

Bluetooth Delay-time Messaging for Construction on Hwy. 401



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Project Background

Hwy. 401 IC at Hwy.137 connects to USA (I-81)

- 2 lanes each direction;
- SADT 41,900



Project Background (2017)

Hwy. 137 Bridge – Major Rehabilitation Required:

- deck repairs, overlay, new barrier walls, approach slabs, bearings, expansion joints, and ballast walls
- Repairs to deck soffit, abutments and piers
- LONG DURATION single lane closures required



Project Background (2017) Challenges

- OPP concerns:
 - Queue end collisions;
 - Hwy. 401 safety due to driver frustration;
 - restrictions to truck movements on adjacent EDR and/or minor roads;
- Township and County concerns that traffic will be diverting to Emergency Detour Routes (EDRs);
- Managing Public Complaints due to long delays



Project Background (2017) Solutions / Actions:

1. Adjusted lane closure to improve lead-in visibility (OPP);
2. Added radar speed display sign (OPP);



3. Post expected delay times on PVMSs

Project Background (2017)

Anticipated Benefits?

- Reduced speeds in construction zone;
- Fewer public complaints;
- Fewer accidents;

PVMS Delay-time Messaging:

- 2017 approach utilized Bluetooth Technology to calculate and display the delay times:
 - Installed by TPA North America;
 - 5 BTM units WB; 2 BTM Units EB;
- Inform motorists of expected delay times on multiple PVMSs:
 - 8, 13 and 28 km ahead on a daily basis;
 - Extended to 44 and 75 km ahead on long weekends

**LEFT LANE
CLOSED
3 KM AHEAD**

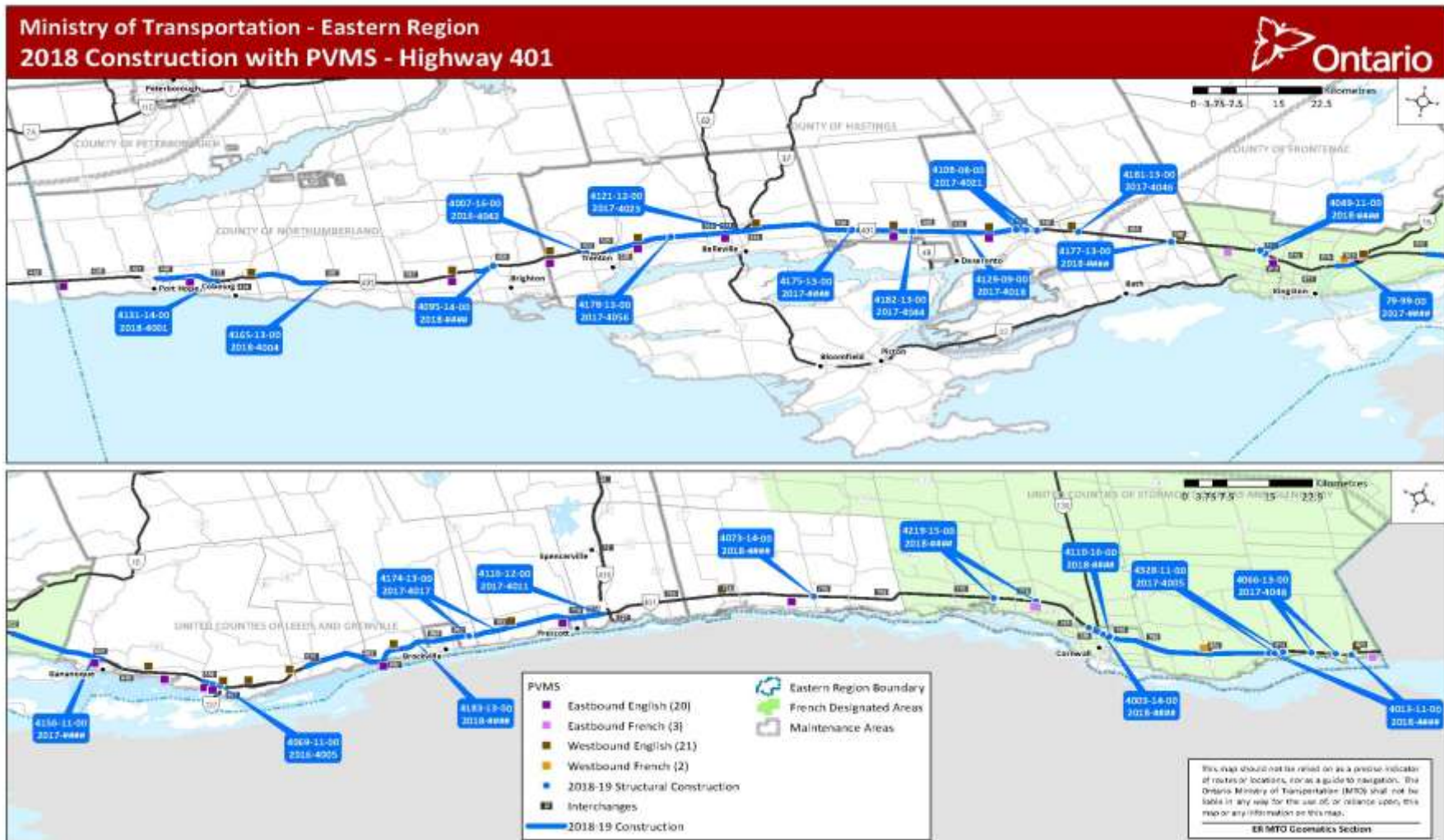
**EXPECT
8 MIN
DELAY**

PVMS Delay-time Messaging: Observed Benefits:

- Only 6 (or so) public complaints for the whole season! Why??
 - Messaging effectively got drivers attention;
 - Messaging allowed drivers to make decisions to suit their need;
 - Messaging was reiterated and accurate
- No serious queue end collisions in the first season
 - Delay messaging effectively communicated the likelihood of stopped traffic ahead?

2018 – A Bigger Challenge

25 +/- Construction Zones on Hwy. 401 in 2018



2018 – A Bigger Challenge

Mitigating Serious Queue-end Collisions

– Driver Behaviour and Inattention

Woman killed in Highway 401 crash in South Glengarry Township identified

Police say 4 passenger vehicles, 2 tractor trailers involved in deadly crash

CBC News - Posted: Aug 21, 2017 10:12 PM ET | Last Updated: June 7



Tractor-trailer crash on Highway 401

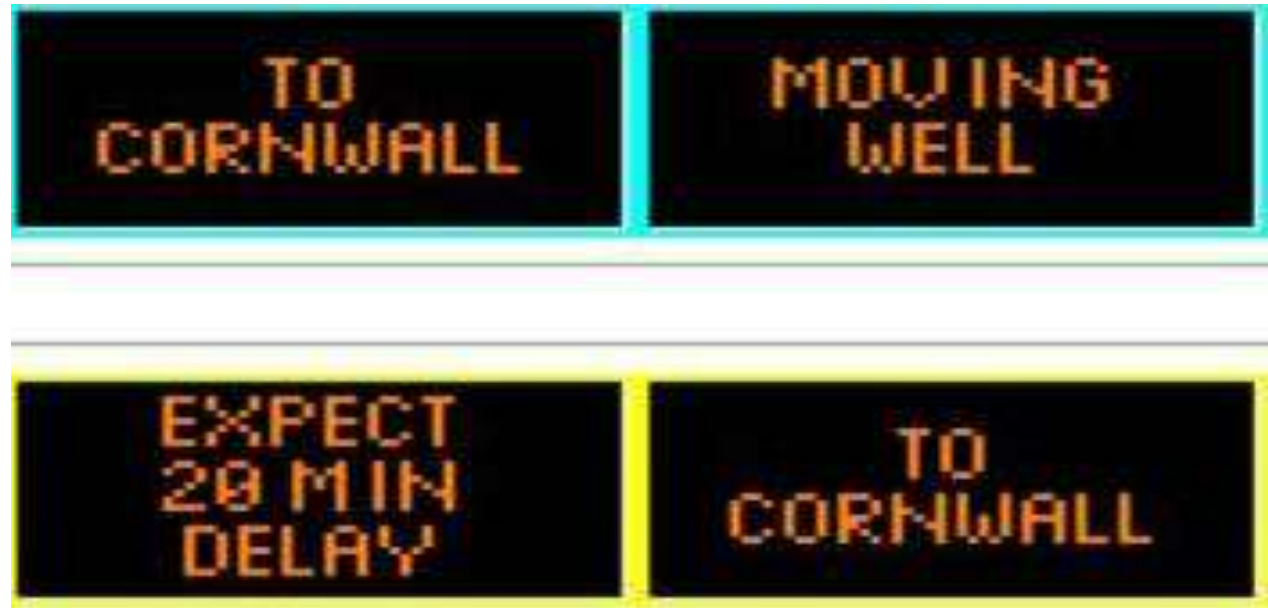
3 lanes closed at Deseronto Road

18 10:40 AM ET | Last Updated: May 31



Bluetooth Delay-time Messaging Pilot Project

- Bluetooth system expanded to cover 400km of Hwy. 401 across Eastern Region for 2018;
- 30 Bluetooth Traffic Monitors (BTMs) displaying messages on 59 VMSs between 6 major centres:
 - Cornwall;
 - Hwy. 416;
 - Hwy. 137;
 - Kingston;
 - Belleville;
 - Port Hope



Bluetooth Delay-time Messaging Pilot Project

Objectives and Rationale:

- Delay-messages seem to be important to drivers
 - Encourage eyes on the road;
 - Messages available to 100% of audience
- Messaging applicable for any type of incident, eg:
 - Construction lane closures;
 - Traffic accidents;
 - OPP has someone pulled over
- messages reiterated (3 times per zone);
- accuracy important (so drivers trust messages)

Bluetooth Delay-time Messaging Pilot Project

Example Messages:



Bluetooth Delay-time Messaging Pilot Project

Example Messages:



Bluetooth Delay-time Messaging Pilot Project

System Set-up, Tuning and Operations:

- Sorting out prioritization for sign messages;
- Delay calculations based on assumed 102 km/hr travel speed (started at 95 km/hr, then 100 km/hr);
- For calculated delays less than 5 min, posting “Expect 5 min. Delay”;
- Added 5 BTMs for improved accuracy;
- Various technical problems (stolen batteries, missing pixels, signs blown out of alignment);
- Special messages for unique issues;



Bluetooth Delay-time Messaging Pilot Project

Special messages for unique issues:



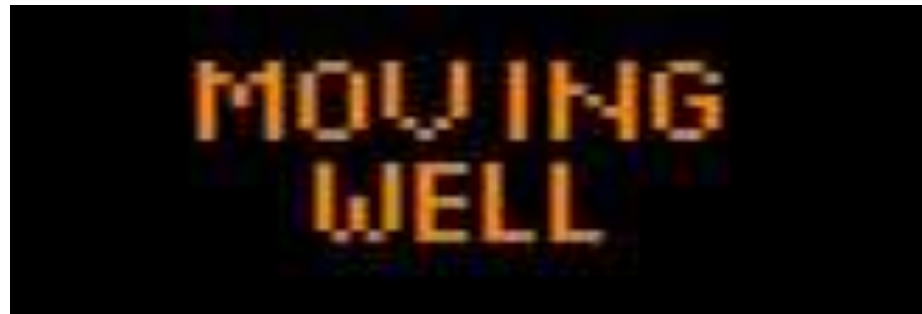
Bluetooth Delay-time Messaging Pilot Project

Next Steps:

- **Continue fine-tuning based on observations and feedback;**
- **Get stakeholder (OPP, Municipal, OTA etc.) and public feedback;**
- **Evaluate effectiveness**

That's All!

Hopefully



In 2018