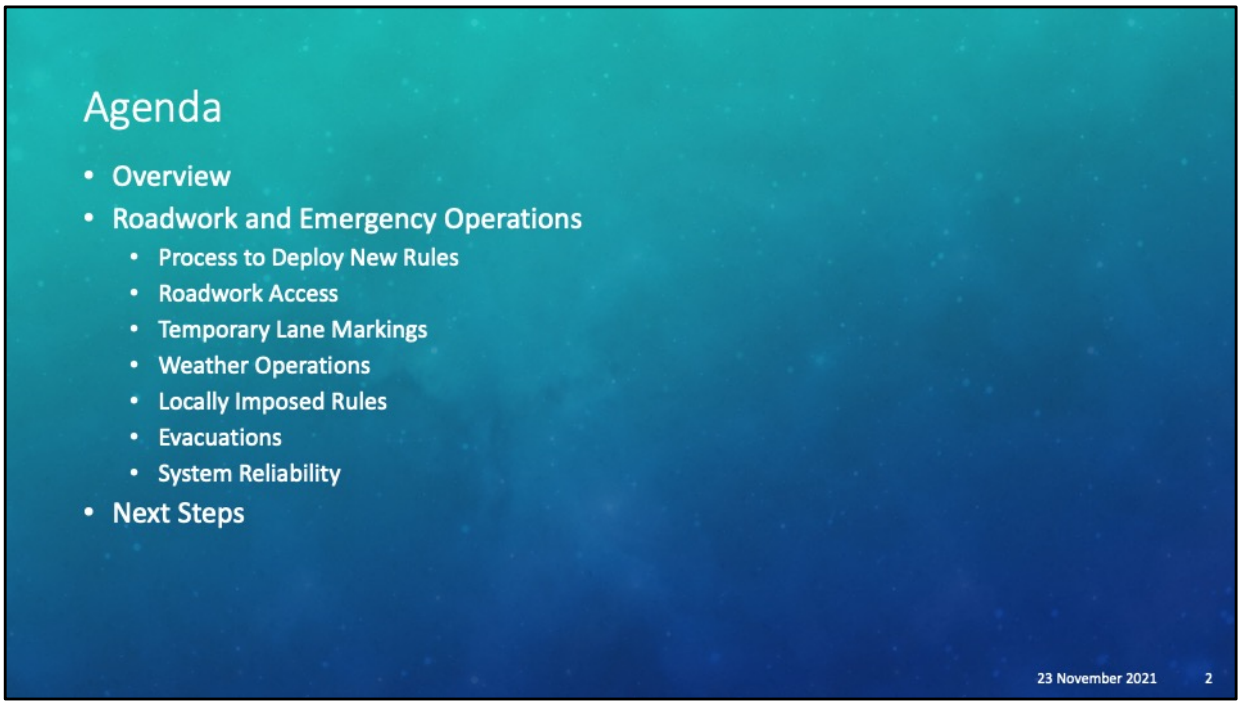
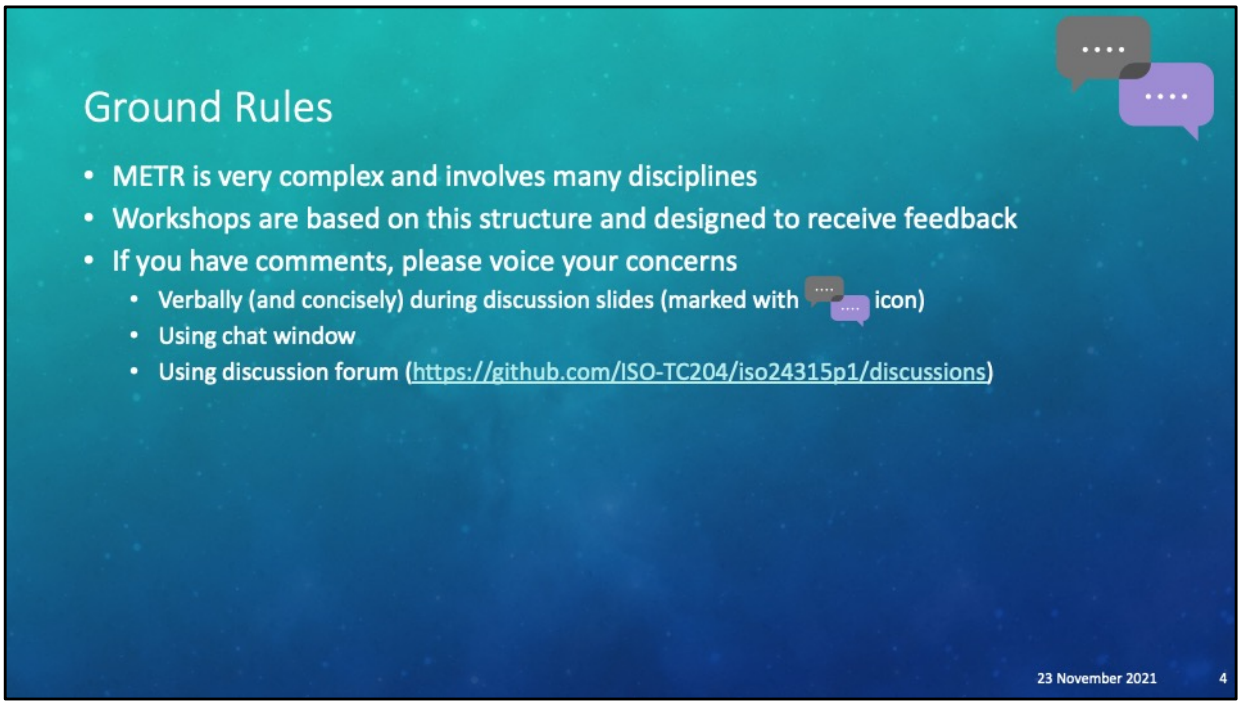
Welcome to the ninth workshop on METR. Today we will talk about roadwork and emergency operations.



The topics today are listed on this slide

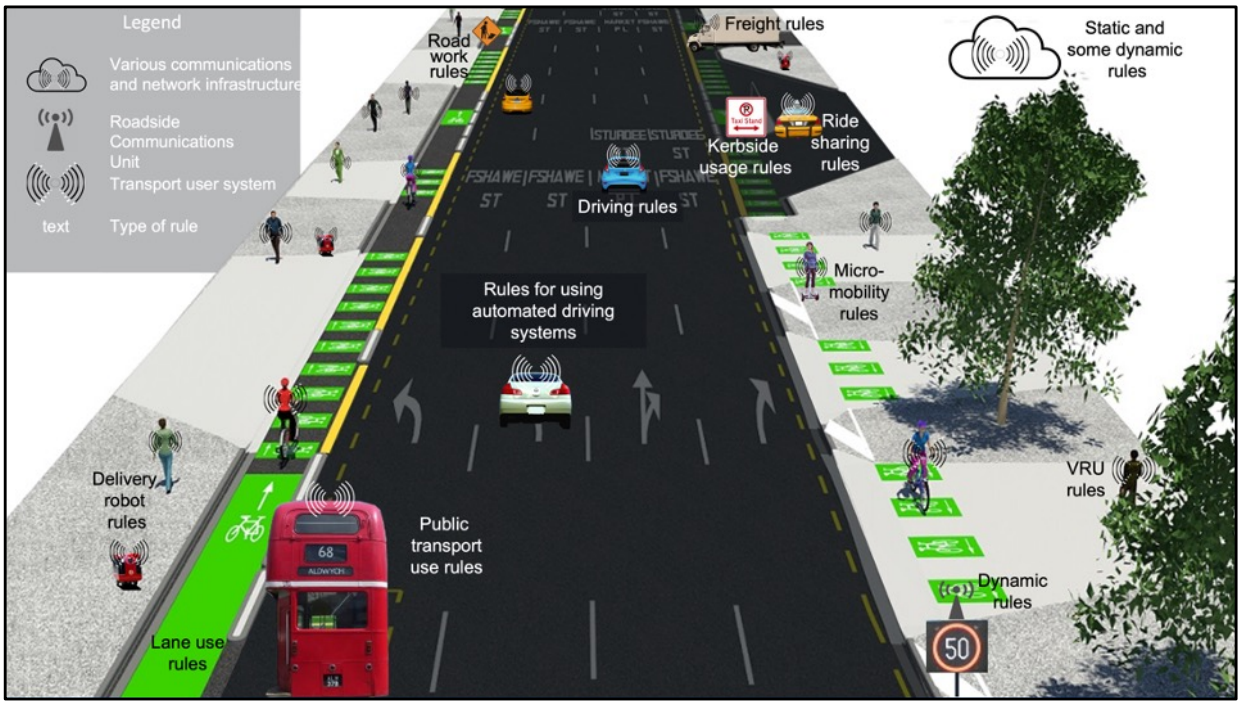
It is important to acknowledge that the materials developed to date represents a team effort. While there is a core editing group, as shown in the upper left, the concepts presented within this presentation already reflect valuable inputs from the review team shown on the right. In addition, the overall document is being prepared under the auspices of ISO/TC 204/WG 19, and especially its METR Drafting Team.



Before we begin, it is useful for everyone to understand the ground rules of our conversation. The development of the ConOps is intended to be a cooperative effort that reflects the input from stakeholders from different perspectives. To facilitate this process, the development team has prepared the workshops to gain feedback from stakeholders – but your feedback does not have to be limited to the topics presented.

The workshops are generally structured to present a topic and then gain feedback. Participants are welcome to voice their concerns during the workshop presentations, either verbally or using the chat window, but we request that verbal feedback is made when we are on discussion slides. We also recognize that our workshops are time limited and comments should be kept fairly concise. If major topics of discussion arise we can schedule additional meetings to focus on specific points, as needed. We have also established a discussion forum on the Github site to promote off-line conversations and encourage everyone to use the facility,

After we complete the workshops, we expect to prepare a draft ConOps early next year, and there will be ample opportunity for additional comments on the document once distributed.

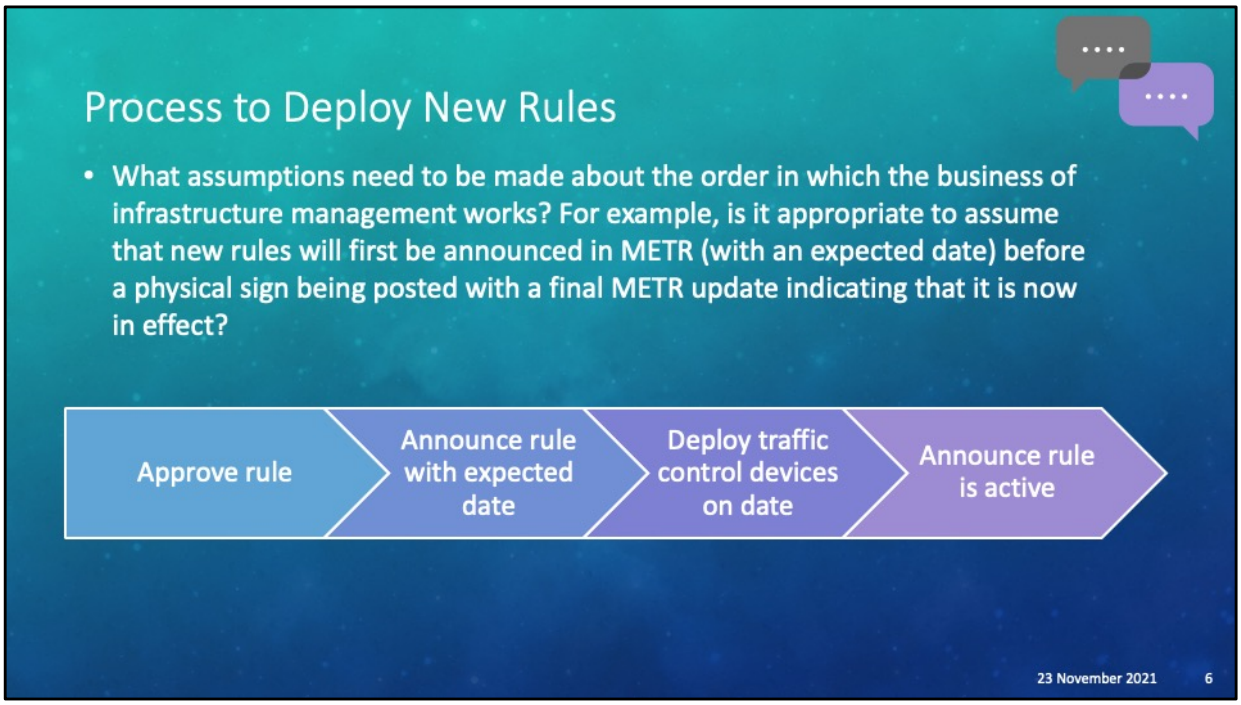


METR is intended to support all transport user systems. This includes: vehicle systems (e.g., automated driving systems and driver support systems), sidewalk delivery robots, and other devices such as smartphones used by pedestrians and perhaps units on-board micromobility devices (e.g., e-scooter interfaces)

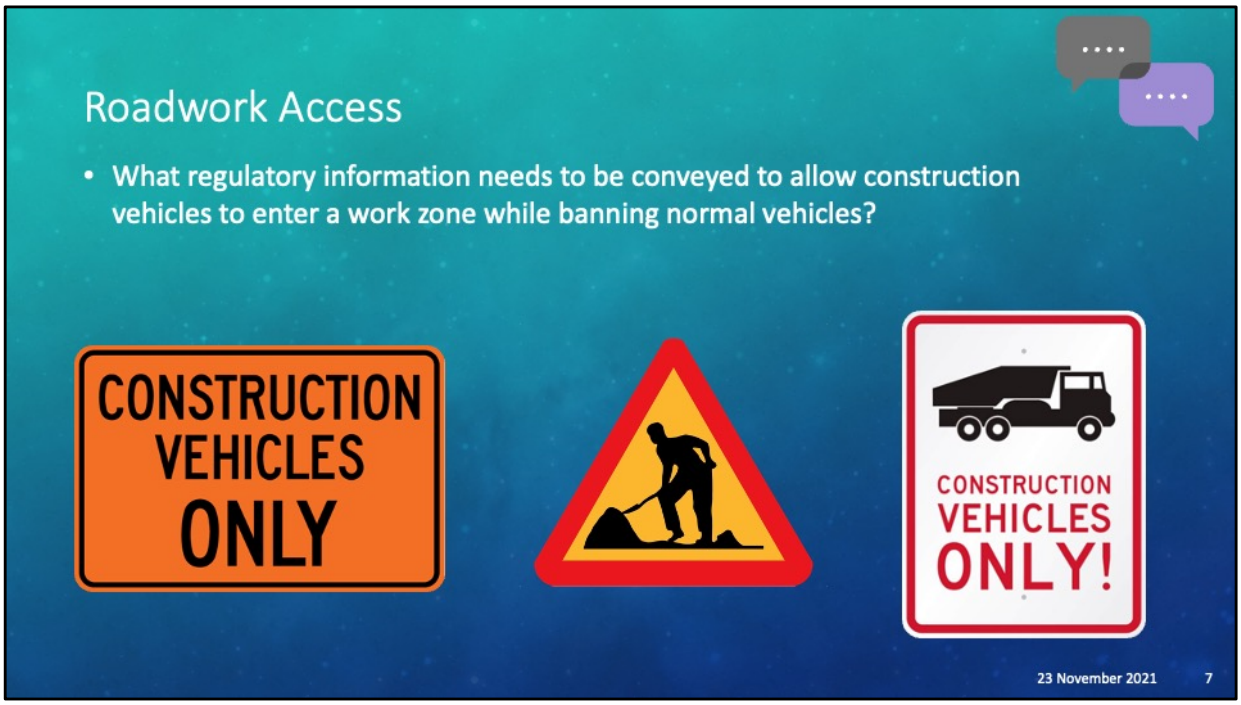
The information provided to these users would potentially include all rules related to using the transport facilities, such as (from top and proceeding clockwise) any special rules for freight delivery or for the operation of heavy vehicles, kerbside usage rules (e.g., bus stop, taxi stand), ride sharing rules (e.g., what forms of ride sharing are allowed), micromobility rules (e.g., are e-scooters allowed in cycle lanes), VRU rules (e.g., is the sidewalk closed to pedestrians), dynamic rules (e.g., variable speed limits, lane control signals), public transport use rules (e.g., does my ticket quality me for a transfer, what are the fare zones), lane use rules (e.g., bike only, bus only, HOV-2), delivery robot rules (e.g., what is the maximum speed for a delivery robot for this sidewalk), road work rules (e.g., speed limit for the work zone). METR is intended to be flexible enough to address all of the transport rules, these are just a few examples that demonstrate the breadth of the effort.

Importantly, in order to cover all rules, the scope must include rules that can change

or be imposed in a dynamic fashion. For example, temporary lane closures due to unplanned incidents and signal timing information need to be considered and handled in a trustworthy way, even when long-range communications may not be available. Thus, the full scope of METR will likely need to rely on both cloud based delivery mechanisms as well as local broadcast of exceptional data.



The first question for discussion today deals with what assumptions need to be mode about the process to implement a new rule (e.g. installing a new sign).

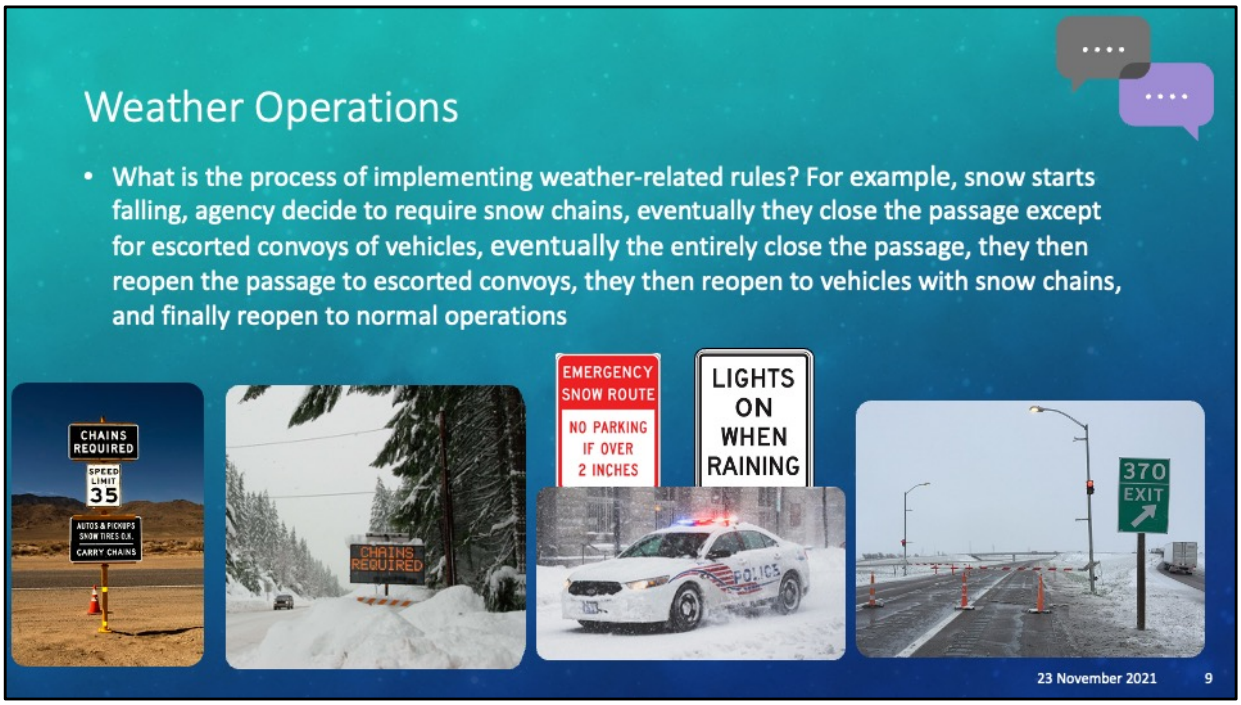


Within work zones, some signs relate to accessing the work zone itself. Does METR need to support any specific features related to these types of rules?

CV Only sign - https://www.signsworldwide.com/images/detailed/4/Construction-Vehicles-Only-sign.jpg
Work zone - https://freesvg.org/img/ryanlerch_Workman_Ahead_Roadsign.png
CV2 Only Sign - https://www.myparkingsign.com/CST/Construction-No-Parking-Signs

Within work zones, lanes are often shifted to allow for proper worker safety distances. The pavement markings can often be confusing as to which is considered the current markings versus the ones being overridden. Is this issue within the scope of METR, and if so, what features does METR need to support to handle these details.

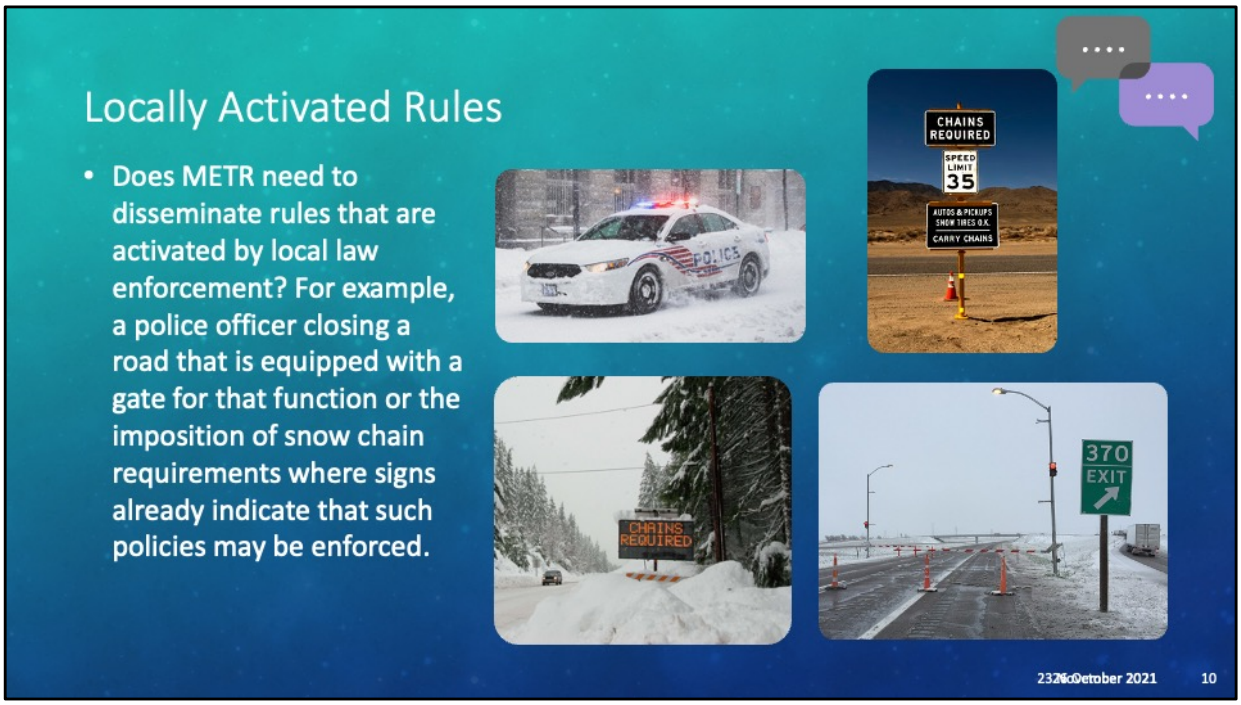
Intersection - https://www.workzonesafety.org/training-resources/fhwa_wz_grant/atssa_temporary_pavement_markings/
Carriageway - http://www.workzonesafety.org/training-resources/fhwa_wz_grant/atssa_temporary_pavement_markings
Faded markings - https://c1.staticflickr.com/7/6049/6235123387_f4479bda2f_b.jpg



Some rules are implemented in stages. For example, this slide shows how a facility might transition from normal operations to road closure. What features does METR need to support to allow for this type of operation?

Emerg Snow Route sign – https://www.signoutfitters.com/EmergencySnowRouteNoParkingIfOver2InchesSign18x24.aspx
Lights Raining sign – https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/mutcd2009r1r2edition.pdf
Chain sign - https://www.flickr.com/photos/curtisperry/7086781795
Dynamic chain sign - https://upload.wikimedia.org/wikipedia/commons/a/a6/Chains_required_(4046720333).jpg
Police vehicle - https://www.flickr.com/photos/sgreeneptx/23978673723/
Snow swing gate - https://upload.wikimedia.org/wikipedia/commons/thumb/f/f7/2015-05-09_18_53_21_Gate_and_cones_blocking_the_main_lanes_of_Interstate_80_during_a_late_spring_snowstorm_at_Exit_370_in_Archer%2C_Laramie_County%2C_Wyoming.jpg/1200px-2015-05-

09_18_53_21_Gate_and_cones_blocking_the_main_lanes_of_Interstate_80_during_a_late_spring_snowstorm_at_Exit_370_in_Archer%2C_Laramie_County%2C_Wyoming.jpg



When rules are activated locally (e.g., deployment of an existing gate or message sign), how should METR respond?

Emerg Snow Route sign – https://www.signoutfitters.com/EmergencySnowRouteNoParkingIfOver2InchesSign18x24.aspx
Dynamic chain sign - https://upload.wikimedia.org/wikipedia/commons/a/a6/Chains_required_(4046720333).jpg
Police vehicle - https://www.flickr.com/photos/sgreeneptx/23978673723/
Snow swing gate - https://upload.wikimedia.org/wikipedia/commons/thumb/f/f7/2015-05-09_18_53_21_Gate_and_cones_blocking_the_main_lanes_of_Interstate_80_during_a_late_spring_snowstorm_at_Exit_370_in_Archer%2C_Laramie_County%2C_Wyoming.jpg/1200px-2015-05-09_18_53_21_Gate_and_cones_blocking_the_main_lanes_of_Interstate_80_during_a_late_spring_snowstorm_at_Exit_370_in_Archer%2C_Laramie_County%2C_Wyoming.jpg

Ad-Hoc Rules

- Is there a need to support a local regulator, such as a police officer, imposing an ad-hoc rule, such as redirecting traffic due to an incident?
- How should a user system determine precedence among ad-hoc rules and static/temporary rules?

How does METR become aware of and publicize ad hoc rules?

https://s0.geograph.org.uk/geophotos/05/01/17/5011714_afb0a475.jpg

Compromises to Infrastructure

- Does METR need to accommodate rules related to compromised infrastructure (e.g., collapsed bridge, flooded road, avalanche covered roadway) that are longer term?

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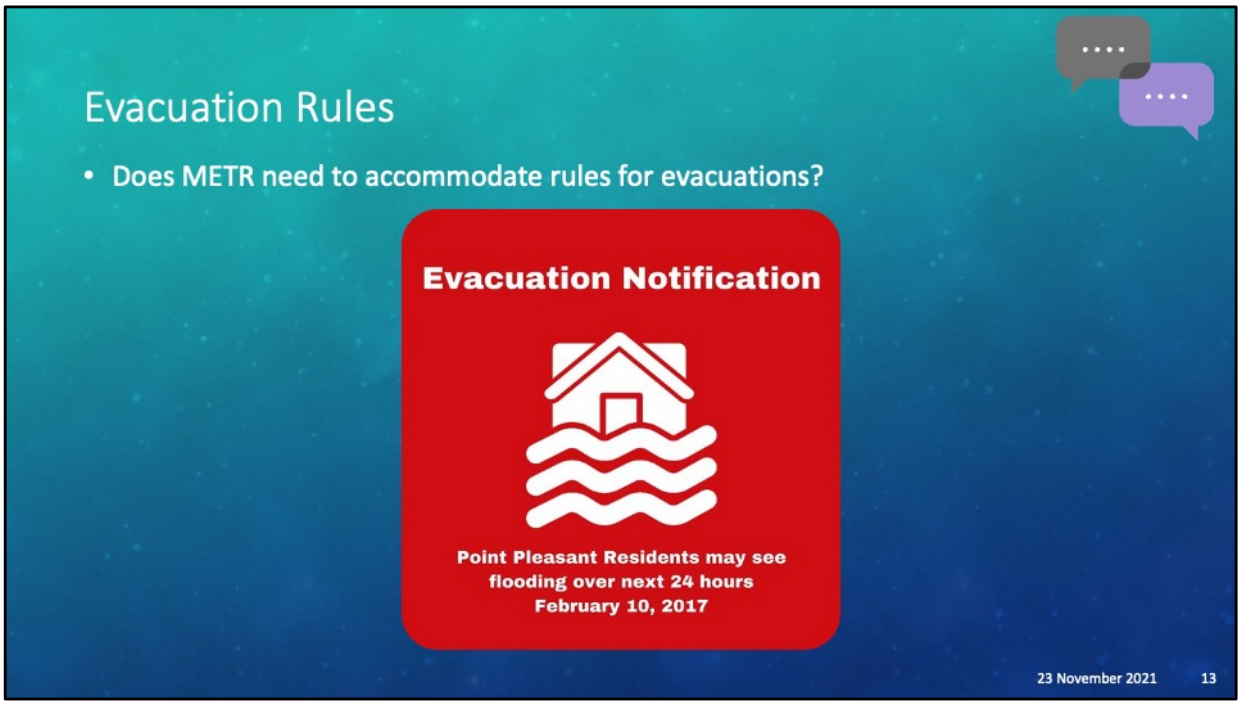
Are there any differences that need to be considered when facilities are closed for a long period?

Tacoma Narrows - https://thumbs.gfycat.com/CoordinatedImpossibleFlycatcher-size_restricted.gif
I-35 bridge, Minneapolis - https://upload.wikimedia.org/wikipedia/commons/thumb/6/6b/I35_Bridge_Collapse_4crop.jpg/800px-I35_Bridge_Collapse_4crop.jpg
Road closed sign - https://upload.wikimedia.org/wikipedia/commons/1/18/Road_closed_sign_winter.jpg
Flooded road - https://www.flickr.com/photos/mysticwales/2372892853



Should METR address evacuation scenarios? For example, should it address the definition of evacuation zones, evacuation routes, and traffic rules on those routes?

https://www.saccounty.net/news/latest-news/PublishingImages/PointPleasantEvacNotification02102017.png

Overriding Traffic Control Devices

- To what extent should METR accommodate situations when normal rules do not apply due to special circumstances, such as driving on the wrong side of the freeway during an evacuation scenario, i.e., a higher priority rule?

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To what extent does METR need to deal with rules that override other rules (e.g., reversible flow lanes, perhaps due to an uncommon evacuation scenario)?

https://upload.wikimedia.org/wikipedia/commons/thumb/5/52/I-93ContraflowLaneReversalConcordNH.jpg/275px-I-93ContraflowLaneReversalConcordNH.jpg

How stable and resilient does the METR network need to be? What happens if METR information is not available and how critical is it during times of disaster?

bridge - https://upload.wikimedia.org/wikipedia/commons/9/9d/Bay_Bridge_collapse_2.jpg
flood - https://upload.wikimedia.org/wikipedia/commons/5/50/Hurricane_Katrina_Flooding.jpg
wildfire - https://gamepedia.cursecdn.com/pwi_gamepedia_en/d/d0/Wildfire.png


NEXT STEPS
23 November 2021
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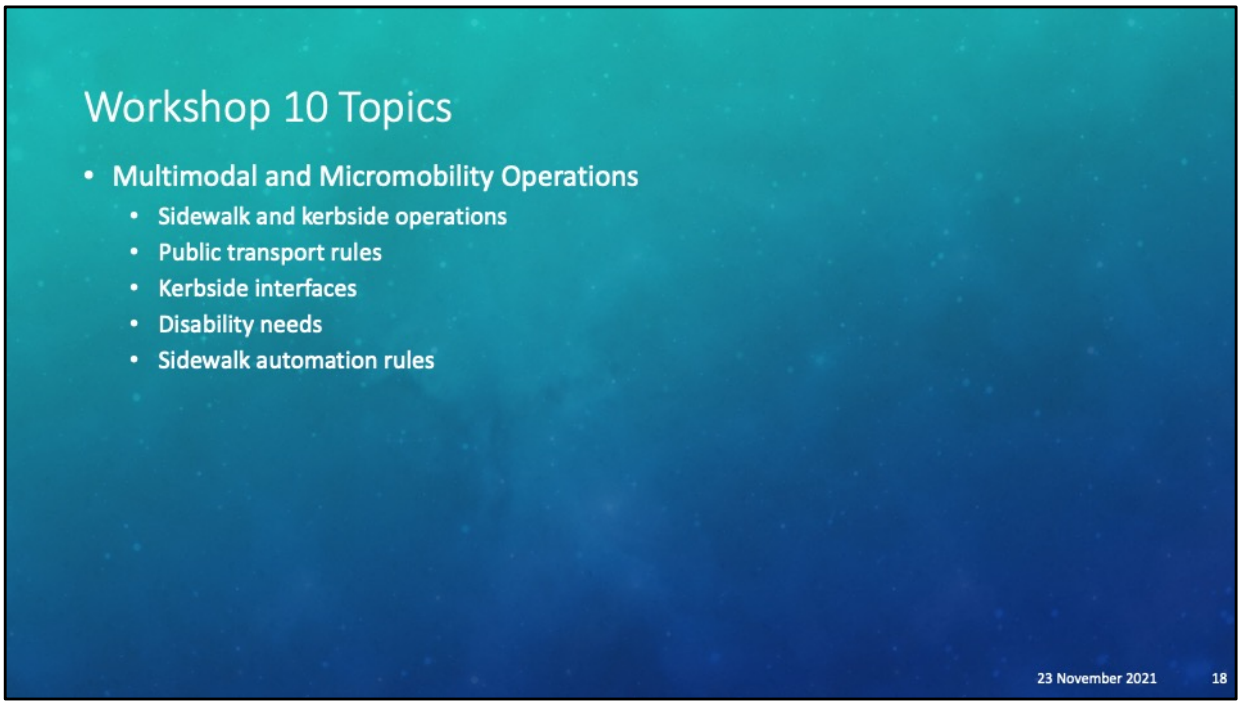
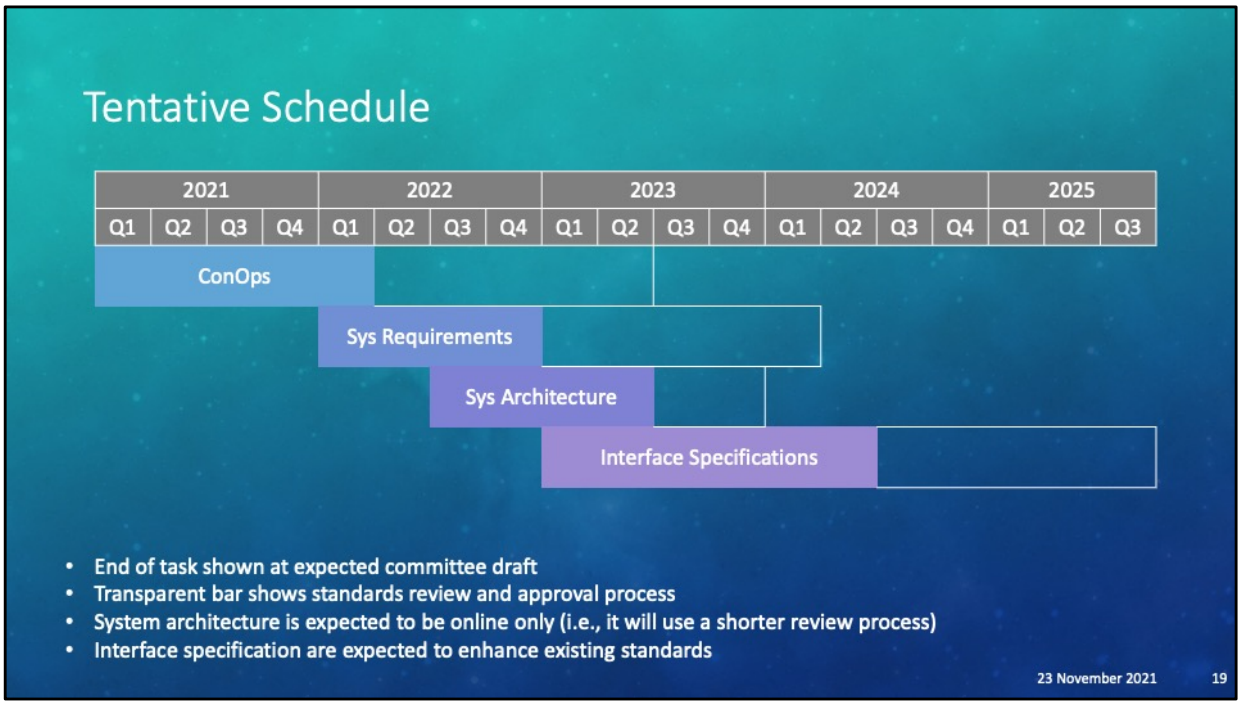
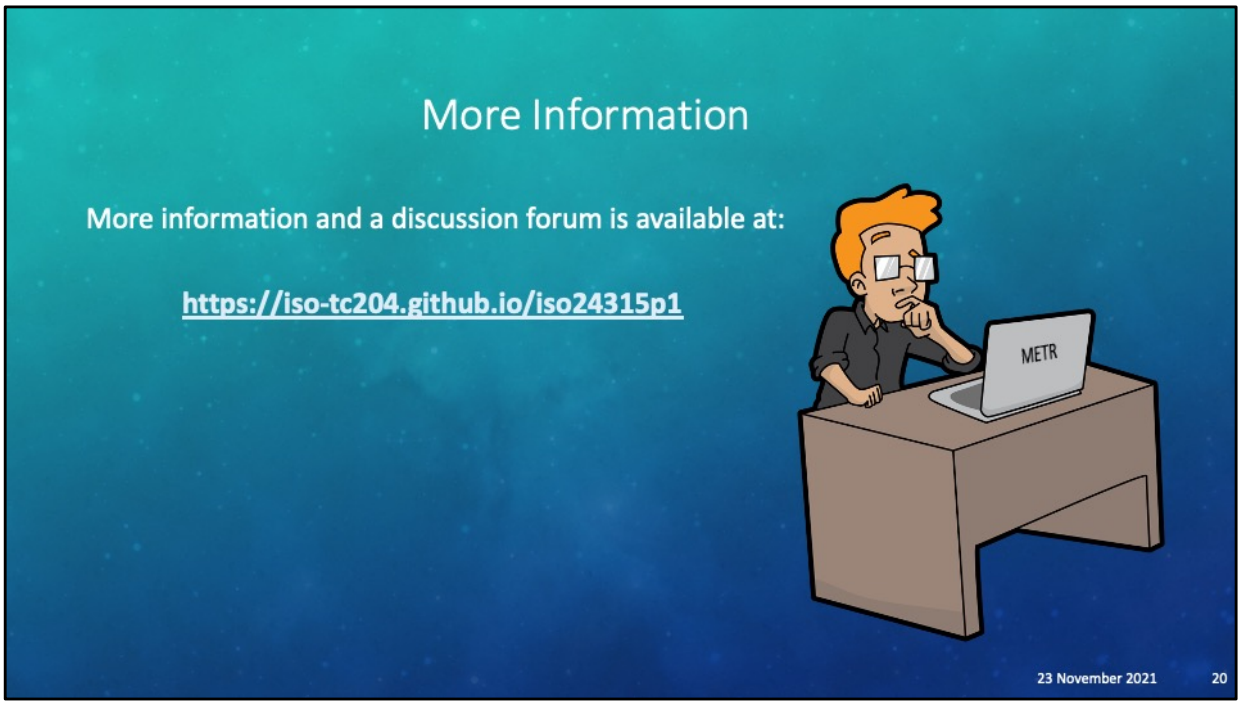
We've now completed 9 of our 12 workshops. Our next workshop will focus on roadwork and emergency operations



The next workshop will focus on the topics shown on this slide



As a reminder our current expected timeline is shown here. We hope to have a ConOps draft in early 2022, whereupon it will start the standardization process (of multiple reviews prior to standardization)



More information about the project and the latest developments will be posted on our GitHub site. This will include a PDF of weekly presentation files to be posted after our meetings each week.

https://upload.wikimedia.org/wikipedia/commons/thumb/2/24/Cartoon_Guy_In_Deep_Thought_Using_A_Computer.svg/1200px-Cartoon_Guy_In_Deep_Thought_Using_A_Computer.svg.png