

LONESTAR CV UPDATE

IMPLEMENTATION OF QWARN AND RSWZ

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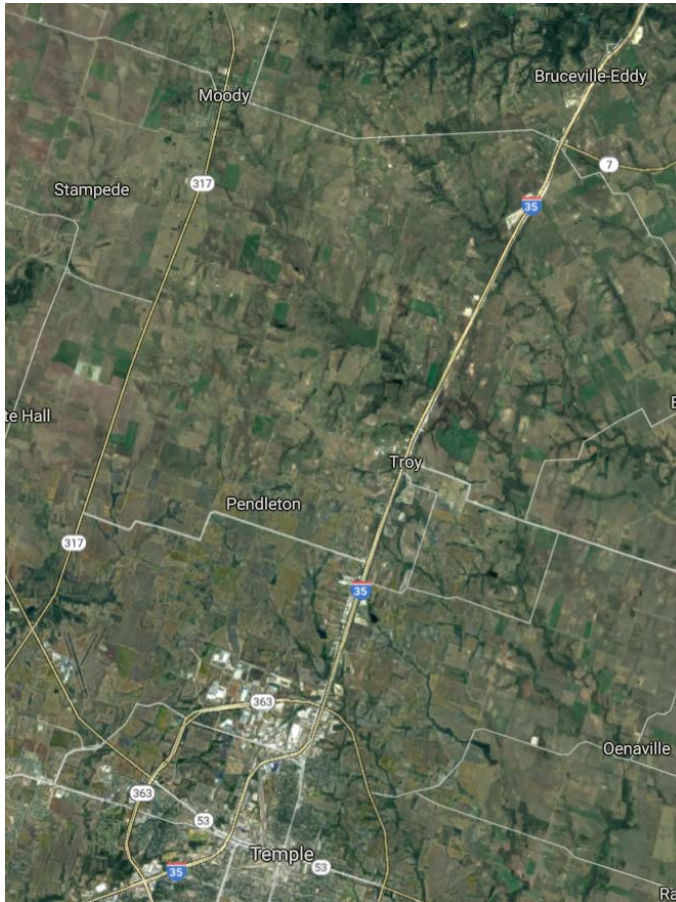
AGENDA

- Background
- Integration with TTI's lane closure data
- BIM Geometry Challenges
- Lonestar Status

BACKGROUND

- Connected work zone project implementation
 - Reduced speed work zone (RSWZ)
 - Queue warning (QWARN)
- Project area within TTI's lane closure monitoring
- Lonestar incorporated FDOT SunGuide® connected vehicle module
 - Adding a decision support system module
 - Adding functionality for this project's CV apps

PROJECT LOCATION



- I-35 between Temple and Bruceville-Eddy
- Multiple lane closures planned



INTEGRATION WITH TTI

LANE CLOSURE DATA



EXISTING LANE CLOSURE DATA

```
▼<lane_closures update_timestamp="3/23/2018 12:42:55 PM">
  ▼<lane_closure>
    <closure_id>4156</closure_id>
    <closure_condition>Construction</closure_condition>
    <start_roadway_name>S 57th St</start_roadway_name>
    <start_cross_street_qualifier>At</start_cross_street_qualifier>
    <start_cross_street_name>I-35</start_cross_street_name>
    <start_county_name>Bell</start_county_name>
    <start_city_name>Temple</start_city_name>
    <start_latitude>31.09381</start_latitude>
    <start_longitude>-97.3762</start_longitude>
    <end_roadway_name>S 57th St</end_roadway_name>
    <end_cross_street_qualifier>At</end_cross_street_qualifier>
    <end_cross_street_name>I-35</end_cross_street_name>
    <end_county_name>Bell</end_county_name>
    <end_city_name>Temple</end_city_name>
    <end_latitude>31.09381</end_latitude>
    <end_longitude>-97.3762</end_longitude>
    <start_mile_marker>0.0</start_mile_marker>
    <end_mile_marker>0.0</end_mile_marker>
    <project_section_id>2B</project_section_id>
    <planned_start_timestamp>3/8/2016 7:00:00 AM</planned_start_timestamp>
    <planned_end_timestamp>2/1/2019 5:00:00 PM</planned_end_timestamp>
    <closure_length_miles>0</closure_length_miles>
    <closure_duration>Continuously</closure_duration>
    <duration_exceptions count="0"/>
    <closure_direction>Northbound</closure_direction>
    <facility_type>Mainlanes</facility_type>
    <left_shoulders>False</left_shoulders>
    <lane1>True</lane1>
    <lane2>True</lane2>
    <lane3>False</lane3>
    <lane4>False</lane4>
    <lane5>False</lane5>
    <lane6>False</lane6>
    <lane7>False</lane7>
    <lane8>False</lane8>
    <right_shoulders>False</right_shoulders>
    <existing_lanes>2</existing_lanes>
    <closed_lanes>2</closed_lanes>
    <fixed moving rollings>Fixed</fixed moving rollings>
```

- Includes road, direction,
- For start and endpoints: cross street, latitude and longitude
- Lane blockage included

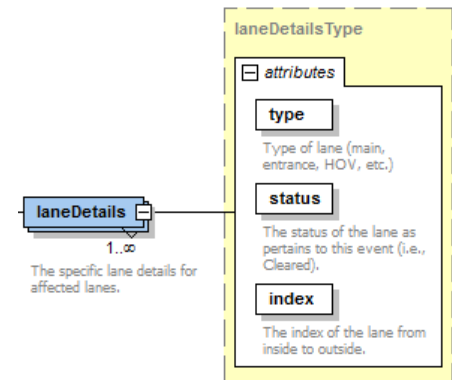
```
▼<description>
  Avenue K at 57th street intersection closed for retaining wall and bridge construction.
</description>
▼<traveler_description>
  Avenue K at 57th street intersection closed for retaining wall and bridge construction.
</traveler_description>
<detour_description>Detour provided for local and business access.</detour_description>
<high_impact_closure>False</high_impact_closure>
<closure_entry_timestamp>3/2/2016 7:08:58 AM</closure_entry_timestamp>
<closure_modification_timestamp>1/16/2018 8:03:47 PM</closure_modification_timestamp>
<closure_behind_barrier>False</closure_behind_barrier>
<closure_buffer_lane>Next to Lane</closure_buffer_lane>
<large_truck_activity>True</large_truck_activity>
<upstream_entrance_ramp>False</upstream_entrance_ramp>
<avg_upstream_hourly_ramp_volume>0</avg_upstream_hourly_ramp_volume>
<closure_cancelled>False</closure_cancelled>
<cancellation_reason/>
<cancellation_text/>
<cancellation_timestamp/>
<closure_hold>0</closure_hold>
<linked_closure_id/>
<early_closure_termination>False</early_closure_termination>
<early_termination_timestamp/>
<data_operator>j-zissa@tti.tamu.edu</data_operator>
<closure_status>Active</closure_status>
</lane_closure>
```

ADDING: ADDITIONAL LANE DETAILS



```
<xs:simpleType name="laneType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="MainLane"/>
    <xs:enumeration value="EntranceRamp"/>
    <xs:enumeration value="ExitRamp"/>
    <xs:enumeration value="EntranceAndExitRamp"/>
    <xs:enumeration value="Shoulder"/>
    <xs:enumeration value="HOV"/>
    <xs:enumeration value="Divider"/>
    <xs:enumeration value="ExpressLane"/>
    <xs:enumeration value="LeftInterchangeRamp"/>
    <xs:enumeration value="RightInterchangeRamp"/>
    <xs:enumeration value="InterchangeEntranceRamp"/>
    <xs:enumeration value="HovMainLane"/>
    <xs:enumeration value="HovEntranceRamp"/>
    <xs:enumeration value="HovExitRamp"/>
    <xs:enumeration value="HovEntranceAndExitRamp"/>
    <xs:enumeration value="HovExitAndEntranceRamp"/>
    <xs:enumeration value="HovLeftInterchangeRamp"/>
    <xs:enumeration value="HovRightInterchangeRamp"/>
    <xs:enumeration value="HovInterchangeEntranceRamp"/>
  </xs:restriction>
</xs:simpleType>
```

```
<xs:simpleType name="laneStatus">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Cleared"/>
    <xs:enumeration value="Blocked"/>
    <xs:enumeration value="Unknown"/>
  </xs:restriction>
</xs:simpleType>
```



ADDING: SPEED LIMIT DATA

- Posted speed limit
 - Normal speed limit on the segment if no work zone existed
- Reduced speed limit
 - While the work zone is in effect, what is the new speed limit





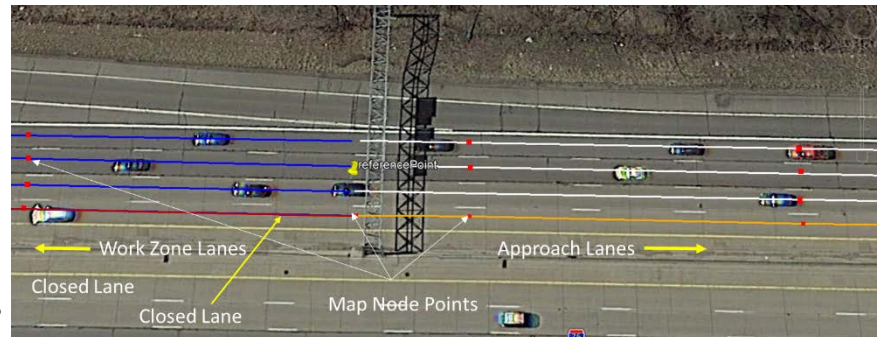
BIM GEOMETRY CHALLENGES

WHAT WE CAN PROVIDE



CAMP BIM GEOMETRY

- CAMP's Work zone map consists of three major elements:
 1. Reference Point: Defines beginning of the work zone. The vehicle application uses the location of the reference point for generating appropriate alerts for the driver
 2. Approach Lane(s): Defines lane(s) that lead to the work zone
 3. Work Zone Lane(s): Defines lane(s) within the work zone.



- Approach lanes
- Approach lane closed at the reference point
- Work zone lanes
- Closed lane in work zone
- Map node points

From: WZW Guidelines 12-14-2017 v_05.docx (CAMP)

A.2 Figure 10: Example of a Four-lane Work Zone with Left Lane Closed

TXDOT AVAILABLE GEOMETRY DATA

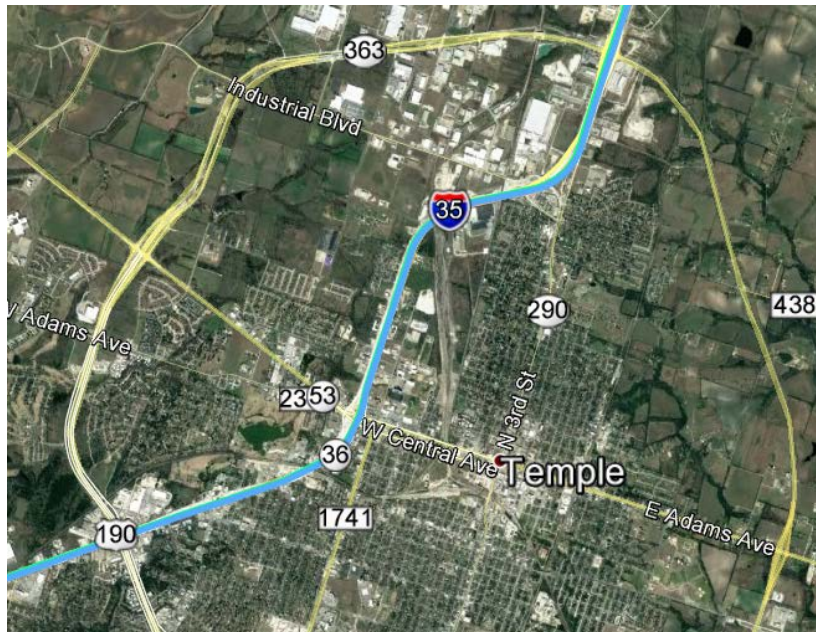
- Reference point for start of work zone
- No lane level detail, only a single lane will be used
- Distance for alerts and warnings







- Warning for RSWZ
- Alert for RSWZ
- Construction zone

OUTDATED GEOMETRY DATA (SHAPE FILES)

I-35 at Temple, TX



-  S Frontage Road for I-35 (centerline)
-  Southbound I-35 Mainlane (centerline)
-  Northbound I-35 Mainlane (centerline)
-  N Frontage Road for I-35 (centerline)





LONESTAR STATUS



LONESTAR MAP ROADSIDE UNITS

RSU Status

Home

Name	Op Status	Location Description	Roadway	Direction
I35_at_SH121	Active	I35 @ SH 121	I35	North
I35_at_PGBTurnpike	Active	I35 @ PGB Turnpike	I35	North
I35_at_Valewood Pkwy	Out of Service	I35 @ Valewood Pkwy	I35	North
I35_at_Basswood	Active	I35 @ Basswood Blvd	I35	North
I35_at_NTarrantPkwy	Active	I35 @ N Tarrant Pkwy	I35	North

☒

OverviewRtas BroadcastingBIMs BroadcastingWork Zone

Basic Information Message

Cause: QWARN
Location: I35 NB @ SH 121
Speed normal / current: 65 / 36 mph
Queue length: 1 mile
Start time: 2018-03-01 12:06 pm
Duration: until canceled
Travel Advisory Message:
Slowdown ahead use caution

The map view displays a section of Interstate 35 (I-35) with several Roadside Units (RSUs) indicated by colored dots and wireless signal icons. The units are located at various points along the highway, including near Troy and Draughon-Miller Central Texas Regional Airport. A large blue double-headed arrow connects the map view to the list view, indicating the bidirectional relationship between the two.

- Equipment on both map and list view
 - Operational status
 - Coloring by status (as with other devices)
- View of the current messages broadcasting

MULTIPLE BIMS ACTIVE

RSU Status

Home

Name	Op Status	Location Description	Roadway	Direction	Latitude	Longitude	IP Address
B51RSE_001	Active	B51 Bench	nowhere	North	29443729	-98614583	129.162.199.30
TestTrackRSE_001	Out of Service	SwRI Test Track	nowhere	North	29451108	-98616328	unknown

Overview

Rsas Broadcasting

BIMS Broadcasting

Work Zone

Response Plans

IH35E NB @ SH121 CONGESTION

CON IH35E SB @ US287 ALL LANES

Basic Information Message

Title: Reduced Speed Work Zone

Location: I35E South @ US287

Speed normal: 65

Speed reduced: 35

Lanes closed: All

Multiple events may broadcast simultaneously

RSWZ EVENT

Planned Event - DAL1_2018-03-16_0003_Construction

Save Delete Print Show On Map Event Create a Secondary Event Show PTZ Camera Go To Preset Form 2111 Reporting Ownership abos:abbos:19036

Event Info Info Page 2 Response Plan Event History

Description

Id: DAL1_2018-03-16_0003_Construction

Description: CVS Test Event 2

Type: Construction

Source: HCRS

Severity: Major ☒ Auto

Verified By: HCRS

Reminder	Estimated Duration	Private	Hazmat	Fatalities
0 min	0 min	<input type="checkbox"/>	<input type="checkbox"/>	0

Vehicle Count: 0

Vehicle Description

Start Time: Friday, March 16, 2018 10:45 AM ☐ No End Time (Indefinite): Friday, March 30, 2018 01:19 PM

Recurrence: No recurrence scheduled.

State: Pending

Pending	Active	Closed
3/16/2018 1:19 PM		

Affected Lanes

Freeway

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Associated Events

Primary Event:

Secondary Events: No secondary events

Location

Location Type: ☐ Point ☒ Line ☐ Region

Location: End Location:

County: All

Roadway: IH35E Direction: South

Cross Street: at US287

Location: IH35E at US287

Weather Conditions

Infrastructure Damage:

Snapshots

No Snapshot Currently Assigned to this Event

0 of 0

- Event is created by an operator
- Managed the same as other events in Lonestar

RSWZ RESPONSE PLAN MESSAGE

Planned Event - DAL1_2018-02-08_00064

Save Print Show On Map Create a Secondary Event Show Go To PTZ Preset Camera Preview Execute Terminate Override Search Response Plan Actions 0 Miles New Save As Template Add Device Remove Device Response Plan Configuration Ownership abos:abbos:10076

Event Info Info Page 2 Response Plan Event History

Base Response Plan: CON IH35E SB @ US287 ALL LANES

Drag Device(s) Here

Dms Signs

- IH20 EB Duncanville Rd
- IH20 EB Hampton
- IH20 WB Hampton
- IH20 WB SH310
- IH35E SB Camp Wisdom
- IH35E SB Louisiana Dr

Add DMS

DMS Message Info

Proposed Message

Priority: N/A

IH35E SOUTH
AT US287
10PM - 6AM

Beacons

Current Message

Priority: N/A

HOV LANE
MONDAY-FRIDAY
3:30PM TO 7:00PM

Beacons

Modify Message

Modify Message

Drag DMS here to add to group

Drag Device(s) Here

Basic Information Message

Cause: Reduced Speed Work Zone
Location: I35 SB @ US287
Speed normal: 65 mph
Speed reduced: 35 mph
Lanes closed: All
Start time: 2018-03-01 12:06 pm
Duration: until canceled
Travel Advisory Message:
Traffic diverted to north bound frontage road

Modify Message

Primary Camera

No Preset

Suggested Response Plans

Current Response Plan

IH35E SB @ US287 1 LEFT
CON IH35E SB @ US287 1 RIGHT
CON IH35E SB @ US287 ALL LANES

Message is created by the operator, location data is filled in from the event

QWARN EVENT

Unplanned Event - DAL1_2018-03-15_0001_AbnormalCongestion

Save Print Show On Map Create a Secondary Event Show Go To PTZ Preset Camera Reporting Form 2111 Ownership

abosabbos:19036

Event Info Info Page 2 Response Plan Event History

Description

Id: DAL1_2018-03-15_0001_AbnormalCongestion

Description: CVS Test Event 1

Type: Abnormal Congestion

Source:

Severity: Minor ☒ Auto

Verified By: System Alarm

Reminder	Estimated Duration	Private	In Workzone	Hazmat	Fatalities
<input type="checkbox"/> 0 min	<input type="checkbox"/> 0 min	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 0

Vehicle Count: 0

Vehicle Description

State: Verified - T2

Reported - T1	Verified - T2	Roadway Cleared - T5	Incident Cleared - T6	Normal Traffic - T7	False Alarm	Closed
3/15/2018 10:20 AM	3/15/2018 10:25 AM					

Affected Lanes

Freeway

--	--	--	--	--	--	--

Associated Events

Primary Event:

Secondary Events: No secondary events

Location

Location Type: ☒ Point ☐ Line ☐ Region

County: All

Roadway: IH35E Direction: North

Cross Street: at SH121 (Sam Rayburn Tollway)

Location: IH35E at SH121 (Sam Rayburn Tollway)

Weather Conditions

Infrastructure Damage

Snapshots

No Snapshot Currently Assigned to this Event

0 of 0

- QWARN event created
- Lanes with slow speeds noted with
- Managed the same as other events in Lonestar

QWARN RESPONSE PLAN MESSAGE

Unplanned Event - DAL1_2018-02-09_00016

Save Print Show On Map Create a Secondary Event Show Go To PTZ Preset Camera Preview Execute Terminate Override Search 0 Miles New Save As Template Add Device Remove Device Response Plan Configuration Ownership abosabbos:10076

Event Info Info Page 2 Response Plan Event History

Base Response Plan: IH35E NB @ SH121 CONGESTION

Drag Device(s) Here

Dms Signs

- IH35E NB Belt Line
- IH35E NB Crosby Express Lan
- IH35E NB Inwood
- IH35E NB Northwest Hwy
- IH35E NB Royal
- IH35E NB Sandy Lake

DMS Message Info

Proposed Message

Priority: N/A

IH35E NORTH
AT SH121
CONGESTION

Current Message

Priority: N/A

Beacons

Add DMS

Drag DMS here to add to group

Modify Message

Drag Device(s) Here

Basic Information Message

Cause: QWARN

Location: I35 NB @ SH121

Speed normal/current: 65 / 36 mph

Queue length: 1 mile

Start time: 2018-03-01 12:06 pm

Duration: until canceled

Travel Advisory Message:

Slowdown ahead use caution

Modify Message

Primary Camera

No Preset

Suggested Response Plans

Current Response Plan

Auto Generated Response Plan

- IH35E NB @ SH121 2 RIGHT
- IH35E NB @ SH121 CONGESTION
- IH35E NB @ SH121 1 RIGHT
- IH35E NB @ SH121 2 LEFT
- IH35E NB @ SH121 1 LEFT
- IH35E NB @ SH121 3 LEFT
- IH35E NB @ SH121 ALL LANES
- IH35E NB @ SH121 EXIT
- IH35E NB @ SH121 EXIT 1 LEFT

Browse more...

Message is prefilled by the detection data, but can be edited

QUESTIONS?

