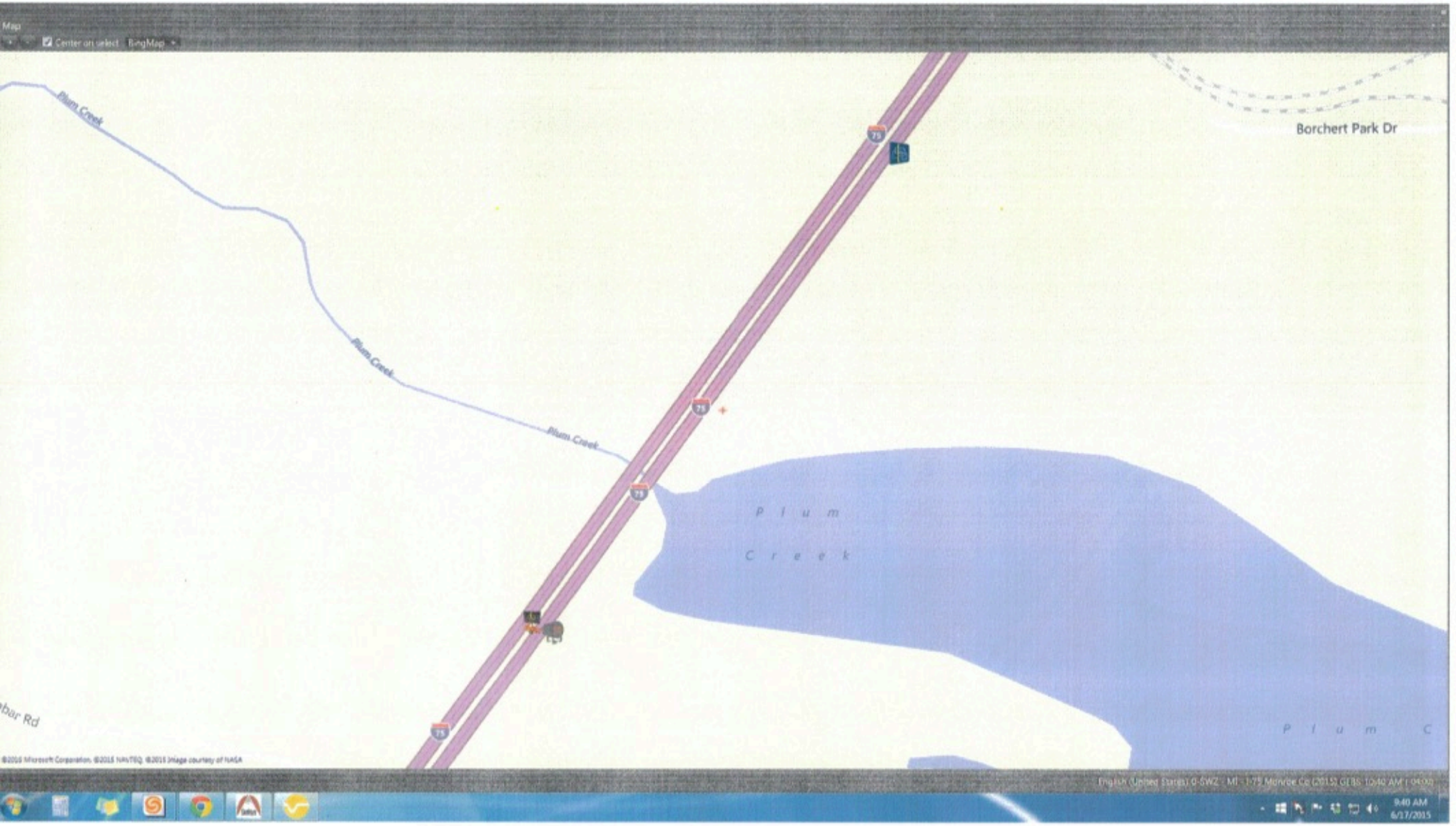
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English (United States) 0-SWZ - MI - I-75 Monroe Co (2015) GEBS 10:40 AM (-04:00)
9:40 AM
6/17/2015


Map
Center on select
BingMap
Timbar Ln
E Davenmoor Dr
Raven Pkwy
Ray Circle
Teakwood Dr
Poplar Dr
Hull Rd
Hull Rd
Hull Rd
E Albain Rd
E Albain Rd
Laplaisance Rd
Waters Edge Dr
Waters Edge Dr
Waters Edge Ct
Willow View Ct
La Plaisance Creek
75
75
75
75
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9:39 AM
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