Improving Incident Management and Traveler Information Through Data Partnerships: Waze Case Study

Bob Taylor, PE, PTOE

Manager of Traffic Operations

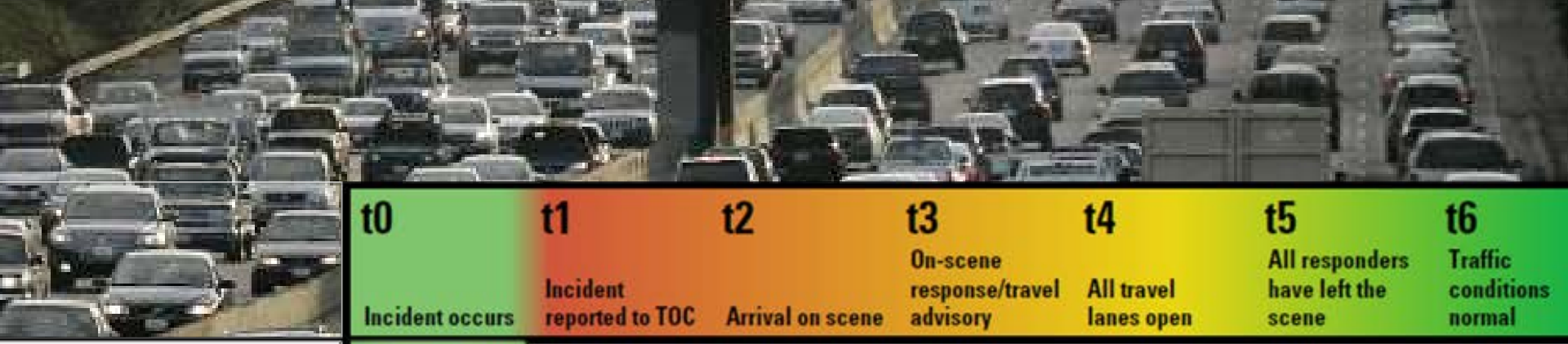
Pennsylvania Turnpike Commission

PENNA TURNPIKE

IBTTA

TOLLING. MOVING SMARTER.

CONNECTED CITIZENS by waze



t0	t1	t2	t3	t4	t5	t6
Incident occurs	Incident reported to TOC	Arrival on scene	On-scene response/travel advisory	All travel lanes open	All responders have left the scene	Traffic conditions normal
Detection						
Notification *(Verification, Dispatch)*						
Arrival *(Size-up, Report to TOC)*						
Response activities *y, Command, Traffic Management, Plan X)*						
Clearance & Termination						
Recovery						

*There are **known knowns**. These are things we know that we know.*

*There are **known unknowns**. That is to say, there are things that we know we don't know.*

*But there are also **unknown unknowns**. There are things we don't know we don't know.*

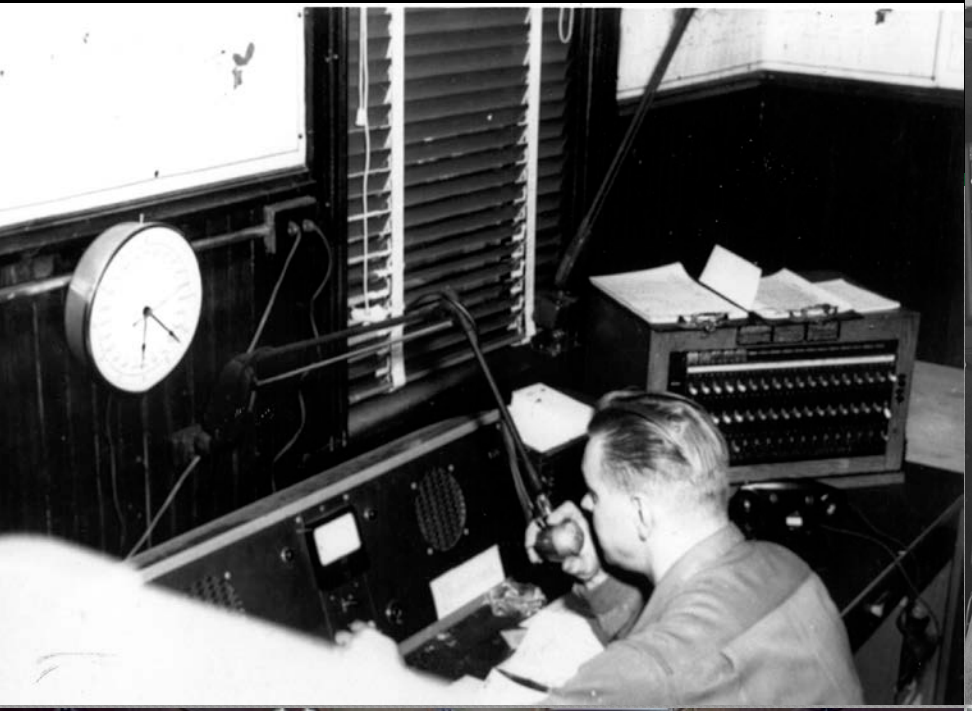
-Donald Rumsfeld

The Pennsylvania Turnpike Commission's Adoption of the National Unified Goal of

TRAFFIC INCIDENT MANAGEMENT

MISSION | To operate a safe, reliable, customer-valued toll road system that supports national mobility and commerce.

1. **Focus on the safety of yourself, all first responders and our customers**
2. **Clear the road as quickly and safely as possible**
3. **Provide prompt and reliable communications**



DISTRICT 1
DISTRICT 2
DISTRICT 3

STATE POLICE

ENHANCING AWARENESS

TRADITIONAL METHODS

- *11
- Maintenance reports
- Troop T
- CCTV
- RWIS

VERIFICATION AND ANALYSIS

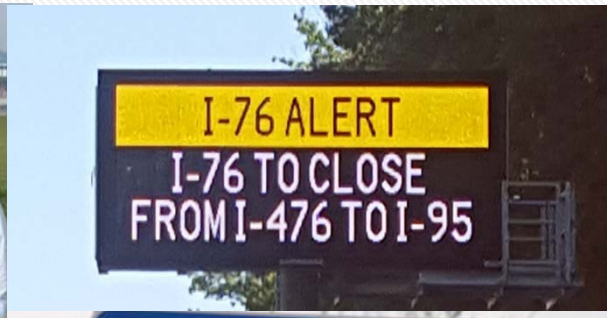
TRADITIONAL METHODS

- People

TRAVELER INFORMATION

TRADITIONAL METHODS

- Travel advisories
- HAR
- DMS



ENHANCING AWARENESS

EMERGING METHODS

- Mobile CCTV
- UAVs
- Social media
- Connected vehicles
- Data sharing partnerships

VERIFICATION AND ANALYSIS

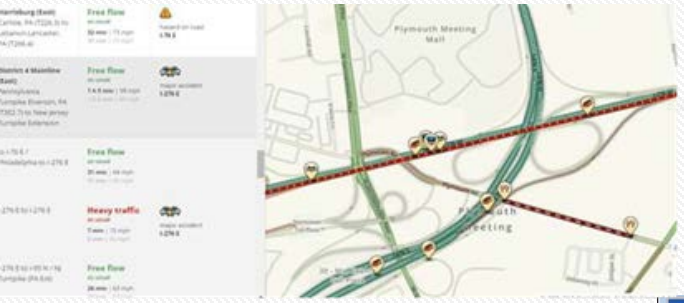
EMERGING METHODS

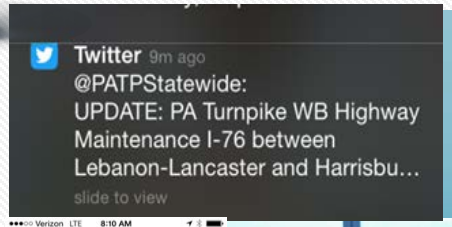
- Alerting tools
- CCTV analytics
- NextGen ATMS
- Predictive analytics

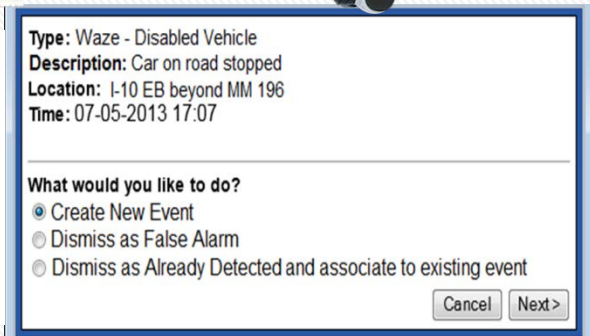
TRAVELER INFORMATION

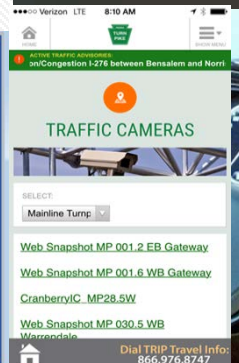
EMERGING METHODS

- Social media
- Connected vehicles
- Data sharing partnerships









Priority Areas:

- **Work Zones**
- **Traffic Incident Management**
- **Weather**
- **Safety**

Oncoming Vehicles
Warns drivers of lane closings and reduced speeds when approaching incident zones.

Responder Vehicles
Warns on-scene responders of vehicles approaching the incident zone at speeds or in lanes that pose a high risk to their safety.

Z71
OFF ROAD
EXTREME OFFROAD
GRUNT HAULING
WE HAUL SCRAP METAL
& APPLIANCES
ANYTHING ELSE FOR THE RIGHT PRICE
314-513-8392
1500

64% of American adults own a smartphone

67% of smartphone owners use their phone for turn-by-turn navigation

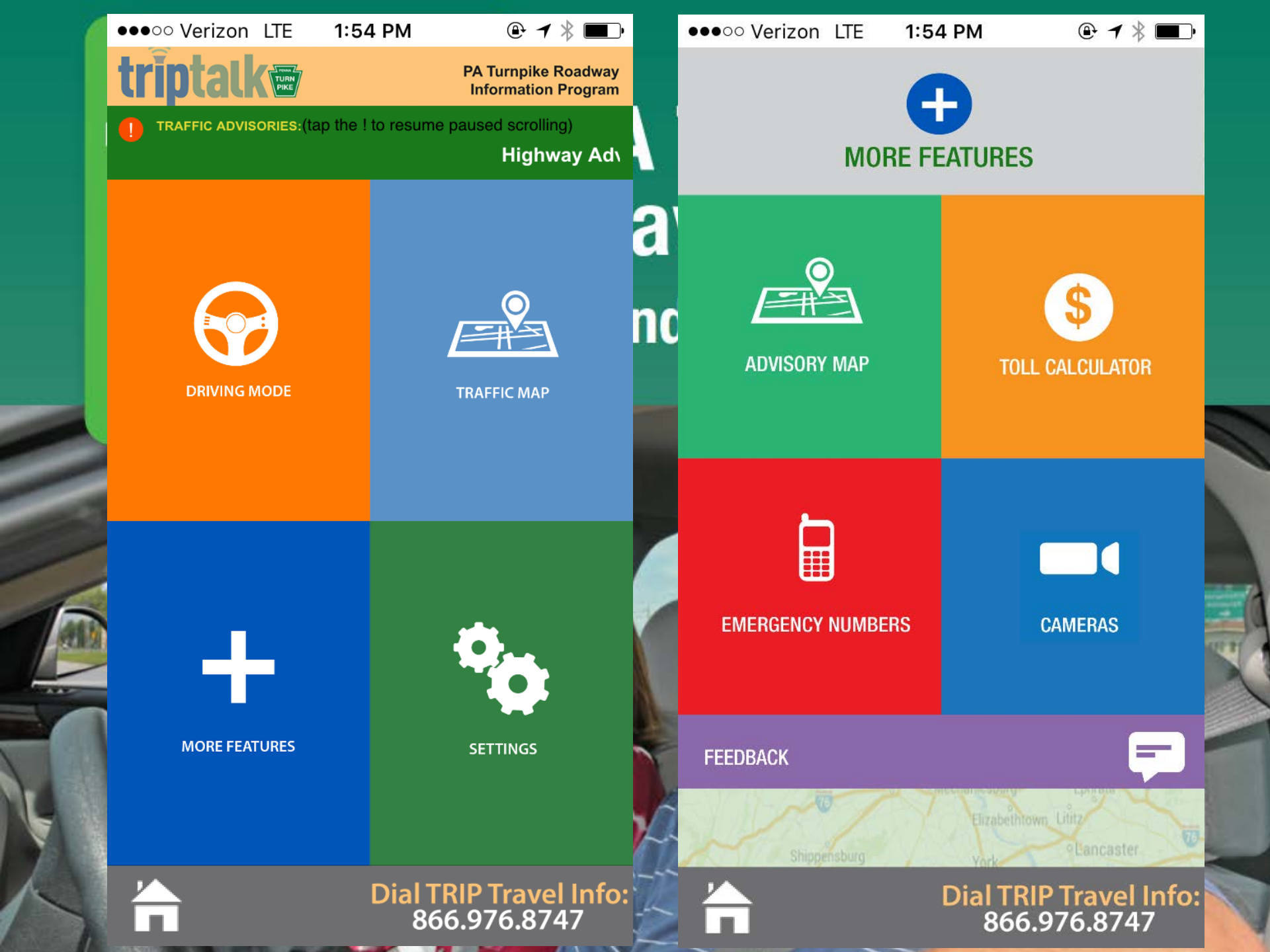
In 2013, 3,154 people were killed due to distracted driving

trip talk

PENNA TURN PIKE

PA Turnpike Travel Alerts

Hands-Free, Eyes-Free!


●●●○○ Verizon LTE 1:54 PM
triptalk
PA Turnpike Roadway Information Program
TRAFFIC ADVISORIES: (tap the ! to resume paused scrolling)
Highway Adv
DRIVING MODE
TRAFFIC MAP
MORE FEATURES
SETTINGS
Dial TRIP Travel Info: 866.976.8747
●●●○○ Verizon LTE 1:54 PM
MORE FEATURES
ADVISORY MAP
TOLL CALCULATOR
EMERGENCY NUMBERS
CAMERAS
FEEDBACK
Elizabethtown
Lititz
Lancaster
Shippensburg
York
Dial TRIP Travel Info: 866.976.8747

PTC Objectives:

Obtain incident data to improve situational awareness

Obtain an additional tool to monitor congestion

Complement Trip Talk as another traveler information app

Community of Drivers

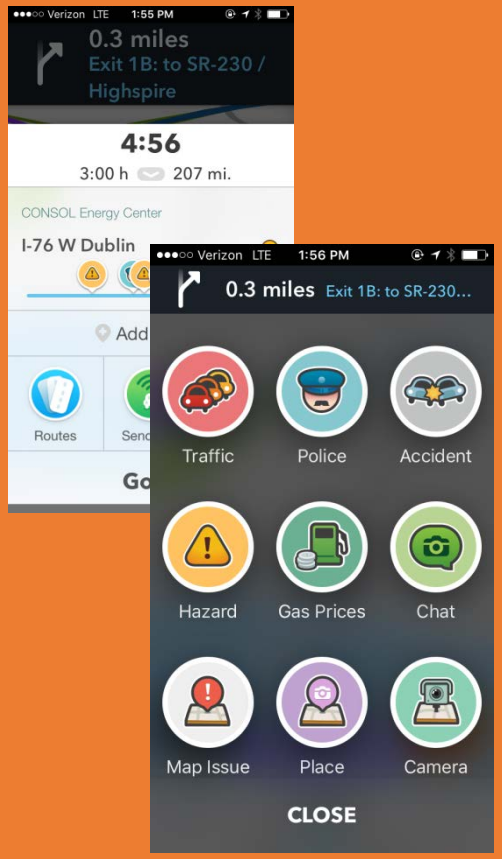
Sharing real-time traffic information & road alerts

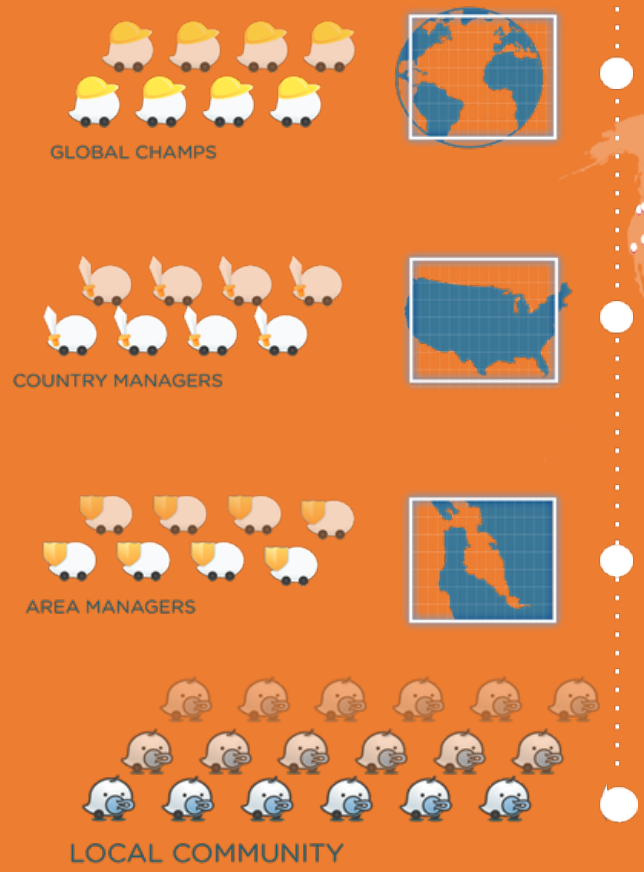
Map Editors Community

Keeping the Waze map most up-to-date

Local Governments

Working with local governments to update upon road closures and traffic related alerts



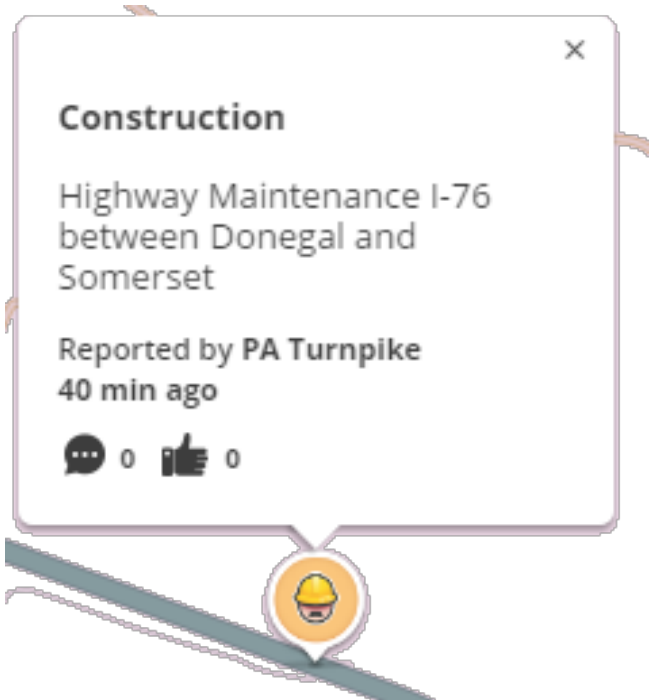


1 year

55 governments

A year into the program, Waze is partnered with 55 governments, municipalities and DOTs worldwide

Verizon 3:15 PM 34%
Sausalito
Park Presidio Blvd
California St
Tap to Cancel
Golden Gate Park
Masonic
Oak St
Kezar Dr
Stanyan St
Verizon 3G 7:21 AM 55%
Back
Update price
Send
Fred Meyer
3300 Portland Rd, Newberg, OR
Uh-oh!
Typing is disabled while driving. Please try again when stopped.
Passenger
OK 5
Not offered
Next
1
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PQRS
8 TUV
9 WXYZ
0
DON'T DRINK AND DRIVE!
Enjoy your night out with Easy Taxi & Waze!
#NoFeeYesSafety
500 m Crawford Ave.
NYPD reminds you to drive safely at
Flatbush Ave Ext & Tillary
Louis Ave
Keeney St
Central Park Ave
Lawndale Ave
Ridgeway Ave
Hamlin Ave
16:58
4 min
2.3 km
PENNSYLVANIA STATE POLICE



- Discussions: Feb 2015
- Agreement: April 2015
- Press release
- XML feeds
- Phase 1
- Road closures
- Live map roll-out
- Email alerts
- Special events
- Phase 2

Data Feeds

WAZE XML Feed	ENS XML FEED - existing output
1. Event Id (M): Each event must have its unique ID. Once event is created, only the relevant content description field may be updated. If event's location is changed, the new event must be created instead.	<eID>171216</eID>
2. Type (M):	<e_Type>T</e_Type>
3. Sub Type (O)	<e_Title>
4. Start_date (M): Relevant event start time in YYYY-MM-DD HH:MM GMT format	<e_Added>
5. Update_date (O): Additional event related time stamps (if exist)	<e_Updated>
6. End_date (O): Additional event related time stamps (if exist)	
7. Description (M): Textual description of event details (limited by 200 characters)	</e_Summary> <e_Narrative> <e_TTStext>
8. Severity (M): Severity level of event, one of the following: "MINOR", "MAJOR", HEAVY"	<e_Speed>Stopped or Slow Moving</e_Speed>
9. Location (M): Information related to event location	<e_StartMP>
9.1. Street (M): Name of street on which event is occurring	available
9.2Latitude/Longitude (M): Event location coordinates in WGS84 format for either a single location or a range (from, to) are mandatory. They will be correlated with the street related attribute fields for matching to map location.	<e_StartLatLon
9.3. Direction (M): Direction of travel affected by event.	<e_Direction>E</e_Direction>
9.4. Specify End (O): In case of a lengthy event, the end location may be specified	<e_EndMP>
9.4.1. From Cross Street (O): Name of street intersecting with starting point location	<e_StartIC>
9.4.2. End Cross Street (O): Name of street intersecting with end point location	<e_EndIC>
9.4.3 End Latitude/End Longitude (M): End location of event with coordinates in WGS84 format.	<e_EndLatLon>

Waze Baby

Welcome to the world, Wazer! You're a baby for now, until you've driven your first 100 miles.

Waze GrownUp

All grown up! You can pick a custom mood for your Wazer.

Waze Warrior

You're in the top 10% of high scorers in your State. Drive around with a shield.

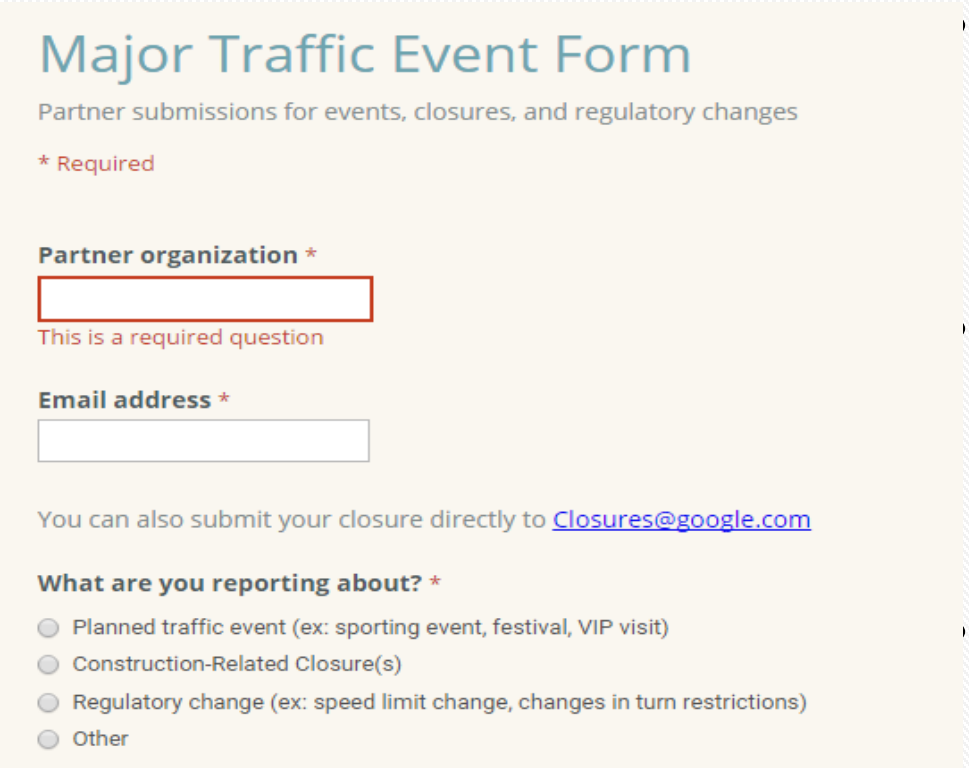
Waze Knight

You're in the top 4% of high scorers in your State. Fight traffic with a sword.

Waze Royalty

You're in the top 1% of high scorers in your State. Ride in style with a crown!

Phase 1 Implementation



Major Traffic Event Form

Partner submissions for events, closures, and regulatory changes

* Required

Partner organization *

This is a required question

Email address *

You can also submit your closure directly to Closures@google.com

What are you reporting about? *

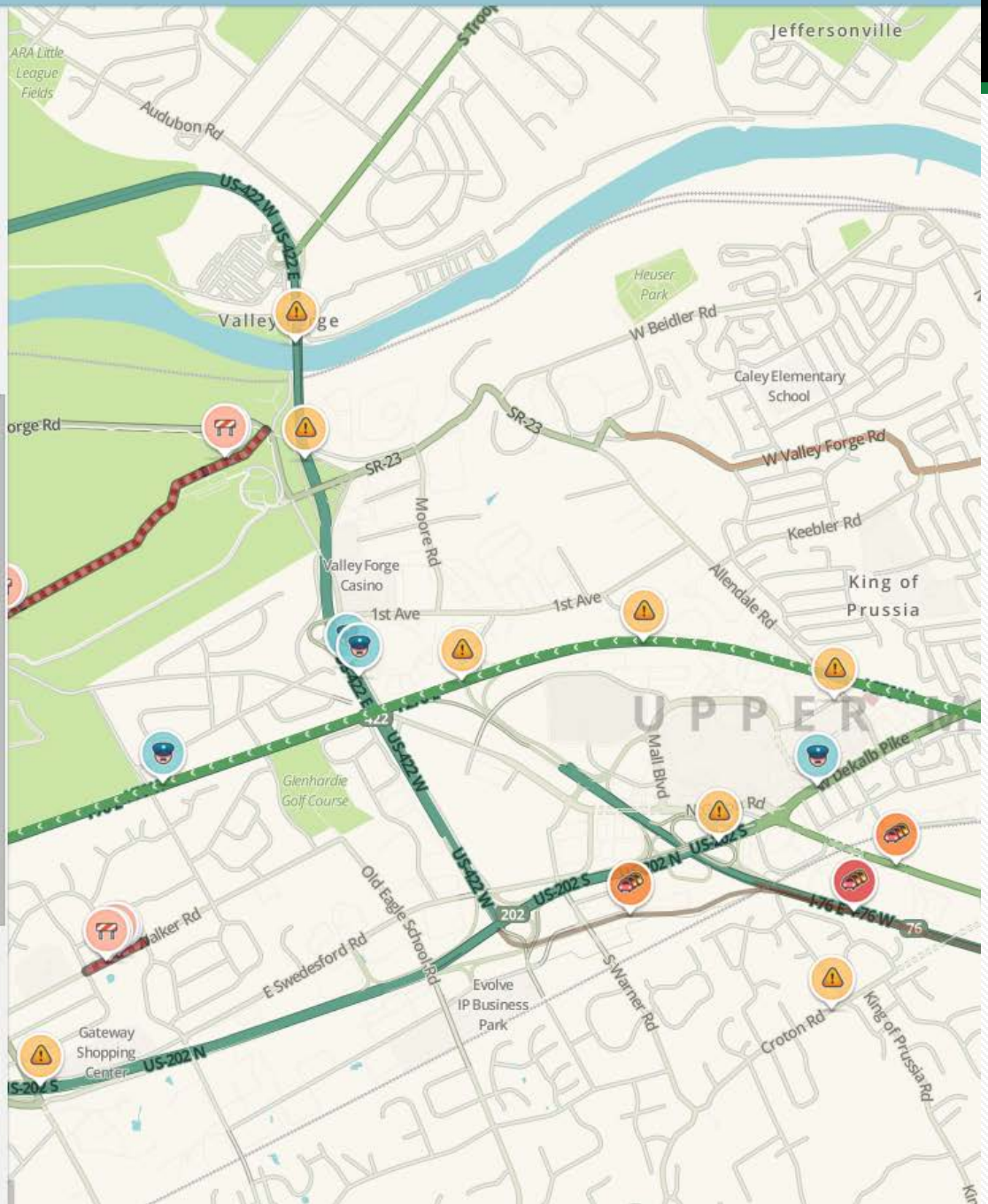
- Planned traffic event (ex: sporting event, festival, VIP visit)
- Construction-Related Closure(s)
- Regulatory change (ex: speed limit change, changes in turn restrictions)
- Other

- Planned Plan X's sent to Waze. **This is done by the Manager of the Operations Center or a Duty Officer**.
- Unplanned Plan X's sent to Waze. **Considered only for major events lasting greater than 2 hours**.
- Closures, planned events, regulatory changes and other updates shared.

waze Traffic View beta Pennsylvania Turnpike Commission | Urban Sections

WATCHLIST

Philadelphia East (East) Junction 333.9 (T333.9) to New Jersey Turnpike Extension	**Free flow** as usual **24 min** | 69 mph 24 min | 70 mph	car stopped on road **I-276 E**
Pittsburgh (West) New Stanton, PA (T75.5) to Cranberry, PA (T28.5)	**Free flow** as usual **39 min** | 71 mph 39 min | 70 mph	
Philadelphia West (West) Junction 333.9 (T333.9) to Pennsylvania Turnpike Morgantown, PA (T298.3)	**Free flow** as usual **30 min** | 70 mph 30 min | 70 mph	fog **I-76 W**
Philadelphia West (East) Pennsylvania Turnpike Morgantown, PA (T298.3) to Junction 333.9 (T333.9)	**Free flow** as usual **29 min** | 72 mph 29 min | 73 mph	roadworks **I-76 E**
Philadelphia East (West) New Jersey Turnpike Extension to Junction 333.9 (T333.9)	**Free flow** as usual **25 min** | 68 mph 25 min | 67 mph	roadworks **I-276 W**
Harrisburg (East) Carlisle, PA (T226.3) to Lebanon-Lancaster, PA (T266.4)	**Free flow** as usual **33 min** | 72 mph 33 min | 71 mph	roadworks **I-76 E**



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Actual Conditions

Normal Conditions

Live Map	Use/ Purpose
All Roads	High level view of all PTC roads
Urban Sections	To monitor urban sections
District 1	For staff assigned to monitor District 1
District 2	For staff assigned to monitor District 2
District 3	For staff assigned to monitor District 3
District 4 & 5	For staff assigned to monitor District 4/5

UNUSUAL TRAFFIC - ALERTS

Heavy traffic on I-76 W, East Providence

Sun Nov 29 13:39:28 EST

Extra delay: **34 minutes** • Jam length: **6.3 miles** • Current speed: **9.5 mph** • Traffic: **86% slower than usual** • View map.

Traffic jams in East Providence

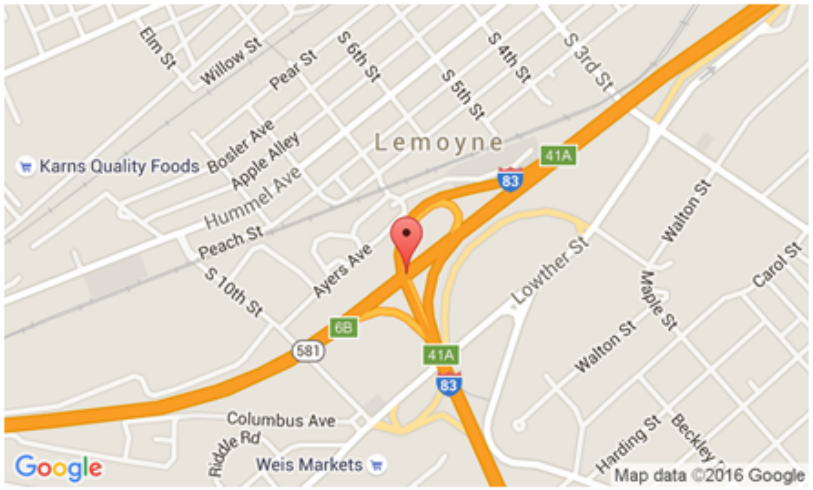
User contributed photo

Unsubscribe from Waze Traffic Alerts

PennDOT Waze Alerts

A new alert has been received from the Waze data feed for District 8.

Report Time : 5/6/2016 3:42:37 PM (0 minutes ago)
Type : ACCIDENT_MAJOR
Report Description : N/A
City : Lemoyne, PA
Street : Exit 41A: SR-581 W / to I-81 S / Camp Hill
Incident Reliability * : 5
Report User Rating * : 3
Waze Alert ID : c3b49101-397c-36ff-9e25-07ce0d70744a
Links : Waze Live Map | Google Map



*: Incident Reliability from 0 to 10, 10 being most reliable, is based on the report user's rating and subsequent user responses.
*: Report User Rating from 0 to 6, 6 being highest, is a ranking based on a points accumulation system.

These notifications are automatically generated from PennDOT's Waze Alerts System.
If you have questions or concerns regarding these notifications, please email our Resource Account for assistance.

Type: Waze - Disabled Vehicle
Description: Car on road stopped
Location: I-10 EB beyond MM 196
Time: 07-05-2013 17:07

What would you like to do?

- (•) Create New Event
- ( ) Dismiss as False Alarm
- ( ) Dismiss as Already Detected and associate to existing event

Cancel | Next >

waze LIVE MAP MAJOR EVENTS SUPPORT BLOG ABOUT Login

Major Traffic Events

Browse events

In preparation for major events, or when unforeseen disasters happen, the Waze community updates the map with road closures and other obstructions, so everyone can bypass traffic and save time.

Download Waze and bypass closures related to these events:

GET IT ON Google play
Download on the App Store
Download from Windows Phone Store

Press Kit
Tell us about upcoming events

Share

World Meeting of Families - Papal Visit

Happening Now

Philadelphia, Pennsylvania Sep 19 - Sep 28, 2015

04 days 07 hours since event started

Below is a live map with the most up-to-date info on road closures and hazards reported by the Waze community. Be sure to drive with Waze open to bypass traffic related to this event.

Info by voludu2
Area Manager

Info by dmoubic
Area Manager

Planned closures

TODAY

Benjamin Franklin Pkwy Inner	00:00 - 23:59
Benjamin Franklin Pkwy Outer	00:00 - 23:59

Next

Live reports

The list automatically refreshes as new reports come in.

Road Hazard	to Ben Franklin Pkwy	0 0
Road closed	Benjamin Franklin Pkwy Outer	0 0
Road closed	Benjamin Franklin Pkwy Outer	0 0
Road closed	Benjamin Franklin Pkwy Inner	0 0
Road closed	Benjamin Franklin Pkwy Inner	5 0
Road closed	Benjamin Franklin Pkwy Inner	0 0
Road closed	Benjamin Franklin Pkwy Outer	11 0

Show more

Partners

TURN PIKE

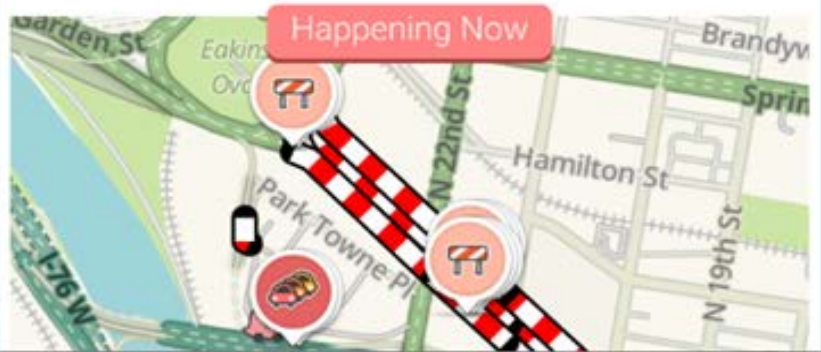
INBOX

AVOID CLOSURES IN YOUR AREA

WORLD MEETING OF FAMILIES - PAPAL VISIT

SEP 19 - SEP 28, 2015

Drive with Waze to find alternate routes and get real-time traffic updates.

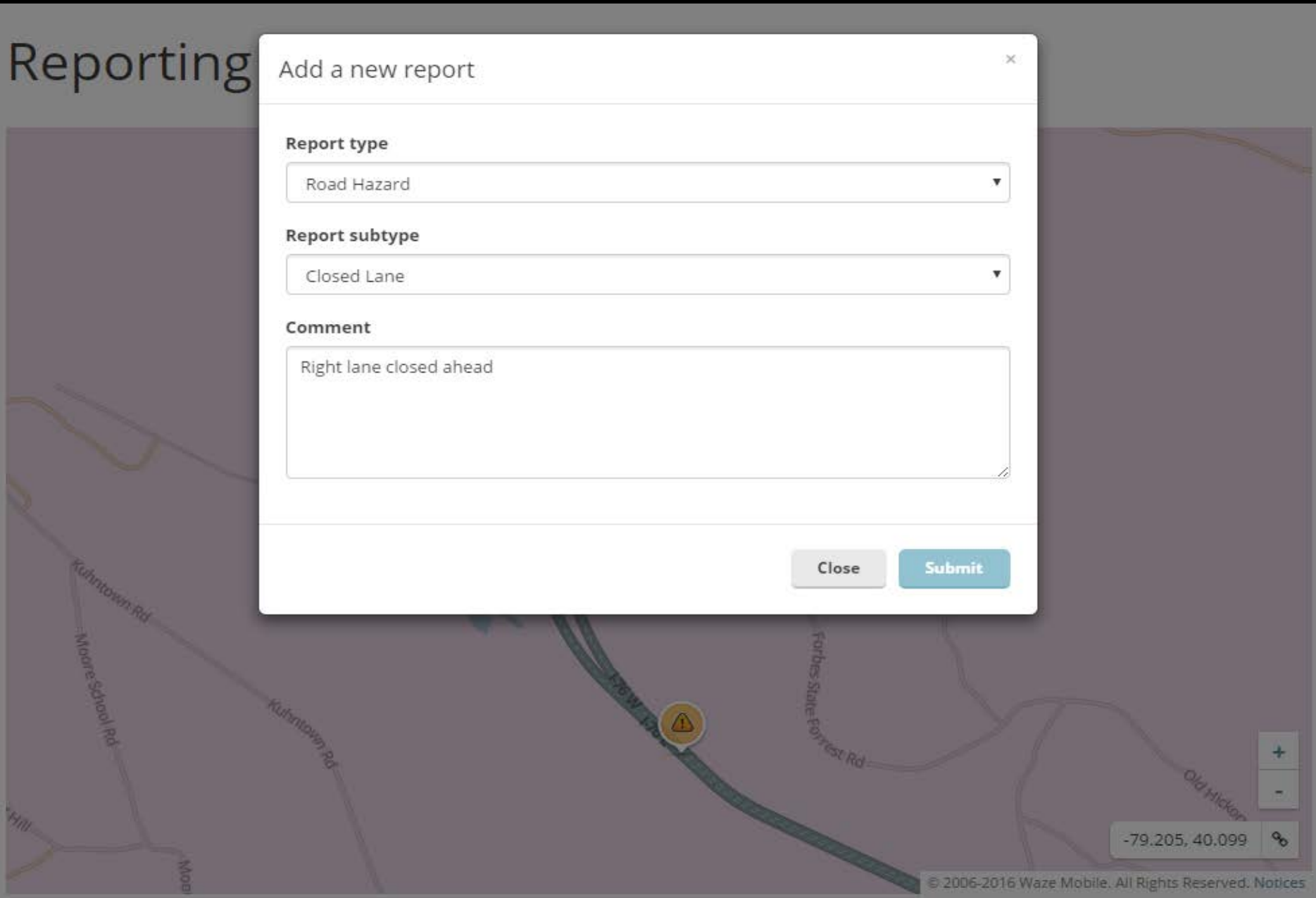


Waze Summit

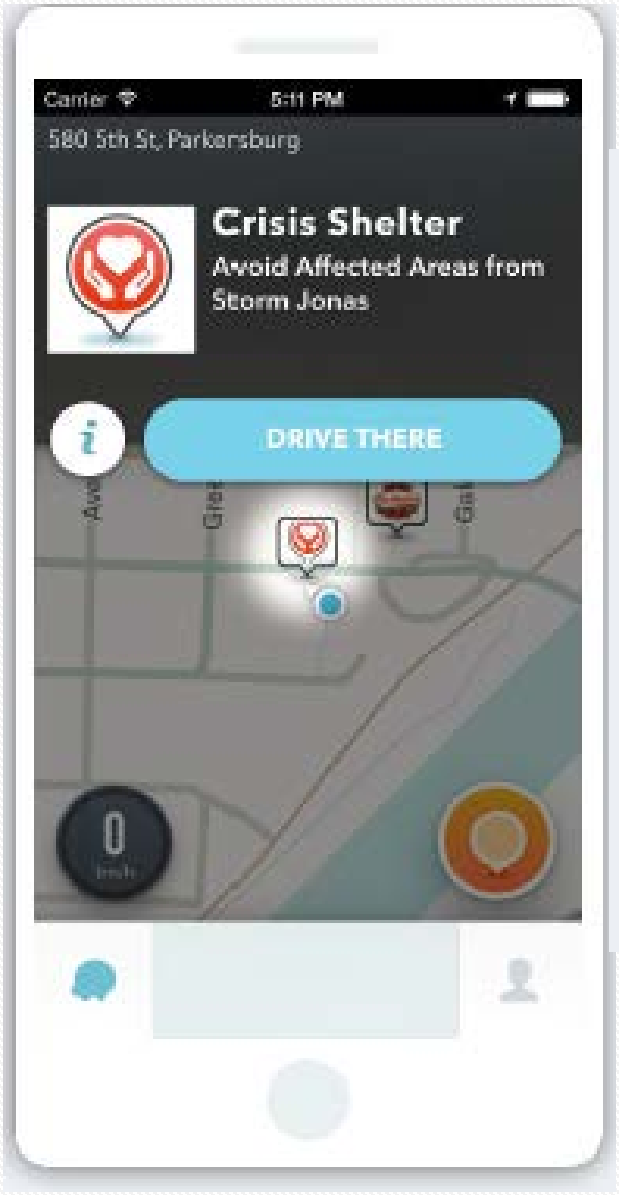
Phase 2 Implementation

- Data quality and format
  - What Happened: **Accident**
  - Where: **at MM 29 between Lansdale (Exit 31)& Mid-County (Exit 20**)
  - Effect: **Lane Closed**
- Manual and crisis reporting
- Map editing
- Safety alerts – curves, tunnels, toll plazas
- Connected vehicle applications – mobile work zones
- Performance and data management

Manual Reporting



Crisis Reporting – Jonas Example



Crisis Centers

69 total shelters were provided by:

- **61** Community
- **3** CCP
- **5** Google CR Red Cross shelter feed

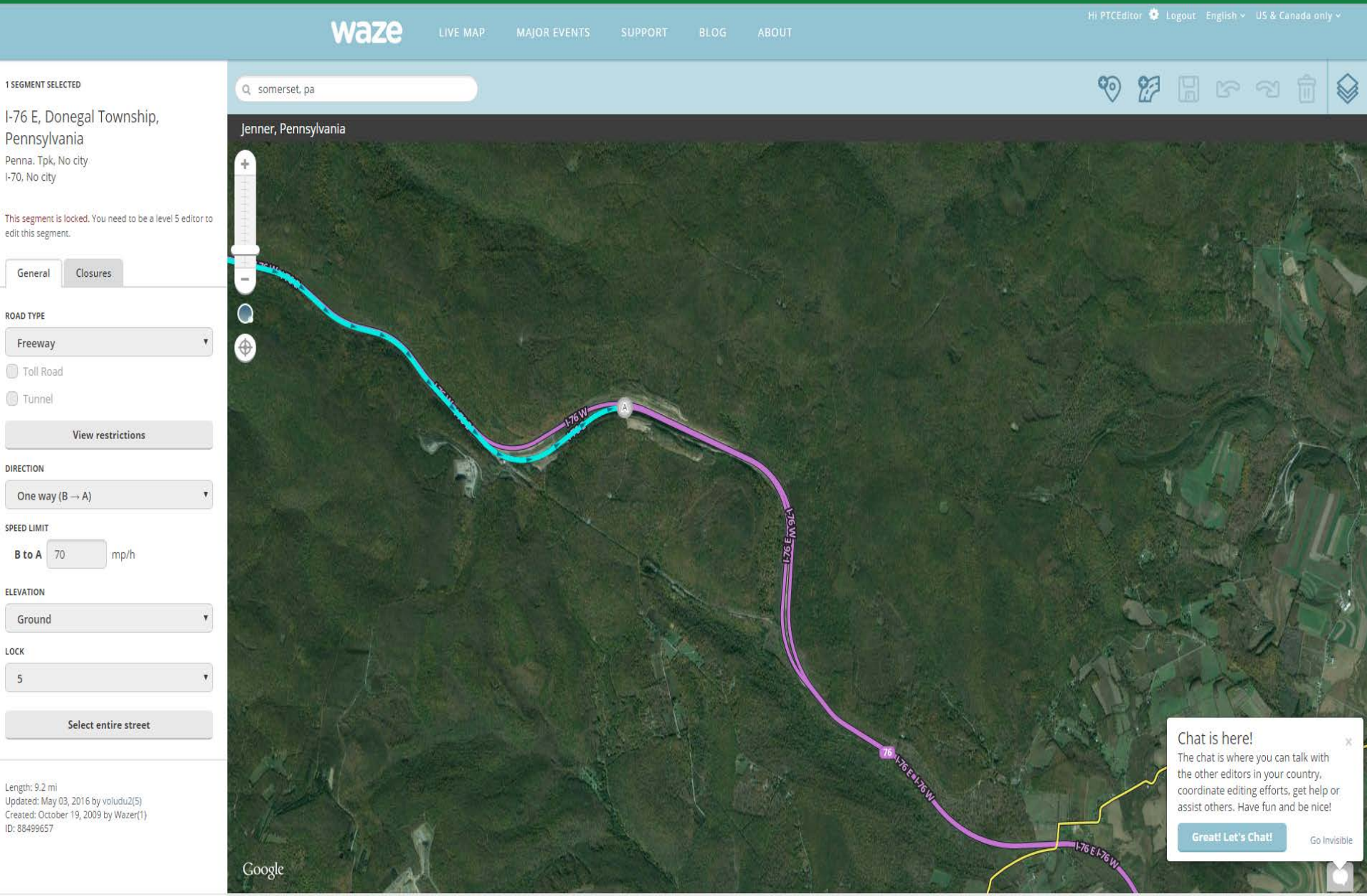
Search **"Help"** in Waze to find Crisis Centers

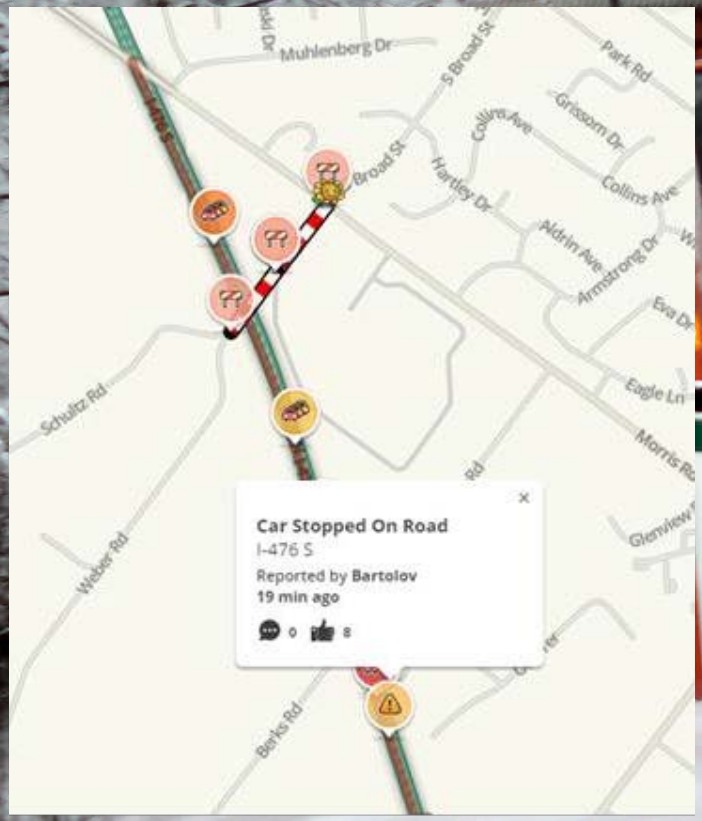
Road Closures

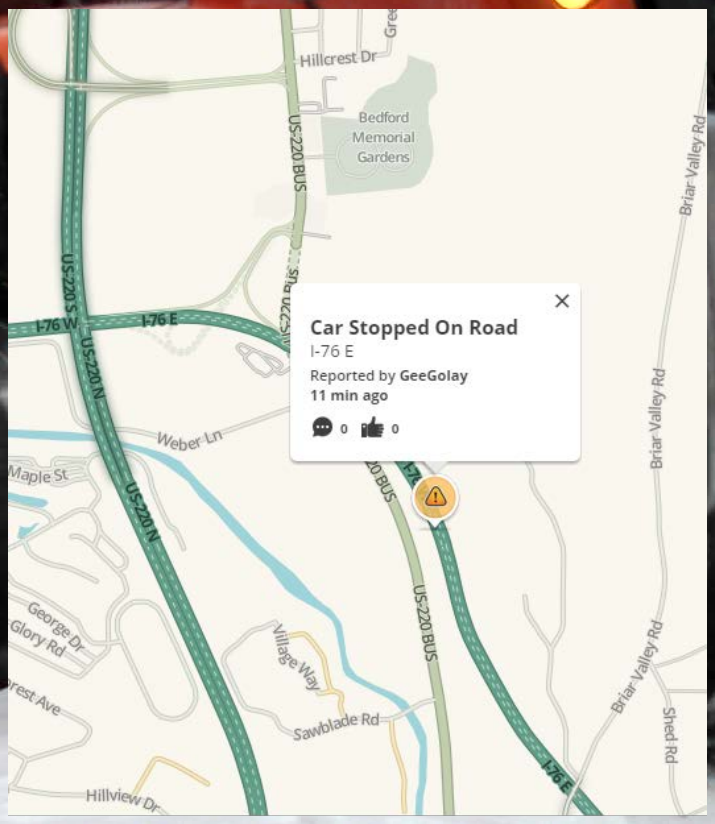
~7000 road segments closed

- Community 98%
- Partners 2%

Map Editing


waze
LIVE MAP
MAJOR EVENTS
SUPPORT
BLOG
ABOUT
Hi PTCEditor
Logout
English
US & Canada only
1 SEGMENT SELECTED
I-76 E, Donegal Township, Pennsylvania
Penna. Tpk, No city
I-70, No city
This segment is locked. You need to be a level 5 editor to edit this segment.
General
Closures
ROAD TYPE
Freeway
Toll Road
Tunnel
View restrictions
DIRECTION
One way (B → A)
SPEED LIMIT
B to A
70
mp/h
ELEVATION
Ground
LOCK
5
Select entire street
Length: 9.2 mi
Updated: May 03, 2016 by voludu2(5)
Created: October 19, 2009 by Wazer(1)
ID: 88499657
somerset, pa
Jenner, Pennsylvania
I-76 W
I-76 E
I-76 E I-76 W
Google
Chat is here!
The chat is where you can talk with the other editors in your country, coordinate editing efforts, get help or assist others. Have fun and be nice!
Great! Let's Chat!
Go Invisible



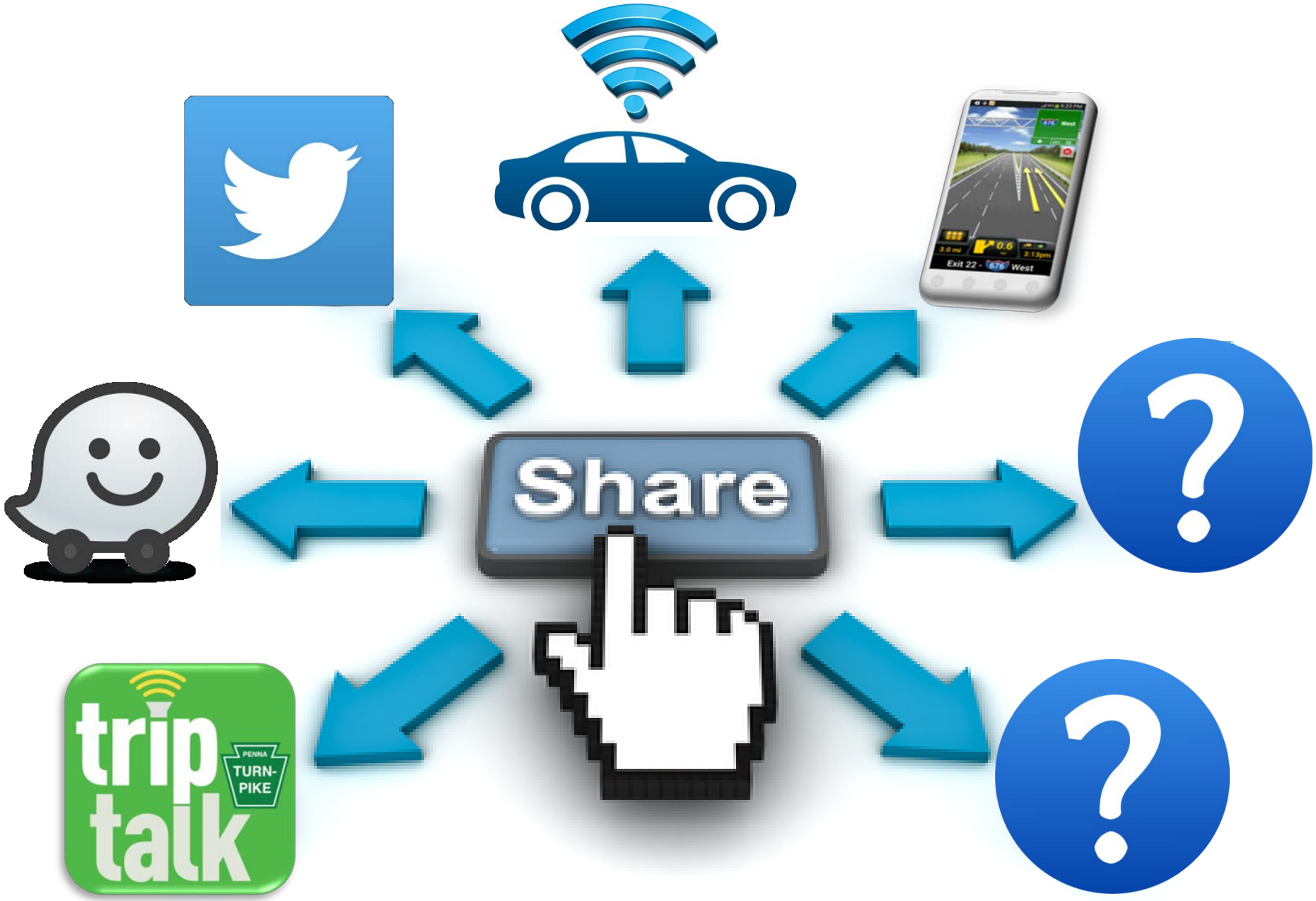


19 min before a call

8 min before a call

30 seconds after incidents occur?

Waze Notification (Blue) in Advance of 9-1-1 Call (Orange)
GENESIS PULSE
Waze Event
9-1-1 Event
450 Events
Waze Event is First
69.2%
-17.5
-15
-12.5
-10
-7.5
-5
-2.5
0
2.5
5
7.5
10
12.5
15


Share
trip talk
PENNA TURN-PIKE
Exit 22 · 676 West

Thank You!

Bob Taylor, P.E., PTOE

Pennsylvania Turnpike Commission

700 South Eisenhower Blvd. | Middletown, PA 17057

Phone: 717-831-7548 | Cell: 717-645-1740

robtaylo@paturnpike.com