

Connected Work Zone Verification and Validation Survey Results

Survey Questions		Colorado DOT	Qlynx Technologies
1	Agency Profile & Role	Government State Department of Transportation	
	Agency name, region/state/province	Colorado Department of Transportation, US, Colorado	Qlynx Technologies, based in Colorado, but we provide smart work zones across the United States. This is a private company, but we expect to be providing CWZ feeds for our customers, various state DOTs.
2	Point of Contact (name, title, email, phone).	Benjamin Acimovic, Traffic Operations and Technology Manager Benjamin.acimovic@state.co.us, 720-951-6151	Devorah Henderson, Co-Founder and Head of Engineering, devorah@qlynxtech.com, 404-989-8956
3	Your role in work zone data collection/management	I lead the development of the smart and connected work zone specifications that required work zone data collection and management. -	
	- Policy/planning	X	
	- Technical/data management		
	- Field operations	X	

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Survey Questions		Colorado DOT	Qlynx Technologies
	- Other (specify)	X connected and smart work zone specs and standards	
4	Who is currently in charge of work zone data feeds in your agency?	Office of Innovative Mobility.	Our programming department
5	Who championed the adoption of WZDx (if applicable)?	Ashley Nylan and the Office of Innovative Mobility	Myself, Devorah Henderson
	Current Work Zone Data Practices	traditional with some connected and smart work zone deployments on larger projects.	
6	How many work zones are typically in place at any given time (regardless of worker presence)?	150	40

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Survey Questions		Colorado DOT	Qlynx Technologies
7	How would you describe the distribution of your work zone sizes? (e.g., mostly small, mostly large, a mix)	a mix.	Mostly large
8	What types of work zones do you typically manage? (e.g., mobile operations, long-term closures)	all sorts – mobile, temp, long term, short term	
9	How long are work zones typically in place?	depends on the project and work. We have events going for a few hours, up to a few months	1 month – 7 years
10	How long are workers typically present within those work zones?	depends on the project and work. We don't have any methods of detecting active workers in real time.	We do not currently track this data, but may do so for in the future. There are definitely workers present in these work zones, as they are one of the categories that smart work zone systems help protect.
11	When are work zones typically active (nighttime, weekends, etc.)?	depends on the project and work	Most of these work zones are constantly active, although weekends or night-times are often used for more significant phases of closure. Occasional projects function only on nights or weekends, but this is the minority.

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Survey Questions		Colorado DOT	Qlynx Technologies
12	Where are your work zones located? (urban, rural, statewide, etc.) Are there any differences you can see with how (or what type of) field devices are deployed depending on area type?	?—depends on the project and work. We have a good mix of events, with a large bulk of events on I-70 and I-25, with the remaining being distributed across smaller roads across more rural parts of the state.	Primarily urban. Yes, significantly more field devices are deployed in dense urban areas, since the high volume of traffic can create more risk for backups and accidents etc. Urban areas are also more likely to implement multiple safety strategies (queue systems, sensors, PCMS units, flashing beacons, travel times systems etc).
13	Field devices used for work zone data:		
	- Arrow board		
	- Camera		X
	- Dynamic message sign (DMS)	(supported but not used)	X
	- Flashing beacon	(supported but not used)	X
	- Hybrid sign	(supported but not used)	

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Survey Questions		Colorado DOT	Qlynx Technologies
	- Location marker	(supported but not used)	
	- RSU		
	- Traffic sensor	(supported but not used)	X
	- Traffic signal		

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Survey Questions		Colorado DOT	Qlynx Technologies
	Other (specify)	Geotab vehicle location/status sensors mounted on construction vehicles including autonomous truck-mounted crash attenuator vehicles.	
14	What's the current response time for updating work zone data feeds based on changes to the work zone? Is that different from your ideal response time?	twice a year based on changes on the CWZ and WZDx standard.	From our side, most changes are registered digitally and we can update them to the feed in minute by minute data. However, if any manual changes are needed, this would depend on the reponse time from those in the field, which could be variable.
15	CV/V2X technology experience:		
	- Pilots		
	- Implementations		
	- Other (specify)		
	- Briefly describe the experience here		
16	Platforms/software used to create work zone data feeds:		

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Survey Questions		Colorado DOT	Qlynx Technologies
	- In-house tools		X
	- Vendor system		
	- Other (specify)		
WZDx/CWZ Adoption & Status			
17	Which specification(s) do you currently use?		
	WZDx v3.x		
	WZDx v4.x	4.2	
	CWZ v1.0	1.0 is implemented, but has not been fully validated	X
	Other (specify)		
18	When did you adopt WZDx?	2019	
19	Why did you adopt WZDx? (problems you wanted solved)	national standard and getting work zone data into our cotrip and other feeds. We also wanted to share our work zone data with the traveling public through third party services like Waze, and implementing these kinds of standards enables us to do that.	
20	Do you plan to transition to CWZ v1.0?		
	- Yes in progress	X	X
	- Yes Planned		
	- No		
	- Unsure		
21	Estimated CWZ adoption timeline:	2027	Variable
22	Have you started testing or implementing CWZ v1.0?	Yes, the first round of implementation is complete	We are not yet providing it to customers but are working so it will be ready to release when needed.

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Survey Questions		Colorado DOT	Qlynx Technologies
23	Who do you look to for deciding when to adopt new technology or standards? (peers, FHWA, vendors, etc.)	use cases, other peers, FHWA	Peers, FHWA.

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Survey Questions		Colorado DOT	Qlynx Technologies
Implementation Process			
24	Describe your process for creating and maintaining a WZDx/CWZ feed.	The bulk of CDOT's work zone information comes from planned events recorded by TMC personnel. Additional information from speed reduction forms, mobile vehicles such as autonomous truck-mounted attenuators, and connected field devices such as iCone connected arrow boards are fused with those planned events to improve information content (speed reduction forms), location accuracy (arrow boards for static events and vehicle locations for mobile events), and event time ranges (arrow board status keeps events open longer).	We are used to providing data feeds to customers, so in this case, we are just working to get data into the proper format and to ensure we have all the needed data for CWZ.
25	How do you ensure feed data is fresh, updated, and accurate?	This is mainly completed through strong communication between construction contractors and TMC operators, and high standards placed on contractors. Connected field devices and mobile vehicles assist in this operation but are only present for a limited number of work zones. On the backend, an update to a planned operation (submitted by a TMC operator upon receiving information from a contractor) is pushed out through CDOT's advanced data streaming platform and is directly ingested by the WZDx/CWZ feed management system. Updates to vehicle locations and connected device are collected directly by the WZDx/CWZ	Our system is able to track equipment digitally and so can update a significant amount of data to the feed one a minute by minute basis. But we do have questions about timely collection of any data that would be manually entered and how to get it from field personnel or DOTs in a timely manner.
26	How does a contractor or maintenance team contribute data to your feed?	Contractors communicate the status of ongoing work with TMC operators. Comment :Is this a contractual obligation? And is this the right way to describe this communication?	We have not yet worked on this aspect data collection, but are considering how to make this easy for customers.

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Survey Questions		Colorado DOT	Qlynx Technologies
27	Any back-office/IT concerns with WZDx or CWZ?	nope	
28	How did you secure your WZDx/CWZ feeds to ensure that only authorized users can access or modify the data?	Access to the published WZDx/CWZ data feeds are secured through CDOT's traveler information data feed subscription. Access to the source data is secured through CDOT's internal TMC access controls.	In our case, because we are a technology company, we are used to password protecting data and ensuring our procedures have security compliance.
Challenges & Gaps			
29	What issues have you faced in deploying your feed?	None on the CWZ feed itself, that was very simple – mostly a copy of the WZDx feed. However on the internal feed generation, CDOT does not have a good method for linking additional data sources (mobile vehicles and connected field devices) to specific work zones. All of the associations are done through inferences based on location, time, and other device properties. This added a lot of complexity and uncertainty to the integration of live/connected information with other data sources.	

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Survey Questions		Colorado DOT	Qlynx Technologies
30	Have you noticed any difference in implementability between WZDx and CWZ?	The only noticeable difference is that for the CWZ feed, the geometry type of MultiPoint was removed. CDOT has been using that geometry type for events where only the start and end point are known, as drawing a LineString between these two points may be a poor representation of the spatial extent of the event. This situation is rare, but does occur occasionally.	No
31	Are there any gaps (e.g., geographic, domain, data elements, or implementation) you can see?	There is no place for an expected activity schedule in the current WZDx message. I believe the current approach is to submit multiple separate events using the first-occurrence and next-occurrence related road event types?	Data elements: 1. We provide Bluetooth devices in a fair number of work zones. The original intention was for CWZ to contain Bluetooth devices. However, these were first categorized as sensors, and near the time CWZ was approved, the group realized that Bluetooth devices really need their own device type since they have data elements not part of normal sensors. I still think these are needed as they are a common work zone data device. 2. Classification Data for Radar Sensors - I believe the current feeds support things like speed, volume, and occupancy from radars. But I don't believe it includes classification data (i.e. size of vehicles, small, medium, and large) and that is a common data type provided by side fire radars. I think DOTs may want access to this, where applicable.
32	Any application areas or use cases you want prioritized?	I am not coming up with anything	

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Survey Questions		Colorado DOT	Qlynx Technologies
33	What concerns do you have with the CWZ standard?	No concerns	I think the feed could use more ability to define and provide data about the work zone itself.

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Survey Questions		Colorado DOT	Qlynx Technologies
Additional Guidance & Support Needs			
34	Where would you like more guidance? (check all that apply)		
	Converting from WZDx to CWZ		
	Understanding required/optional fields		
	Data quality validation	X	
	Publishing compliant feeds		
	Vendor/contractor workflows		
	Security	X	
	Other (specify)		

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Survey Questions		Colorado DOT	Qlynx Technologies
35	What features or enhancements would you like to see added to the CWZ standard?	1. The established REST pull request framework works well for general use cases but can be inefficient for iterative updates and more precise requests. The addition of standardized query parameters would be a valuable addition, to standardize ways to filter the feed. We would suggest query parameters for: · modified_since/changed_after: a timestamp (ISO8601 or utc milliseconds) which filters for only events which have changed since the timestamp specified. This would significantly reduce message sizes for multiple successive requests · geospatial filter: could be a polygon or a point and radius, or even a linestring and width. This would allow filtering for events in the vicinity of a user. 2. Additionally, for center-to-center communication, the current best approach is for the consumer to make continual timed request to the provider, then evaluate whether any changes are present in the feed. This adds a lot of processing load to both systems, and if the consumer wishes to reduce their change latency, they must query more often, further increasing the load on both sides. Adding an alternate streaming communication protocol (such as Websockets, gRPC, MQTT, Server-Sent Events, ...), would alleviate these issues, and allow notification of changes to be pushed from the provider to the consumer. The addition of a modified_since/changed_after query parameter would improve the current system but not alleviate all the concerns. This issue is even more relevant for field device feeds, which is becoming widely supported by connected field device manufacturers. 3. Is there planned support for road closure events (unrelated to work zones)? At CDOT, those are closely linked, and we would like to have a better way of sharing these road closures.	More consideration about the work zone ID to define the entire work zone and how a person can provide information about the work zone itself.
36	Do you see a need for deployment support? What type of support?	not at this time	
37	Would a test spec/use case test documentation be valuable to you?	more use case examples/documentation are always welcome!	

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Survey Questions		Colorado DOT	Qlynx Technologies
Projects, Funding, and Analysis			
38	What projects are you working on that touch WZDx or CWZ?	I am not working on anything additional here at the moment	
39	Have you done any analysis on the standard/spec?	Only as it pertains to CDOT's implementation	Yes, we analyzed it significantly during its development
40	Where do you send your feeds? (511, third parties, WZDx Feed Registry, etc.)	CDOT's WZDx feed is shared with the WZDx feed registry, the SDX, and is consumed by Waze.	We anticipate that our feeds will mostly go to DOTS, but can provide them to any parties they specify.
41	What grants or funding do you use for work zone activities?	Need some help on this answer	NA
V&V Participation			
42	Self-assessment: Compared to other agencies, your CWZ/WZDx implementation is:		
	Advanced / Early adopter	X	
	Following the lead of early adopters		
	Just getting started / Not currently pursuing, maybe "wait and see"		
43	Are you willing/able/ready to be a validation site (regardless of current agency progress in CWZ implementation)?	I would be open to this	Because we are a private vendor, this is probably not appropriate for us to say yes to, as it would be a question for the DOTs we support, since if their data.
44	Are you willing to share a CWZ feed for V&V testing?	Absolutely! CDOT's CWZ feed is ready and available on the USDOT WZDx feed registry.	This would depend on the DOTs we support.
45	Any related CWZ work we should know about so we don't duplicate effort?	None	

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Survey Questions		Bentley Systems	Caltrans
1	Agency Profile & Role	Road asset and condition monitoring with crowdsourced data & AI	
	Agency name, region/state/province	Blyncsy (Bentley Systems)	California Department of Transportation
2	Point of Contact (name, title, email, phone).	Mark Pittman, Sr. Director, Transportation AI	
3	Your role in work zone data collection/management		Transportation Engineer
	- Policy/planning		
	- Technical/data management		
	- Field operations		

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Survey Questions		Bentley Systems	Caltrans
	- Other (specify)	Data collection & analysis	
4	Who is currently in charge of work zone data feeds in your agency?	No applicable for our data collection & analysis process.	Office of Connected Ecosystem, CAV Program
5	Who championed the adoption of WZDx (if applicable)?	No applicable for our data collection & analysis process.	Office of Connected Ecosystem
	Current Work Zone Data Practices	On demand data collection in work zones and analysis of lane closure and providing WZZDx feed	Using LCS (Lane Closure System) developed by Caltrans
6	How many work zones are typically in place at any given time (regardless of worker presence)?	It depends on the are we are monitoring. Typically clients request monitoring (eg ground truth imagery, lane closures) on known work zoen location. It can range on 10-20 miles of a highway or statewide.	Around 72000 lane closures per month are requested before pre-screening , and 50,000 per month is the number of requests entered into the Caltrans Lane Closure System (LCS) after pre-screening.

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Survey Questions		Bentley Systems	Caltrans
7	How would you describe the distribution of your work zone sizes? (e.g., mostly small, mostly large, a mix)	No applicable for our data collection & analysis process.	It would be better to define the small, large or mix. The distribution of our work zone sizes is mixed, with a combination of small, medium, and large projects depending on the location, type of work, and project duration. Refer to AB752 2023-2024 for more information.
8	What types of work zones do you typically manage? (e.g., mobile operations, long-term closures)	No applicable for our data collection & analysis process.	Work zone operation team usually manages the short-term planned lane closures.
9	How long are work zones typically in place?	No applicable for our data collection & analysis process.	Please clarify this question. Do you mean how long is the lane closure or how long it takes to put a lane closure in place.
10	How long are workers typically present within those work zones?	No applicable for our data collection & analysis process.	It depends on the length of the closures.
11	When are work zones typically active (nighttime, weekends, etc.)?	No applicable for our data collection & analysis process.	It depends on lane requirement chart.

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Survey Questions		Bentley Systems	Caltrans
12	Where are your work zones located? (urban, rural, statewide, etc.) Are there any differences you can see with how (or what type of) field devices are deployed depending on area type?	No applicable for our data collection & analysis process.	It depends on lane requirement chart.
13	Field devices used for work zone data:	No applicable for our data collection & analysis process.	
	- Arrow board		
	- Camera		
	- Dynamic message sign (DMS)		
	- Flashing beacon		
	- Hybrid sign		

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Survey Questions		Bentley Systems	Caltrans
	- Location marker		
	- RSU		
	- Traffic sensor		
	- Traffic signal		

Connected Work Zone Verification and Validation Survey Results

Survey Questions		Bentley Systems	Caltrans
	Other (specify)		The field devices used for work zone data include arrow boards, cameras, portable changeable message signs (PCMS), flashing beacons, hybrid signs, location markers, roadside units (RSUs), traffic sensors, and traffic signals. Please refer to Caltrans standard plans and construction plans for details.
14	What's the current response time for updating work zone data feeds based on changes to the work zone? Is that different from your ideal response time?	Near-real time with crowdsourced dash cam imagery	The current response time for updating work zone data feeds is approximately every 1 to 2 minutes after a change is made to the work zone information. This aligns closely with our ideal response time, as near real-time updates help ensure accurate and timely traveler information
15	CV/V2X technology experience:	No applicable for our data collection & analysis process.	
	- Pilots		
	- Implementations		
	- Other (specify)		
	- Briefly describe the experience here		For pilot and testing bed information refer to champion group.
16	Platforms/software used to create work zone data feeds:	In house tools	

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Survey Questions		Bentley Systems	Caltrans
	- In-house tools		
	- Vendor system		
	- Other (specify)		In-house tools – primarily the Lane Closure System (LCS), which generates work zone data feeds. QuickMap is used to visualize these feeds for public access but does not create the feeds itself.
WZDx/CWZ Adoption & Status			
17	Which specification(s) do you currently use?		
	WZDx v3.x		
	WZDx v4.x	WZDx v4.x	
	CWZ v1.0		
	Other (specify)		We currently use the WZDx specification (latest known public release is v4.2). We are aware of the CWZ v1.0 specification could be a potential as a reference for future work.
18	When did you adopt WZDx?	No applicable for our data collection & analysis process.	The WZDx specification (v1.1) was published in September 2018. We collaborated with Bay area MPO on pilot projects. It's on research phase.
19	Why did you adopt WZDx? (problems you wanted solved)	No applicable for our data collection & analysis process.	We adopted WZDx for pilot purpose to standardize work zone data and improve the accuracy, timeliness, and interoperability of information shared with travelers and connected vehicle systems. The primary problems we wanted to address included inconsistent work zone reporting, delayed updates to traveler information systems, and the need to support emerging technologies such as CV/ V2X for enhanced work zone safety and traffic management.
20	Do you plan to transition to CWZ v1.0?	Unsure	
	- Yes in progress		
	- Yes Planned		
	- No		X
	- Unsure		
21	Estimated CWZ adoption timeline:	No applicable for our data collection & analysis process.	
22	Have you started testing or implementing CWZ v1.0?	No.	

Connected Work Zone Verification and Validation Survey Results

Survey Questions		Bentley Systems	Caltrans
23	Who do you look to for deciding when to adopt new technology or standards? (peers, FHWA, vendors, etc.)	Industry standards and publications	

Connected Work Zone Verification and Validation Survey Results

Survey Questions		Bentley Systems	Caltrans
Implementation Process			
24	Describe your process for creating and maintaining a WZDx/CWZ feed.	Crowdsourced imagery from work zones is collected on-demand (per customer requested location, time and duration) and data is analyzed to provided WZDX feed and lane closure information.	Based on our research and pilot projects our process for creating and maintaining a WZDx/CWZ feed may begin with inputting work zone information into the Lane Closure System (LCS) . Once closures are approved in LCS, the data is automatically processed by in-house tools to generate the WZDx/CWZ feed in the required format. We perform regular validation checks to ensure data accuracy and completeness, including verifying location, start/end times, and lane impacts. The feed is updated continuously to reflect any changes, and is monitored for errors or delays to ensure near real-time availability for public-facing applications like QuickMap and connected vehicle systems.
25	How do you ensure feed data is fresh, updated, and accurate?	Dash cam imagery provides near-real time imagery of the selected work zone	We ensure feed data is fresh, updated, and accurate by relying on real-time updates from the Lane Closure System (LCS) . All changes to work zones, including new closures, extensions, or removals, are entered and approved in LCS, which triggers updates to the WZDx/CWZ feed. In addition, we perform automated and manual validation checks to verify location accuracy, lane impact information, and start/end times. The feed is continuously monitored to detect any errors or delays, ensuring near real-time accuracy for public-facing applications and connected vehicle systems.
26	How does a contractor or maintenance team contribute data to your feed?	No contribution from other parties currently	Contractors and maintenance teams contribute data to the feed by submitting work zone information through the Lane Closure System (LCS) . They enter details such as location, lane impacts, start and end times, and any changes or updates. Once the submissions are approved in LCS, the data is automatically incorporated into the WZDx/CWZ feed for near real-time availability

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Survey Questions		Bentley Systems	Caltrans
27	Any back-office/IT concerns with WZDx or CWZ?	None	Some back-office and IT concerns with WZDx/CWZ include ensuring data accuracy and consistency , maintaining real-time feed updates , handling system integration with LCS and other traffic management platforms, and addressing cybersecurity and access control for sensitive work zone information. Additionally, resources are needed to monitor feed health , troubleshoot errors, and implement version updates as WZDx/CWZ specifications evolve.
28	How did you secure your WZDx/CWZ feeds to ensure that only authorized users can access or modify the data?	Only authenticated users create the feed	We secure WZDx/CWZ feeds by controlling access through the Lane Closure System (LCS) , which requires authenticated user accounts for data entry and modification. Only authorized personnel, such as district staff, contractors, and maintenance teams with proper credentials, can submit or edit work zone information. Additionally, network security protocols and system monitoring help protect the feed from unauthorized access or tampering.
Challenges & Gaps			
29	What issues have you faced in deploying your feed?	Unknown	Some issues we've faced in deploying our WZDx/CWZ feed include ensuring timely updates from all work zones , maintaining data accuracy and consistency , and integrating the feed with multiple systems like QuickMap and connected vehicle platforms. Additional challenges include training staff and contractors to correctly enter data in LCS, handling feed errors or formatting issues , and keeping up with updates to WZDx/CWZ specifications

Connected Work Zone Verification and Validation Survey Results

Survey Questions		Bentley Systems	Caltrans
30	Have you noticed any difference in implementability between WZDx and CWZ?	Unknown	Yes, there are differences in implementability between WZDx and CWZ. WZDx is widely supported and focuses on standardized work zone data for connected vehicle and traveler information systems , making it relatively straightforward to implement with existing LCS feeds. CWZ , on the other hand, is newer and more specialized, with additional fields and structure for connected work zones, which can require more development and integration effort . Overall, WZDx is easier to implement in the current workflow, while CWZ may offer more detailed capabilities but with slightly higher implementation complexity.
31	Are there any gaps (e.g., geographic, domain, data elements, or implementation) you can see?	Unknown	Gaps exist in geographic coverage, some specialized data elements, and implementation consistency, including staff training and system integration.
32	Any application areas or use cases you want prioritized?	Unknown	Priority application areas include real-time traveler information, connected vehicle safety warnings, work zone performance monitoring, and traffic management optimization . We would also like to prioritize integration with advanced traffic management systems (ATMS), data analytics for work zone planning, and support for CV/ V2X applications to improve safety and efficiency.

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Survey Questions		Bentley Systems	Caltrans
33	What concerns do you have with the CWZ standard?	Unknown	Some concerns with the CWZ standard include implementation complexity , due to additional fields and structure compared to WZDx, which may require more development and integration effort. There are also potential data consistency and completeness issues , especially when capturing specialized work zone types or lane-specific impacts. Additionally, keeping up with version updates , ensuring staff and contractor training , and integrating CWZ feeds with existing systems like LCS and QuickMap are ongoing considerations.

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Survey Questions		Bentley Systems	Caltrans
Additional Guidance & Support Needs			
34	Where would you like more guidance? (check all that apply)		
	Converting from WZDx to CWZ	Yes	
	Understanding required/optional fields	Yes	
	Data quality validation	Yes	
	Publishing compliant feeds	Yes	
	Vendor/contractor workflows	Yes	
	Security		
	Other (specify)		

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Survey Questions		Bentley Systems	Caltrans
35	What features or enhancements would you like to see added to the CWZ standard?	Unknown	We would like to see the following features or enhancements added to the CWZ standard: Lane-specific impacts and work activity details to better represent complex work zones. Real-time work progress updates to improve the accuracy of traveler information and connected vehicle warnings. Enhanced integration guidance with existing systems like LCS, QuickMap, and ATMS. Clearer definitions for required vs. optional fields to reduce data inconsistencies. Support for contractor/vendor workflows to streamline data submission and validation. Security and access control recommendations to protect sensitive work zone data.
36	Do you see a need for deployment support? What type of support?	NA	Deployment support is needed in technical guidance, staff/contractor training, best practices for feed management, and troubleshooting assistance.
37	Would a test spec/use case test documentation be valuable to you?	Yes	Yes, test specifications and use case documentation would help ensure consistent implementation, data accuracy, and proper training.

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Survey Questions		Bentley Systems	Caltrans
Projects, Funding, and Analysis			
38	What projects are you working on that touch WZDx or CWZ?	Pilot projects with New Mexico DOT & North Carolina DOT is collecting imagery from work zone locations	
39	Have you done any analysis on the standard/spec?	No	
40	Where do you send your feeds? (511, third parties, WZDx Feed Registry, etc.)	WZDX Feed Registry	
41	What grants or funding do you use for work zone activities?	None currently	
V&V Participation			
42	Self-assessment: Compared to other agencies, your CWZ/WZDx implementation is:	NA	
	Advanced / Early adopter		
	Following the lead of early adopters		
	Just getting started / Not currently pursuing, maybe “wait and see”		
43	Are you willing/able/ready to be a validation site (regardless of current agency progress in CWZ implementation)?	NA	
44	Are you willing to share a CWZ feed for V&V testing?	NA	
45	Any related CWZ work we should know about so we don’t duplicate effort?	NA	

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Survey Questions		Ver-Mac	Florida DOT
1	Agency Profile & Role	Device MFG	
	Agency name, region/state/province	Ver-Mac, Quebec Canada and Conroe, TX	Florida Department of Transportation
2	Point of Contact (name, title, email, phone).	Serge Beaudry, VP R&D and Products,, serge.beaudry@ver-mac.com 418-933-6850	JoAnna Hand, FDOT State TSM&O Software Manager; Traffic Engineering and Operations Office; joanna.hand@dot.state.fl.us; (850) 510-5444
3	Your role in work zone data collection/management		
	- Policy/planning		Involved in developing and implementing WZDx through collaboration with other FDOT stakeholders.
	- Technical/data management	X	responsible for Data Exchange Platform for Operational Technology (DEPOT) - formerly V2X DEP which is the central repository for V2X (SAE J2735 vehicle-to-everything) data and has expanded to integrate other important traffic data sources, including traffic counters, microwave detection systems, and probe vehicle data including WZDx feeds. There are other sources of WZDx feeds within the Department.
	- Field operations		Typically little involvement. These primarily are under Construction who we regularly collaborate with. However, currently Regional Traffic Management Center (RTMC) operators have processes for inputting work zone events into the FDOT ATMS, SunGuide. As the SunGuide software manager, JoAnna regularly communicates and coordinates with the RTMC operators on processes and systems.

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Survey Questions		Ver-Mac	Florida DOT
	- Other (specify)		1. FDOT's FL 511 system ingests WZDx and is considered a FL navigation provider with data coming from SunGuide. 2. Data Integration and Video Aggregation System (DIVAS), the FDOT system that provides information directly to WAZE also receives data from SunGuide. 3. DEPOT also receives data from SunGuide. 4. Lane Closure Notification System (LCNS) receives data from contractors who submit their plans for approval for closing lanes during construction and also activate when a lane closure is initiated in the field and when remove it when completed. It should be noted that data and information flows of Work Zone information, including WZDx, are still evolving within the Department.
4	Who is currently in charge of work zone data feeds in your agency?	R&D and Support Department	a. FL 511 – James Landini, Central Office Traffic Engineering and Operations b. DIVAS – James Landini, Central Office Traffic Engineering and Operations c. DEPOT - JoAnna Hand, Central Office Traffic Engineering and Operations d. LCNS – Ryan Buck, Central Office Construction
5	Who championed the adoption of WZDx (if applicable)?	Myself- Serge Beaudry	Previously it was Raj Ponnaluri with these efforts beginning in 2021. Since then, various FDOT groups, including JoAnna in TEO have expanded the adoption and use of these.
	Current Work Zone Data Practices		
6	How many work zones are typically in place at any given time (regardless of worker presence)?	n/a	FDOT has hundreds of active projects that may have construction in them at any one time ranging from small traffic signal, ITS or sidewalk work all the way to complex multi-year, multi-phase design build projects. Utilizing some of FDOTs Active Construction Contract data updated on Dec 1, 2025, there are approximately 530 projects in active construction across the state that may have work zones in place.

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7	How would you describe the distribution of your work zone sizes? (e.g., mostly small, mostly large, a mix)	n/a	FDOT Construction work zones consist of a mix from heavy freeway to arterial. Other work zones on FDOT facilities include those by FDOT Maintenance forces and contractors, utility companies and those operating in FDOT right of way. These last three are typically smaller than FDOT heavy freeway construction. In general, over the past few years, it seems that FDOT has more large projects.
8	What types of work zones do you typically manage? (e.g., mobile operations, long-term closures)	n/a	In the current data we are aware of, Construction is the most dominant. Typically, any long-term work on FDOT roadways have additional capacity provided with additional lanes or with well-developed detour routes. FDOT Construction typically involve overnight or short-duration closures as well as long-term closures. Mobile operations can be part of regular Maintenance practices and potentially some Construction projects. These overnight moving activities could be paving projects with various construction functions occurring with lane closures behind tubular markers. The lanes may be closed, but the work area is concentrated and moving throughout the night.
9	How long are work zones typically in place?	n/a	Typically, lane closures just exist long enough to complete the work during lower volume time periods. This is usually overnight or in some cases off-peak hours. This could be from 8 hours down to just a few hours depending on the capacity analysis. These would normally be utility work, ITS maintenance, minor traffic operations improvements. However, the larger project may be in place for months to years with traffic diversions or additional lanes added with long-term barriers protecting the construction work area.
10	How long are workers typically present within those work zones?	n/a	See response #9 above for overnight closures, diversions, additional lanes added with barrier separation.
11	When are work zones typically active (nighttime, weekends, etc.)?	n/a	For this response we are defining active as those locations where lane closures or capacity reductions occur. Most of our work zone lane closures occur during lower volume time periods where traffic impacts are less severe if lanes are closed. This is typically overnight or sometimes off-peak mid-day. These times for closures and capacity reductions are calculated in advance by the department, and these times are specified to the contractor in specifications.

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Survey Questions		Ver-Mac	Florida DOT
12	Where are your work zones located? (urban, rural, statewide, etc.) Are there any differences you can see with how (or what type of) field devices are deployed depending on area type?	n/a	In general, everywhere. From two-lane, two-way roadways in rural areas, to multilane roadways with complex staging in some of the country's largest and heavily congested areas.
13	Field devices used for work zone data:		
	- Arrow board	X	At this time, these are not providing WZDx device feeds from FDOT. These may possibly be providing information from the contractor/vendor to navigation providers.
	- Camera		Yes – these are present in many major construction projects. At this time, these are not providing WZDx device feeds from FDOT. These may possibly be providing information from the contractor/vendor to navigation providers.
	- Dynamic message sign (DMS)	X	Assuming you mean Portable Changeable Message Signs (PCMS) which can be moved as a trailer. FDOT has these in many construction projects. DMS in FL commonly refers to the large, overhead gantry fixed changeable message signs. At times these DMS's are used to alert motorists by posting work zone conditions – especially to alert motorists in advance of lane and shoulder closures. At this time, both PCMS and DMS are not providing WZDx device feeds from FDOT. These may possibly be providing information from the contractor/vendor to navigation providers.
	- Flashing beacon	X	– Occasionally in special condition projects where beacon with fixed signing are used to call attention to a condition like “Caution – Trucks entering or leaving traffic stream when flashing”. At this time, they are not providing WZDx device feeds from FDOT. These may possibly be providing information from the contractor/vendor to navigation providers.
	- Hybrid sign	X	FDOT does utilize variable speed signs to alert motorists to a different posted speed and/or utilizes speed feedback signs to inform motorists if they are above the posted speed. These can also be part of PCMS systems. At this time, they are not providing WZDx device feeds from FDOT. These may possibly be providing information from the contractor/vendor to navigation providers.

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Survey Questions		Ver-Mac	Florida DOT
	- Location marker	X including GPS beacon and worker's module	Currently FDOT has special Smart Work Zone standard plans which incorporate WZDx devices, aka location markers in the CWZ, at the start and end of projects. These standard plans can be utilized by designers by permission (see WZDx System in "Other, item b below". These may possibly be providing information from the contractor/vendor to navigation providers.
	- RSU		not typically used in work zone plans at this time.
	- Traffic sensor	X	Side-fire radar is used in many current and special SWZ standards to gather speed and volume information for work zone applications. It should be noted that RTMC operators utilize the extensive <i>existing</i> traffic sensor network across the state freeway system to be alerted to slowdowns, capacity reduction and queueing which may reflect planned or unplanned lane closures on the roadway system. Also know that these devices can help track historic speeds and volumes which could be used to support alternate lane-closure times different from the original construction contract. At this time, they are not providing WZDx device feeds from FDOT. These may possibly be providing information from the contractor/vendor to navigation providers.
	- Traffic signal	X	At this time, they are not providing WZDx device feeds from FDOT. These may possibly be providing information from the contractor/vendor to navigation providers.

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Survey Questions		Ver-Mac	Florida DOT
	Other (specify)	AFAD	a. Motorist Awareness System (MAS). System used to inform motorists of speed and provide feedback on worker presence, posted speed and motorist speed. i. Portable Changeable Message Sign (PCMS) to alert of speed reduction and worker presence. ii. Portable Regulatory Sign (PRS) with fixed posted speed reduction and amber flashing lights “when flashing” to direct motorists to slow to speed shown. iii. Radar Speed Display Unit (RDU) with the fixed posted speed reduction plus a radar speed variable display to show motorists how fast they are traveling. b. WZDx System – essentially a location marker as above to provide start and end location of work zone and additional details. c. Queue Warning System (QWS) – Series of PCMSs and speed detection devices to detect speeds and queue build ups and warn motorists of downstream queues in advance of slowdowns or stopped traffic in work zones. d. Dynamic Lane Merge (DLM) - Series of PCMSs and speed detection devices in the area of lane drop to support the activation of messages for motorists to merge early or late depending on traffic flow and current roadway capacity e. Dynamic Speed Harmonization (DSH) - Series of PCMSs, speed detection devices and speed feedback signs to communicate speed reductions to motorists as they approach congestion and cause them to reduce speed to facilitate smoother traffic flows through the work zone.
14	What’s the current response time for updating work zone data feeds based on changes to the work zone? Is that different from your ideal response time?	Within 1 minute	Data feed responses vary depending on the application. Some applications require human verification before automated messages can be posted, while others are transmitted and posted immediately with automated processes. Data feeds to WZDx may also be immediately posted depending on the source and system.
15	CV/V2X technology experience:	We are pushing to Waze (who send to google sometime) and onboard some vehicle with HAAS Alert	
	- Pilots	X	FDOT is not aware of these or have any CV/V2X pilots in WZ’s. However, we have several CV/V2X-related pilot projects.
	- Implementations	X	same as previous
	- Other (specify)		NA
	- Briefly describe the experience here		
16	Platforms/software used to create work zone data feeds:		

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Survey Questions		Ver-Mac	Florida DOT
	- In-house tools		DEPOT is a state-owned software that provides an API feed. Support is provided by Southwest Research Institute (SwRI).
	- Vendor system	X - our system	LCNS above is provided by One.Network.
	- Other (specify)		
WZDx/CWZ Adoption & Status			
17	Which specification(s) do you currently use?		
	WZDx v3.x		No.
	WZDx v4.x	X	yes – WZDx 4.2, for DEPOT
	CWZ v1.0	X	No.
	Other (specify)		NA
18	When did you adopt WZDx?	4 years ago	FDOT adopted the use of WZDx in 2022. Since then, we have been working to implement feeds in other platforms and expansions.
19	Why did you adopt WZDx? (problems you wanted solved)	to report location of work zone devices and their data	To distribute work zone information more broadly to motorists – over more areas of the state and further in advance of the actual work zone signing. Wanted to take advantage of connected vehicles or similar application capabilities for the safety of workers and motorists,
20	Do you plan to transition to CWZ v1.0?		
	- Yes in progress	already done	
	- Yes Planned		as soon as finalized.
	- No		
	- Unsure		
21	Estimated CWZ adoption timeline:	<u>done</u>	TBD
22	Have you started testing or implementing CWZ v1.0?	yes	no, waiting for the guidance and protocols for this to have more time for testing and evaluation by others.

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Survey Questions		Ver-Mac	Florida DOT
23	Who do you look to for deciding when to adopt new technology or standards? (peers, FHWA, vendors, etc.)	Early adopters and standards	Looking for further confirmation of the published standards and how these are being applied by other agencies. FHWA or other standards agencies could help to educate and promote these to the agencies. We work out the details of new technology or standards so we can make sure it can be accomplished within all areas affected in FDOT and with our Florida stakeholders. The new technology or standards must be actionable and scalable for the Department and must meet our needs. Other considerations are will others within the state use these and will these technologies and standard change over time.

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Survey Questions		Ver-Mac	Florida DOT
Implementation Process			
24	Describe your process for creating and maintaining a WZDx/CWZ feed.	All of our device are pushing their data real time. We have a tool to setup feed based on project or geography, type of devices, extends of the data and update periods desired by the requester	We are in the process of gathering this information from various sources including 1.) the overall project schedule, 2.) the specific work zone schedule, 3.) the “active” condition of the work zone based on construction or lane closure information, 4.) the posted or changed speed condition, 5.) the presence of workers in the work zone. We need to make sure we are able to collect good data, create and maintain a feed, make sure we have and are following good standards so when we communicate it out to the motoring public it is safe and reliable information.
25	How do you ensure feed data is fresh, updated, and accurate?	Our device are always connected and pushing changes on demand + periodic health check. Data includes timestamps for each devices	Department is still in development of these practices and approaches. Our API is public, and we work to follow the available standards and make sure it is delivered in real time. We use checks to make sure it is not stale, we confirm visually first with RTMC operators with our extensive camera network.
26	How does a contractor or maintenance team contribute data to your feed?	Using our devices. No extra steps	Still in development. Most effort at this time is focused on construction project activities. Note that some construction and maintenance contractors in the state have devices that are capable of communicating directly with navigation providers to inform motorists of work zones.

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Survey Questions		Ver-Mac	Florida DOT
27	Any back-office/IT concerns with WZDx or CWZ?	No	Currently we are working through both the tool development/refinement along with the processes various branches of FDOT must share in to assign proper responsibilities. Naturally, we have data quality concerns that must be addressed when we are pulling data from sources outside of Department. In particular, we need to consider data on our roadways that go directly from vendors to the navigation providers where we are outside of the loop. We need to understand what a good, comprehensive feed is and how it can be maintained. We need to understand how to refine how we comprehensively collect and share data. Also need to understand the need for and how to implement compatibility among various vendors which may be through national standardization.
28	How did you secure your WZDx/CWZ feeds to ensure that only authorized users can access or modify the data?	Credentials are required to access the feed.	FDOT's trained TMC operators utilize our secure ATMS, SunGuide, to input data into the feeds through secure data tunnels.
Challenges & Gaps			
29	What issues have you faced in deploying your feed?	None	See some of responses above. Our feeds for freeways are well established and understood. As we expand into arterial deployments, we lack the same depth of infrastructure which makes a similar level of deployment and monitoring more difficult.

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Survey Questions	Ver-Mac	Florida DOT
30 Have you noticed any difference in implementability between WZDx and CWZ?	Minor	NA
31 Are there any gaps (e.g., geographic, domain, data elements, or implementation) you can see?	What is missing is representing in the device feeds the location of conventional asset that impact the workzone. EX: conventional speed limit sign, end of work zone, shift lanes, etc... fundamentally they are not different from a digital speed limit and end of Work zone GPS beacon, etc..	Currently there are some geographic, data elements for internal department reference. Need to consistently refer to same project including the project limits along the roadway and the time/duration that the project is planned to be under construction. From there we will be able to drill down to work zone level events and activities.
32 Any application areas or use cases you want prioritized?	The one above. This would provide a way better definition of what is going on on the road.	Construction has indicated lane closure, speed reduction and worker presence. We also need to have a consistent and comprehensive feed of data/information.

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Survey Questions		Ver-Mac	Florida DOT
33	What concerns do you have with the CWZ standard?	Slow adoption by the agency to use the device feed as a way to confirm the jobs on going.	How to implement/communicate to all agency stakeholders so we can reach consistent understanding and develop accepted, repeatable processes as we work to inform motorist. From our understanding there are still things being worked out with the CWZ standard and we need to understand the ramifications of the fluid nature of possible changes or things still to be more fully defined.

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Survey Questions		Ver-Mac	Florida DOT
Additional Guidance & Support Needs			
34	Where would you like more guidance? (check all that apply)	none	
	Converting from WZDx to CWZ		Yes.
	Understanding required/optional fields		Would like to understand these so we can implement the ones that are essential to FDOT goals for construction – lane closure, speed
	Data quality validation		Possibly.
	Publishing compliant feeds		NA.
	Vendor/contractor workflows		Possibly
	Security		Possibly.
	Other (specify)		

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Survey Questions		Ver-Mac	Florida DOT
35	What features or enhancements would you like to see added to the CWZ standard?	See 31	Unsure. at this time.
36	Do you see a need for deployment support? What type of support?	no	Possibly to get an understanding of what is being done nationally for comparison. Pilot projects and lessons learned by others could be helpful in this. These could include a better understanding of how field
37	Would a test spec/use case test documentation be valuable to you?	Not for us, but would be valuable for new people	Unsure.

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Survey Questions		Ver-Mac	Florida DOT
Projects, Funding, and Analysis			
38	What projects are you working on that touch WZDx or CWZ?	Sending all lanes closures nationwide to Haas Alert. Using device data including workers to trigger “active” workzone in a 3 rd party ATMS software.	FDOT’s source that feeds WZDx is DEPOT.
39	Have you done any analysis on the standard/spec?		Yes – we have reviewed it and adopted for WZDx 4.2.
40	Where do you send your feeds? (511, third parties, WZDx Feed Registry, etc.)	(511, third parties, WZDx Feed Registry, etc.) third parties	FDOT sends our feeds from DEPOT to WZDx Feed Registry and is a public API available to any navigation providers. The Lane Closure Notification System (LCNS) provides a feed to third party navigation
41	What grants or funding do you use for work zone activities?	Internal money.	FDOT has not received any Federal grants.
V&V Participation			
42	Self-assessment: Compared to other agencies, your CWZ/WZDx implementation is:		
	Advanced / Early adopter	X	
	Following the lead of early adopters		Yes.
	Just getting started / Not currently pursuing, maybe “wait and see”		
43	Are you willing/able/ready to be a validation site (regardless of current agency progress in CWZ implementation)?	Yes	No/Unsure.
44	Are you willing to share a CWZ feed for V&V testing?	Yes	Not at this time.
45	Any related CWZ work we should know about so we don’t duplicate effort?		NA