



Increasing Worker and Driver Safety through Access to Work Zone Data

Virtual Event May 19, 2020

Housekeeping Items



Your phone will be muted during the presentation.



Type your question into the chat box. Q&A will occur at the end of the event.



This virtual event will be recorded.



Slides and recording will be available at:

https://www.transportation.gov/av/data/wzdx





Introduction

Co-Sponsored

- U.S. Department of Transportation (U.S. DOT)
- American Association of State Highway Officials (AASHTO)

Purpose

 To unite GIS and transportation professionals to discuss increasing worker and driver safety through the publication and consumption of work zone data.







U.S. Department of Transportation





Upcoming AASHTO Geospatial Events

- Geospatial Online Transportation Users Group (GOTUG)
 - Webinars held the first Wednesday of June, September, December, and March
 - The next batch of webinars will feature sessions from the 2020 GIS-T meeting
 - For more information and to sign up for notifications of webinar dates, times, and content, visit: https://gotug.transportation.org/
- Upcoming GIS-T Symposium
 - Minneapolis, Minnesota April 2021
 - North Charleston, South Carolina April 2022

For more information, visit: https://gis-t.transportation.org/







Agenda

1. FHWA's Work Zone Data Initiative (WZDI)

Todd Peterson, Federal Highway Administration (FHWA)

2. Work Zone Data Exchange (WZDx): Improving Roadway Safety for Drivers and Automated Vehicles

Amy Nelson – Office of the Secretary of Transportation (OST)

3. WZDx: MC-85 Project in Maricopa County

Tomas Guerra – OZ Engineering

- 4. Panel Discussion
- 5. Interactive Q&A





FHWA's Work Zone Data Initiative



Todd Peterson

Transportation Specialist, Work Zone Management Federal Highway Administration (FHWA)



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Work Zone Data Initiative (WZDI)

Creating a consistent language for communicating Work Zone Event Data across organizational boundaries and throughout project life cycles

- Accelerate the adoption of Work Zone Data Exchange (WZDx) specification
- Advance development of agency processes and applications around availability of standardized data

WZDI Motivations

- Work zone management is increasingly data-driven
- Data describing work zone events are critical for emerging use cases
- Uniformity, accuracy, and portability will enhance development of tools and methods for next-generation work zone management.

Data and the Project Delivery Life Cycle

Planning/Design

"first cone down"

"Estimated" work zone events

Data is dynamic, ephemeral

Uses:

- Project coordination
- ·Lane closure permitting
- Predictive travel times
- Fleet routing
- Anticipated capacity reduction

Current

"last cone up"

"Real-time" work zone events

Data is dynamic, ephemeral

Uses:

- Traveler information
- •Work zone management
- Situational awareness
- Inspection
- Asset management
- Contract monitoring
- •AV navigation

Post-Construction

"Historical" work zone events

Data is static, persistent ("read-only")

Uses:

Permanent record of prior activity, serving:

- Performance management
- Contract monitoring
- Analytics & research

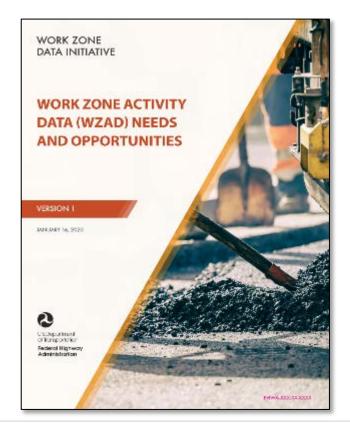
Components of Data-Driven Work Zone Mgmt.

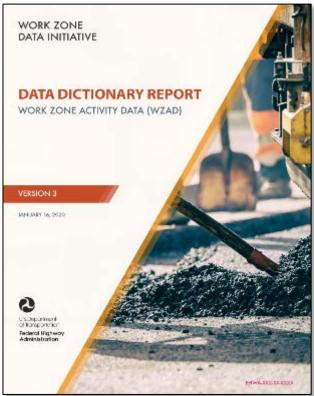
Data

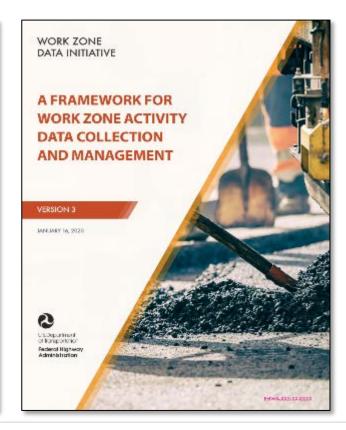
Information about when, where, and how work zones are occurring Work Zone Event Data

System

 Resources and business processes supporting the generation, validation, and distribution of Work Zone Activity Data, and its applied uses. – "Work Zone Data System"





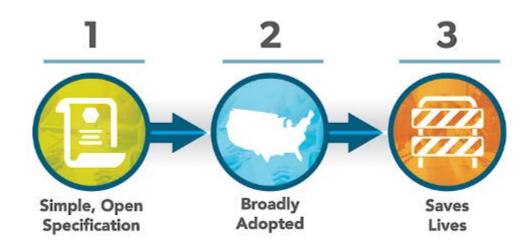


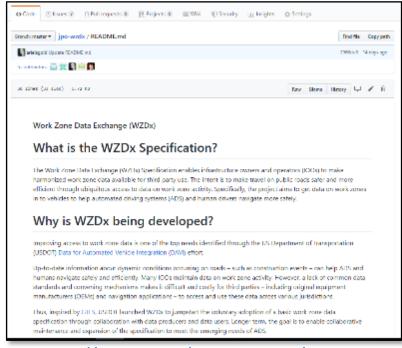
WZDI Resources

Available on the WZDI Collaboration Site

https://collaboration.fhwa.dot.gov/wzmp/wzdi/Forms/AllItems.aspx

Work Zone Data Exchange (WZDx)





https://github.com/usdot-jpo-ode/jpo-wzdx

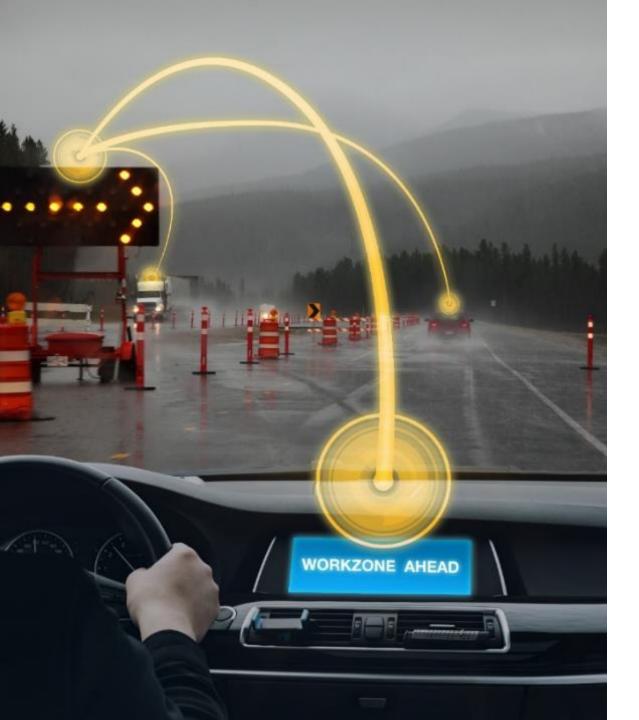
Work Zone Data Working Group

Formalized under the Federal Geographic Data Committee, the objectives are to:

- Maintain the current WZDx Specification;
- Groom the backlog of potential future changes and sources of technical input;
- Use open development methods to foster community involvement and support;
- Identify and promote best practices for creating, publishing, consuming, mapping, and analyzing work zone activity data and the WZDx Specification.

Priorities for 2020:

- Release WZDx Specification version 2.0 announced January 2020
- Develop technical assistance for local agencies deploying WZDx feeds
- Develop version 3 of the WZDx Specification



WZDx Demonstration Grants

Planned one-time funding for public roadway operators to make unified work zone data feeds available

- Total funding: \$2.4M
- Number of Awards: Up to 12
- Potential Award Amounts: Up to \$200,000 each
- **Period of performance:** 14 months
- Cost Share: 20% Non-Federal Share
- Federal involvement: Performance monitoring, technical guidance, and participation in status meetings, workshops, and technical group discussions.

Work Zone Data Exchange (WZDx): Improving Roadway Safety for Drivers and Automated Vehicles



Amy Nelson

Deputy Geospatial Information Officer U.S. Department of Transportation









Next Steps

Three subgroups have been formed to enhance the Work Zone Data initiative



Specification Update



Worker Presence



Technical Assistance





Specification Update

Objective: Enhance and improve the specification for Version 3

- Lead steward in making changes to v2 of the WZDx Specification and managing future development of the specification
- Review and recommend WZDx specification updates
- Focus on defining explicit, comprehensive, and consistent definitions of the features, attributes, and vocabulary needed to effectively model work zone activity data







Specification Update (con't)

- Recommendations will be based on an evaluation of the issue log
- Improvements can be proposed through GitHub or directly to WZDWG members
- Recommendations may include expanding or narrowing the specification
- Modifications will support open scalable standards
- Expected publication date is 8/30/2020







Worker Presence Subgroup

Objective: Include real-time worker presence information in the WZDx feeds

- Data will be used to
 - Improve worker safety
 - Alert drivers to reduce speed
 - Alert automated driving systems that humans are present

Key questions

- How should we define worker presence?
- How do we collect worker presence information?
- How will this data be used?
- What are the privacy, ethical, competitive, and liability issues with this data?







Worker Presence Subgroup (con't)

Current Focus

- Surveying stakeholders and users to understand needs
- Conducting interviews
- Subgroup will make recommendations on worker presence data collection for the v3 spec





Technical Assistance Subgroup

Objective: Educate data producers and consumers on how to access the WZDx's most recent specification and achieve data conformity

- Lead steward in developing and reviewing business rules and best practices for setting up WZDx feeds or updating current feeds as new versions of the specification are released
- Subgroup members will review and propose validation tools for setting up feeds and provide technical guidance to adopters







Technical Assistance Subgroup (con't)

- Will provide step-by-step details on how early adopters implemented the v2 specification
- Will create a form through which WZDWG members can share questions and answers







Contact Information

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Work Zone Data Exchange (WZDx): MC-85 Project in Maricopa County



Tomas Guerra

Principal
OZ Engineering

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Work Zone Data Exchange (WZDx)
MC-85 Project in Maricopa County

Tomas GuerraOZ Engineering





Introduction of Work Zone Data Activities

Pilot

MCDOT/ADOT/U of A Connected Vehicle Work Zone Freight application <a>A



- Freeway and Arterial
- MCDOT Arterial Smarter Work Zone
- ADOT Freeway Smarter Work Zone
- WZDx 1.1 work (Focus on MCDOT MC-85; arterial pilot)

Current

WZDx 2.0 (or later) work ADOT and MCDOT Pilot

Future

Regional Expansion





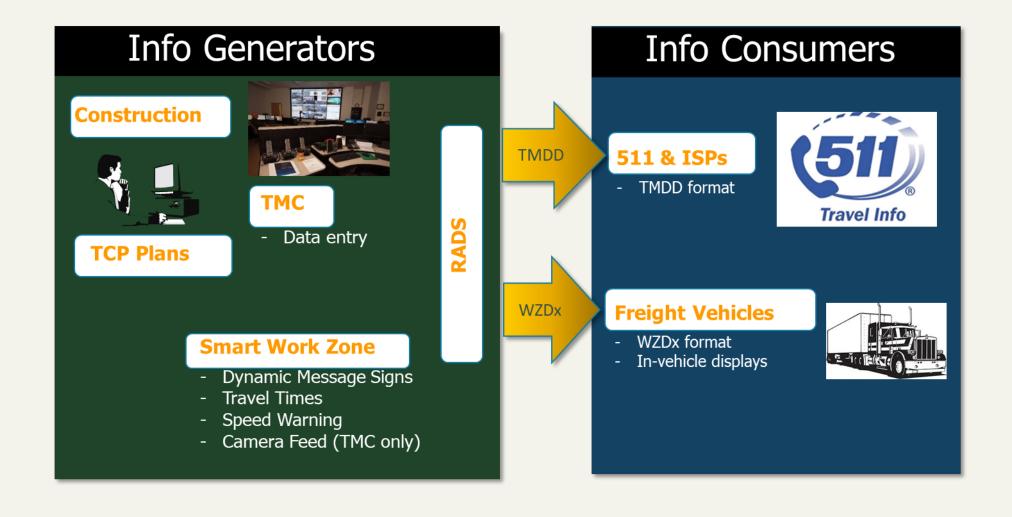
WZDx – Why?

- Understand WZDx specification and applicability
- Provide feedback to US DOT on the specification
- Mainstream and broadcast to third parties for real-time use





Demonstration Pilot



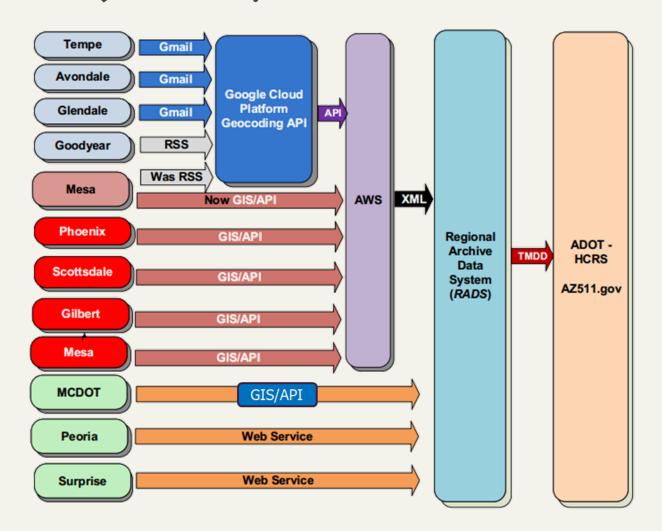




Current GIS Processes (TMDD)

- GIS/API
- Gmail
- RSS
- Web Service

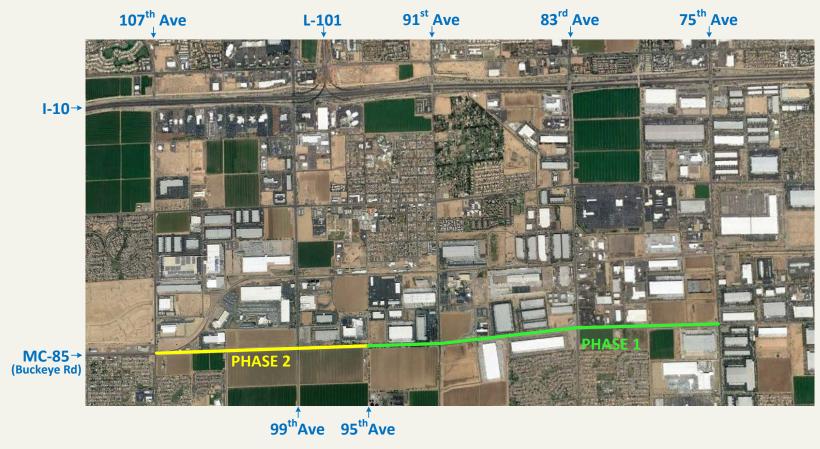
Next Steps:
 Regional WZDx
 (Multiple Sources)







Project Area



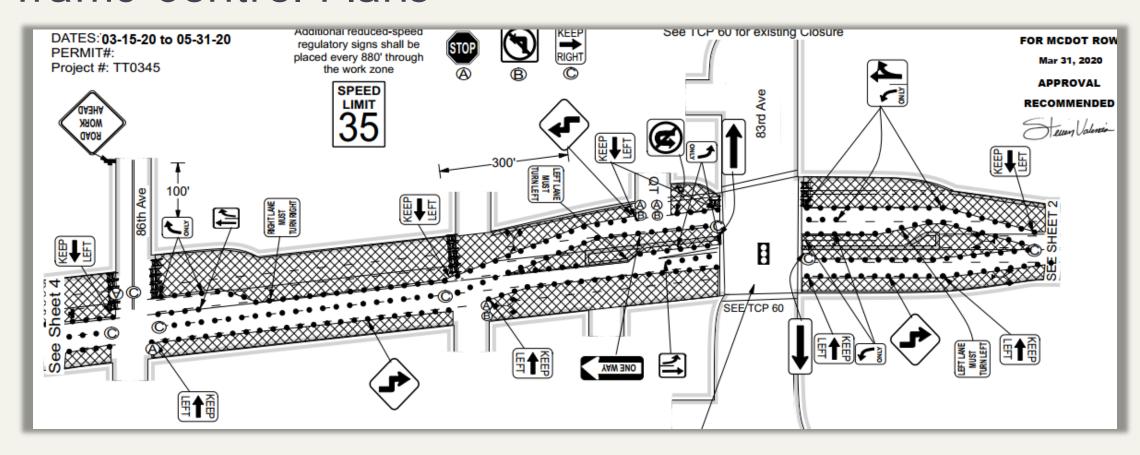
- Major Freight Corridor
- Long Project Duration

- Available Alternate Routes
- Challenging Industrial Area





Traffic Control Plans

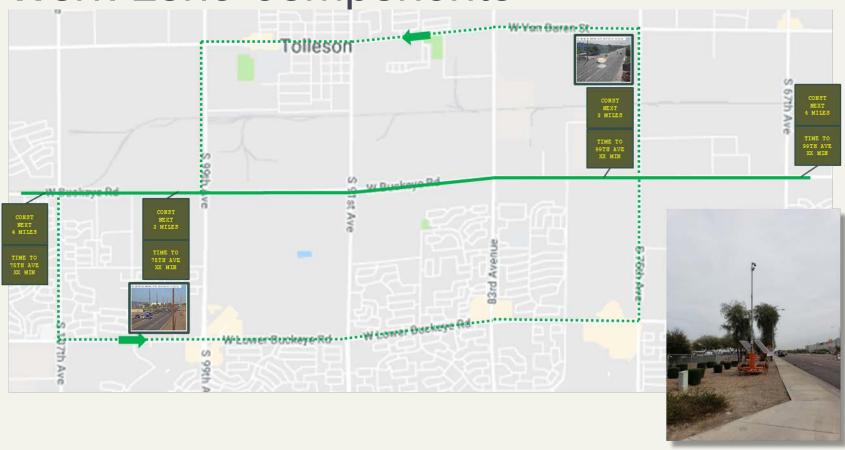


- January 2019 to June 2020, to widen MC-85 to a total of 5 lanes; storm drains, sidewalk, lighting, irrigation.
- Minimum of 1 lane in each direction open, shifting all traffic to opposite side of road, first south half, then north half.
- 24 x 7 restrictions, workers on-site M-F 8 AM to 5 PM.





Smart Work Zone Components



ITS Components:

- Detection (Speed, Occupancy, Volume)
- ARID readers calculate travel times
- Displayed DMS content varies depending on travel times
- Excessive speed feedback signs
- CCTV Cameras
- RSU





USDOT WZDx v1.1

- Work Zone Data Exchange (WZDx)
 - Common Core Data Specification Reference Document
 - https://www.transportation.gov/av/data





Sample WZDx Data Frame

Traffic Control Plan #12 Eastbound

Tag	Value	Notes/Comments
identifier	Maricopa.gov.2019012001	
subidentifier	TT0345;TCP_12;eastbound	Use Project # and TCP #. A single TCP could generate two restrictions, one in each direction.
StartDateTime	startDateTime-ver: 2019-01-20T06:35:00-07:00	By convention, we will include timezone value (-07:00) since AZ does not recognize DST; could also use UTC (Z). Suggest this be a convention for all.
EndDateTime	endDateTime-est: 2019-08-20T23:59:59-07:00	How would day-time construction (8 AM to 5 PM, M-F) be represented? Make five entries?
BeginLocation	roadName: MC-85 (Buckeye Rd) roadDirection: eastbound latitude-est: 33.435795 longitude-est: -112.259716 crossStreet: 91st Ave	
EndLocation	latitude-est: 33.437151 longitude-est: -112.224501 crossStreet: 79th Ave	
wz_status	active	Could this field include a separate Date/Time field if Work Zone will only be set up during off-peak hours during an extend time period?
totalLanes	2	





Sample WZDx Data Frame (con't)

Traffic Control Plan #12 Eastbound (Continued)

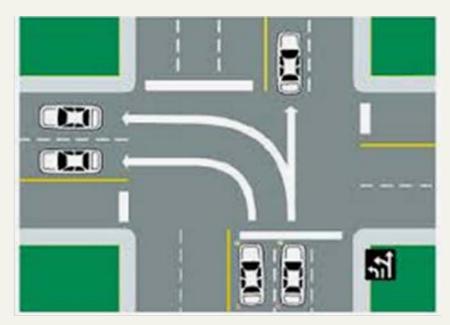
Tag	Value	Notes/Comments
openLanes	shift-left (yes) left-lane(also good?) alternating-flow-lane (no)	Trying to describe the case where all lanes are actually blocked and <u>one</u> lane of traffic is shifted over into the opposing traffic lane. Used shift-left since it means "all open lanes shift to the left". Could also use left-lane? Note, discrepancy in WZDx_final01.xsd, line 185: "shift-left", vs "left-shift-lanes" in reference document.
closedLanes	right-lane	Shared two-way left turn center lane not available or closed; no left turn allowed. Other: How would one represent a center two-way left turn lane on an arterial? See next slide.
closedShoulders	Both	
workersPresent	True	This could require a Date/Time field separate from the Project Start/End Date/Time fields if the closure is always present but workers are only present during certain work hours/days
Description	Eastbound lanes reduced to one lane and shifted to opposing side of roadway on MC-85 (W. Buckeye Rd) from near 91st Ave to near 75th Ave. for approx. 7 months. Westbound traffic also reduced to 1 lane.	Where would real-time ITS information such as travel times / speeds, and DMS message text be represented? Consider embedding within this field, or provide a URL link in this field to another data page, other?
issuingOrganization	Maricopa County DOT	
timestampCreation	2019-01-20T06:35:00-07:00	
timeStampUpdate	2019-03-29T14:42:00-07:00	





Representing Left Turning Lanes





- Shared two-way left turn center lane
- Center two-way left turn lane on an arterial





MCDOT WZDx JSON API (v1.0)

(https://api.mcdot-its.com/WZDx/Activity/Get)

```
▼ WorkZoneActivity:
       identifier:
                                  "maricopa.gov.2019012001"
       subidentifier:
                                  "TT0345;TCP_12;eastbound"

▼ startDateTime:

                                  "2019-01-20T06:35:00-07:00"
         startDateTime-ver:
     ▼ endDateTime:
          endDateTime-est:
                                  "2019-08-20T23:59:59-07:00"
     ▼ beginLocation:
                                  "MC-85 (Buckeye Rd)"
          roadName:
                                  "MC-85"
         roadNum:
                                  "eastbound"
         roadDirection:
         latitude-est:
                                  33.435795
                                  -112.259716
          longitude-est:
         crossStreet:
                                  "91st Ave"
     ▼ endLocation:
                                  33.437151
         latitude-est:
                                  -112.224501
         longitude-est:
                                  "75th Ave"
         crossStreet:
                                  "active"
       wz_status:
       totalLanes:
       openLanes:
                                  "shift-left"
                                  "right-lane"
       closedLanes:
                                  "both"
       closedShoulders:
                                  "true"
       workersPresent:
                                  "Eastbound lanes reduced to one lane and shifted to opposing side

▼ description:
                                  of roadway on MC-85 (W. Buckeye Rd) from near 91st Ave to near 75t
                                  Ave. for approx. 7 months. Westbound traffic also reduced to 1
                                  lane."
       issuingOrganization:
                                  "Maricopa County DOT"
       timestampEventCreation:
                                  "2019-01-20T06:35:00-07:00"
                                  "2019-03-29T14:42:00-07:00"
       timestampEventUpdate:
```





In-Truck Demonstration

- Drivewyze uses WZDx API and defines geo-fenced events within their product
- Swift Trucking company in-vehicle ELD automatically receives workzone notifications







WZDx GeoJSON API (v2)

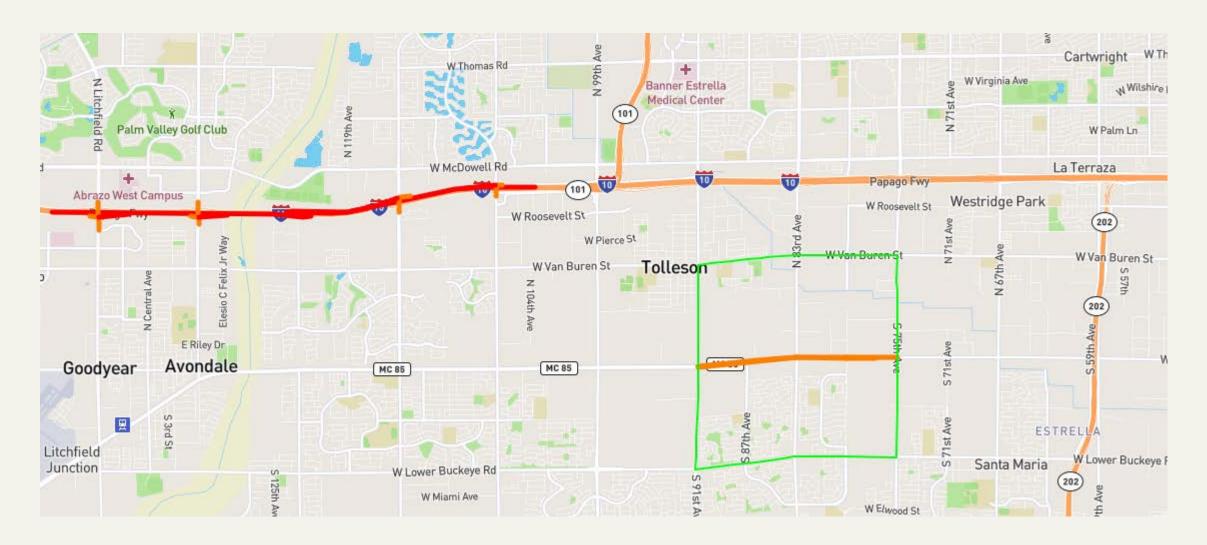
(https://www.transportation.gov/av/data/wzdx)

- The following changes were made to the WZDx Specification in version 2:
 - Adopted a relational data model approach to eliminate nested tables and make the specification more scalable
 - Required feeds to be published in GeoJSON to facilitate data consumption and use
 - **Simplified road closure impact reporting** to indicate whether a road is partially closed, fully closed, or fully open
 - Captured lane-level restrictions (when available) to specify work zone impacts for each lane of a roadway



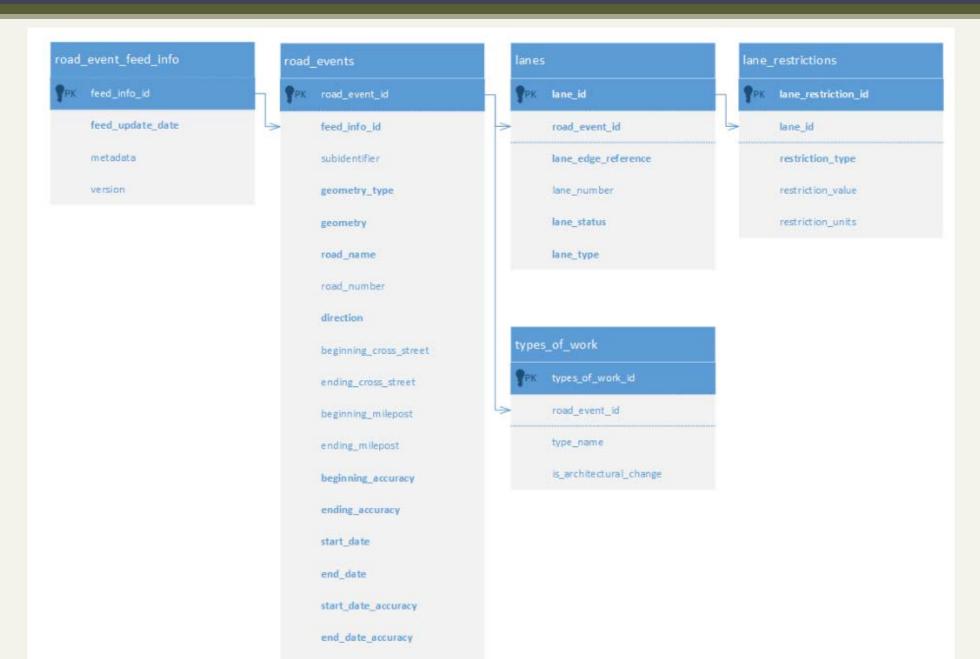


MCDOT WZDx JSON API (v2.0) - GeoJSON









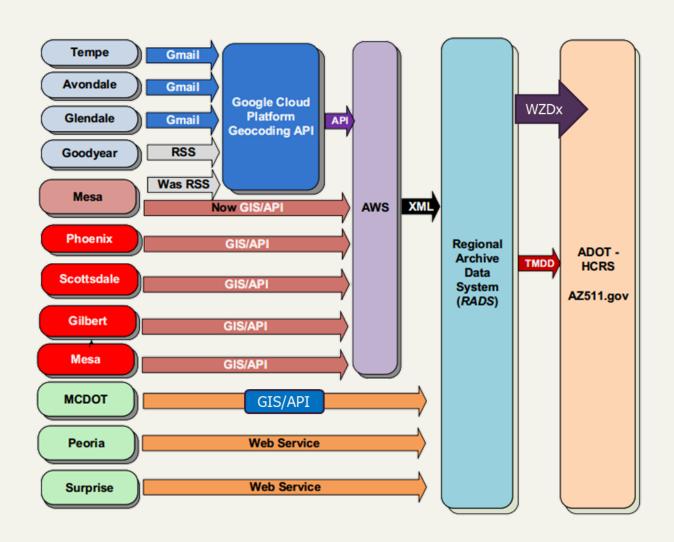




Next Steps Regional WZDx

- GIS/API
- Gmail
- RSS
- Web Service

Next Steps:
 Regional WZDx
 (Multiple Sources)







Thank You!

Point of Contact

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Panel Discussion



Derald Dudley

MODERATOR

Geographer

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PANELIST
State Incident Mgmt. & Operations Administrator
Washington State DOT





Work Zone Database Navigation ▼ Reports ▼ Settings ▼ Administration ▼ WSD0

Work Zone List

Create New

	Region		County	9	State Route		Start Date	End Date	
	Olympic	•	All	· [All	▼	05/14/2020		Filter
SI	how 100 v entries								

	Olympic ▼	All	▼ All	II			▼	05/1	14/2020				F	ilter	
Sł	ow 100 ▼ entries														
N	ame	†≢	Туре	↓↑	Status 11	S R ↓↑	Direction	Į1	Milepost ↓↑	Common Name	↓ ↑	Contract No ↓↑	Start Date 1	End Date ↓↑	Action
5	h St to S H St Paving and ADA Compliance		Contract	1	Active	101	Eastbound		87.49 - 91.51	Hoquiam & Aberdee	n	009491	2/18/2020	10/30/2020	View Edit Duplicate
7	th St Bridge (SR-167 Extension Stage 1A) Week of 05/1	11/2020	Contract	I	Active	O 005	Northbound		136.5 - 138.5	I-5 NB near 70th St B	Bridge	9333	5/13/2020	5/14/2020	View Edit Duplicate
A	gate Pass Bridge - Bridge Painting		Contract	A	Active	305	Both Directions		6.82 - 7.05	Agate Pass Bridge		009409	3/10/2020	10/30/2020	View Edit Duplicate
A	sphalt Repair		Maintenance	A	Active	101	Both Directions		133.9 - 130.9				5/12/2020	5/14/2020	View Edit Duplicate
A	sphalt Repair		Maintenance	A	Active	101	Both Directions		133.9 - 130.9				5/19/2020	5/21/2020	View Edit Duplicate
E	idge		Maintenance	A	Active	101	Both Directions		120 - 120	Skunk creek			5/14/2020	5/14/2020	View Edit Duplicate
b	idge Maintenance		Maintenance	A	Active	101	Southbound		120.4 - 120.4	skunk creek			5/13/2020	5/14/2020	View Edit Duplicate
(nehalis River Bridge Structural Rehabilitation & Painting		Contract	A	Active	107	Both Directions		6.74 - 7.16	Chehalis River Bridg	е	009360	4/6/2019	9/30/2020	View Edit Duplicate
(ack Seal		Maintenance	A	Active	O 101	Northbound		361 - 353				5/18/2020	5/21/2020	View Edit Duplicate
d	ching		Maintenance	A	Active	101	Both Directions		229 - 231				5/12/2020	5/14/2020	View Edit Duplicate
Е	of Elgin Clifton Rd To SR16 - Remove Fish Barriers, Par	ving, ADA & Bridge	Contract	1	Active	302	Both Directions		10 - 11	Minter Cr.		9446	5/11/2020	5/15/2020	View Edit Duplicate
E	of Elgin Clifton Rd To SR16 - Remove Fish Barriers, Par	ving, ADA & Bridge	Contract	1	Active	302	Both Directions		10 - 11	Minter Cr.		9446	5/18/2020	5/22/2020	View Edit Duplicate
(eo Tech Boring		Other	F	Pending	308	Both Directions		3 - 3				5/25/2020	5/29/2020	View Edit Duplicate
H	eron St. Bridge flushing		Maintenance	F	Pending	012	Eastbound		0.08 - 0.13	Heron Bridge			5/13/2020	5/14/2020	View Edit Duplicate
l	terstate 5 / Port of Tacoma Road Interchange - Phase 1		Contract	A	Active	005	Both Directions		135.91 - 136.62			TA5180	5/14/2020	5/22/2020	View Edit Duplicate
J	BLM		Contract	I	Active	O 005	Both Directions		120.01 - 124.45	JBLM		9133	11/18/2019	10/30/2020	View Edit Duplicate
H	lisut Harbor Remove Fish Barrier		Contract	A	Active	116	Both Directions		4.15 - 4.95	Kilisut Harbor		9447	5/11/2020	5/15/2020	View Edit Duplicate
H	lisut Harbor Remove Fish Barrier		Contract	1	Active	116	Both Directions		4.15 - 4.95	Kilisut Harbor		9447	5/11/2020	5/15/2020	View Edit Duplicate
H	lisut Harbor Remove Fish Barrier		Contract	1	Active	116	Both Directions		4.15 - 4.95	Kilisut Harbor		9447	5/18/2020	5/22/2020	View Edit Duplicate
L	indau Assoc. Geo-Tec. Boring		Maintenance	F	Pending	003	Both Directions		48.3 - 48.8	Geo Tech Boring			5/18/2020	5/22/2020	View Edit Duplicate
la	ge littler pick up		Maintenance	A	Active	167	Both Directions		0 - 11	river rd/ SR 167			5/13/2020	5/14/2020	View Edit Duplicate
													T	T	T





Work Zone Database Navigation → Reports → Settings → Administration →

SR 510 Interchange Reconstruct Interchange

Project Information					
Region Olympic	Counties Thurston	Work Zone Type Contract	Contract Number 9297	Status Active	
Create Date 05/08/2020 01:19 PM	Last Modified 05/08/2020 01:19 PM	Created By		Last Modified By	

Location

State Route	Direction	Start Milepost	End Milepost	Common Name
005	Northbound	110.000	112.000	Marvin Rd.

WSDOT Contacts

	Name	Primary Phone	Alt. Phone	Email
1	sales San	(360)	See Crew Manager	wsdot wa gov
2	telo See	(360)	(360)	wsdot.wa.gov
3		(360)	(360)	wsdot.wa.gov





510 **Both Directions** Priority Type On Ramp Contract Start Date **End Date** 5/11/2020 5/15/2020 Description of Work

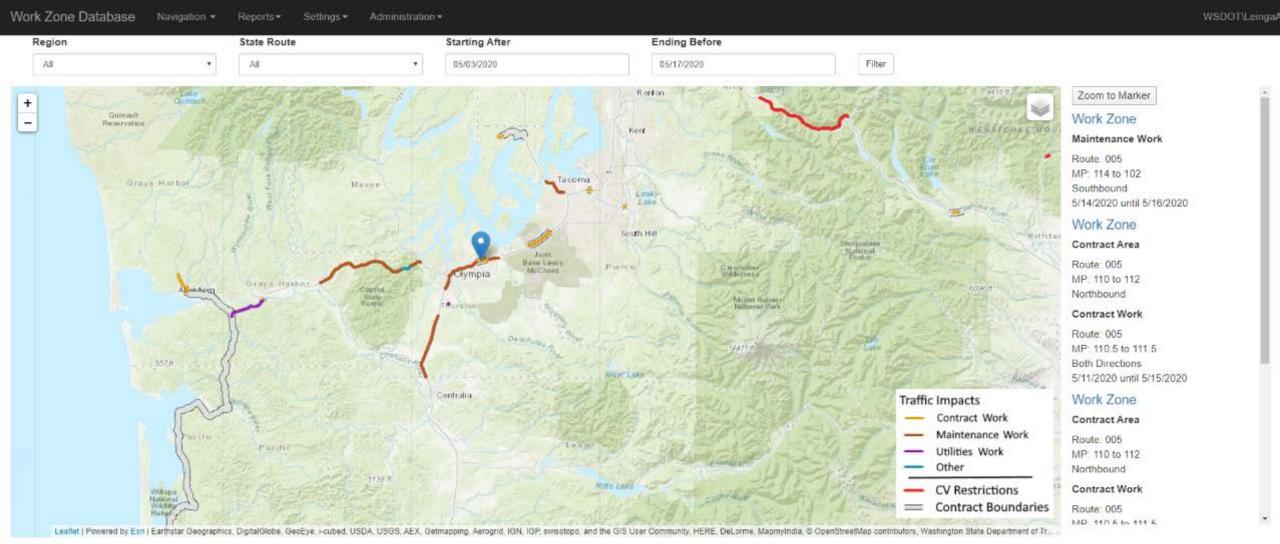
Monday thru Friday day time; No work scheduled Description of Traffic Control Required Monday thru Friday day time; No traffic impacts expected Comments

Weather Permitting Yes Start Hour

7:00 AM

End Hour 03:00 PM Marvin Rd. Interchange

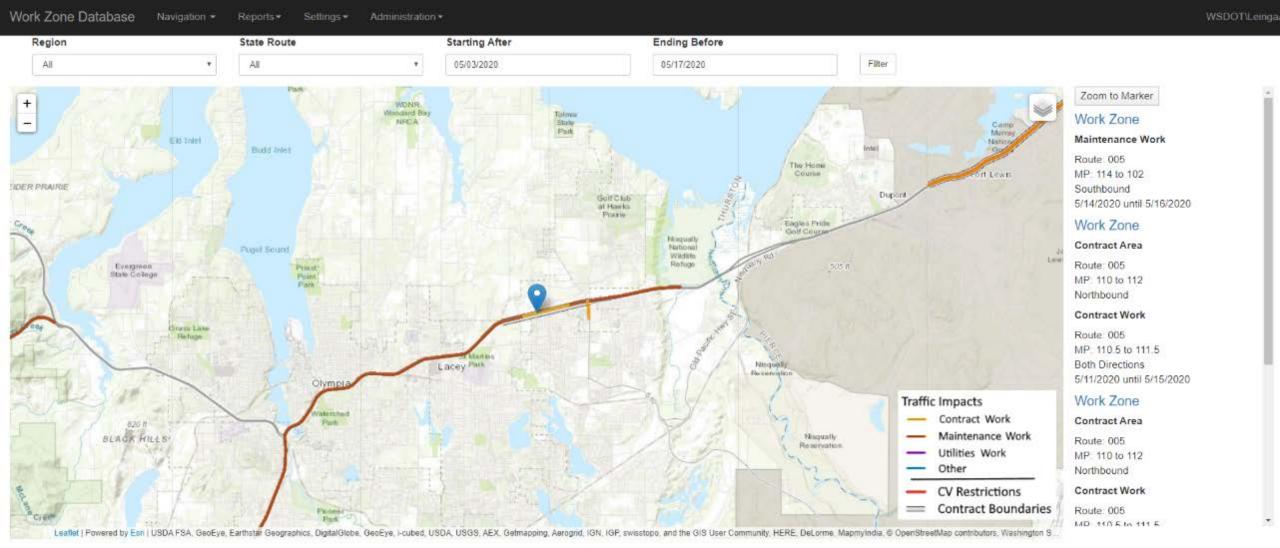
Work Days Mon Tue Wed Thr Fri



@ 2020 - Work Zone Database







© 2020 - Work Zone Database





Questions & Answers

Please type your question into the chat box





Call to Action

Visit the WZDI and WZDx Websites	WZDI Website: https://collaboration.fhwa.dot.gov/wzmp/wzdi/Forms/AllItems.aspx WZDx Website: https://www.transportation.gov/av/data/wzdx
Access and contribute to the WZDx Specification	WZDx Specification (v2.0): https://github.com/usdot-jpo-ode/jpo-wzdx/blob/master/README.md
Access WZDx Data Feeds	TxDOT's v2 and MCDOT's v1.1 feeds: https://data.transportation.gov/Roadways-and-Bridges/Work-Zone-Data-Exchange-WZDx-Feed-Registry/69qe-yiui
Join the Work Zone Data Working Group (WZDWG)	To participate in the working group, contact avdx@dot.gov
Leverage WZDx Technical Support	Technical Assistance and Help Desk – Coming Soon!





Post Event Activities

- Provide feedback on today's virtual event
 - A survey will be distributed to all participants
- Access the presentation and recording on the WZDx website
- Attend future AASHTO Geospatial Events
 - Geospatial Online Transportation Users Group (GOTUG)
 - Learn more at: https://gotug.transportation.org/
 - Upcoming GIS-T Symposium
 - Minneapolis, Minnesota April 2021
 - North Charleston, South Carolina April 2022

For more information, visit: https://gis-t.transportation.org/



MINNEAPOLIS, MINNESOTA





Thank you for your participation!



