



# 2020 NJDOT TRB Annual Meeting Recap

February 13, 2020



**TRBA** 2020  
ANNUAL MEETING

99<sup>TH</sup> Annual Meeting  
Washington, D.C.  
January 12–16, 2020

**MIKE RUSSO**  
**ASSISTANT COMMISSIONER**  
**PLANNING, MULTIMODAL & GRANT ADMINISTRATION**

**ANDY SWORDS**  
**DIRECTOR**  
**DIVISION OF STATEWIDE PLANNING**

# www.NJDOTtechtransfer.net



BUREAU OF RESEARCH

## NJDOT Technology Transfer

[Home](#)[NJ STIC](#)[Tech Talks!](#)[Share Your Ideas](#)[Research](#)[Resources](#)[Calendar](#)

### Events

Other events that provide knowledge transfer opportunities to increase awareness of innovative ideas, research findings, and best practices include the NJDOT Annual Research Showcase, lectures, and expert interviews, among others.



#### Tech Talk! Micromobility's Launch in NJ and Beyond

📅 January 9, 2020

This Tech Talk Event will explore the current state of micromobility as a shared transport option in the U.S. and highlight recent research on cities ...



#### 21st Annual NJDOT Research Showcase

📅 October 31, 2019

The 21st Annual NJDOT Research Showcase was held on October 23rd highlighted the ongoing research, initiatives and benefits of the NJDOT Research program. ...



#### Tech Talk! Green Infrastructure in Transportation

📅 June 19, 2019

The NJDOT Bureau of Research hosted a half-day Tech Talk! Event, Green Infrastructure in Transportation, that highlighted examples of transportation-related green infrastructure projects that



#### 2019 NJDOT TRB Roundtable Discussion

📅 February 15, 2019

Presentations and session notes provided by NJDOT staff who attended the 2019 TRB Annual Meeting are posted and organized by their bureau or unit. ...





## OBJECTIVES FOR TODAY

1. Introduction to TRB and the Annual Meeting
2. How to Attend /Get Involved with TRB
3. Recap (Transfer of Knowledge)
4. Questions & Open Discussion



# INTRODUCTION TO TRB

- Division of the **National Research Council**
- Administered by **National Academies** of Sciences, Engineering, and Medicine
- Funded by **state DOTs**, federal agencies including the U.S. DOT, and other organizations and individuals interested in the development of transportation.

# TRB COMMITTEES & PANELS

- Over **200 committees**, almost every transportation topic is represented
- Provide you with an **opportunity to contribute** to advancing the state of the art and the state of the practice in transportation.
- Visit [www.TRB.org/AboutTRB/Committees.aspx](http://www.TRB.org/AboutTRB/Committees.aspx) for a list



# TRB COMMITTEES & PANELS

- Create an account on [www.mytrb.org](http://www.mytrb.org)
- **Contact the Chair** to express interest and share your qualifications
- Become a **“friend”** of the committee. Membership requires a formal process, however participation in committee activities is not limited to members.
- **Participate** in committee meetings and conference calls
- **Volunteer your time** to review papers, work on committee projects, give presentations, etc.
- When a member space opens up, Chair looks at list of “friends”



# TRB ANNUAL MEETING



Held every January in Washington, D.C.

**January 24-28, 2021** 100<sup>th</sup> Annual Meeting

Registration opens late August (program finalized mid Nov)

One of the largest transportation conferences in the world,

- featuring approximately 5,000 presentations in more than 800 conference sessions.

***Virtually every aspect of transportation is covered at the conference.***

# BENEFITS OF ATTENDING

Benefit to you, NJDOT, and the transportation community at large

- **Networking** with colleagues and establishing professional relationships
- Broaden **knowledge** and perspectives
- Receipt of valuable and timely information about **current practices**
- Gain early awareness of **new research findings** and **emerging technologies**
- Assist NJDOT in **contributing to the broader transportation community**

# HOW DO I ATTEND THE TRB ANNUAL MEETING?

- Registration for NJDOT staff is **FREE**, but **travel expenses are NOT**.
- Registration opens in late August. To register, you can EASILY set up an account on [www.mytrb.org](http://www.mytrb.org)
- Attendees must coordinate with their respective Managers and Directors to express interest in attending, and **get permission**.
- Travel expenses (transportation, lodging, per diem meals) must be planned for within each unit's own travel budget. **PLAN NOW, TRAVEL BUDGET PROJECTIONS ARE OCCURING NOW.**
- Stephanie Nock is the travel coordinator and manages the travel paperwork for TRB attendees. Your travel coordinator should work with her.
- Emails and notifications about the event will start in late Summer
- Travel Packages are due to Stephanie early-mid October



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# DIVISION OF MULTIMODAL SERVICES

## OFFICE OF MARITIME RESOURCES

**Aiden Rogers**  
**Vincent Masciandaro**



# Introduction

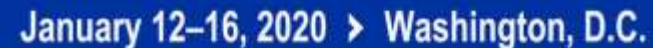
- Work in the Office of Maritime Resources
- Our main focus was to find classes directly related to transportation through waterways
- Attended seminars covering the following topics:
  - Current Research in Marine Environmental Issues
  - Inland Water Transportation
  - Concrete pH Profiles in Marine & Freshwater Environments
  - Utilizing Agent-based Modelling to Evaluate Operational Impacts of an Incident & Possible Alternatives on U.S. Waterways

The logo for the Transportation Research Board (TRB) 2020 Annual Meeting. It features the letters "TRB" in a large, bold, blue font, followed by a stylized blue line graph that trends upwards and to the right, with the year "2020" written in small blue text above the peak of the graph. Below this, the words "ANNUAL MEETING" are written in a smaller, blue, sans-serif font.

**TRB** 2020  
ANNUAL MEETING

The logo for the Transportation Research Board. It consists of the words "Transportation" and "Research Board" stacked vertically in a white, bold, sans-serif font, set against a solid black rectangular background.

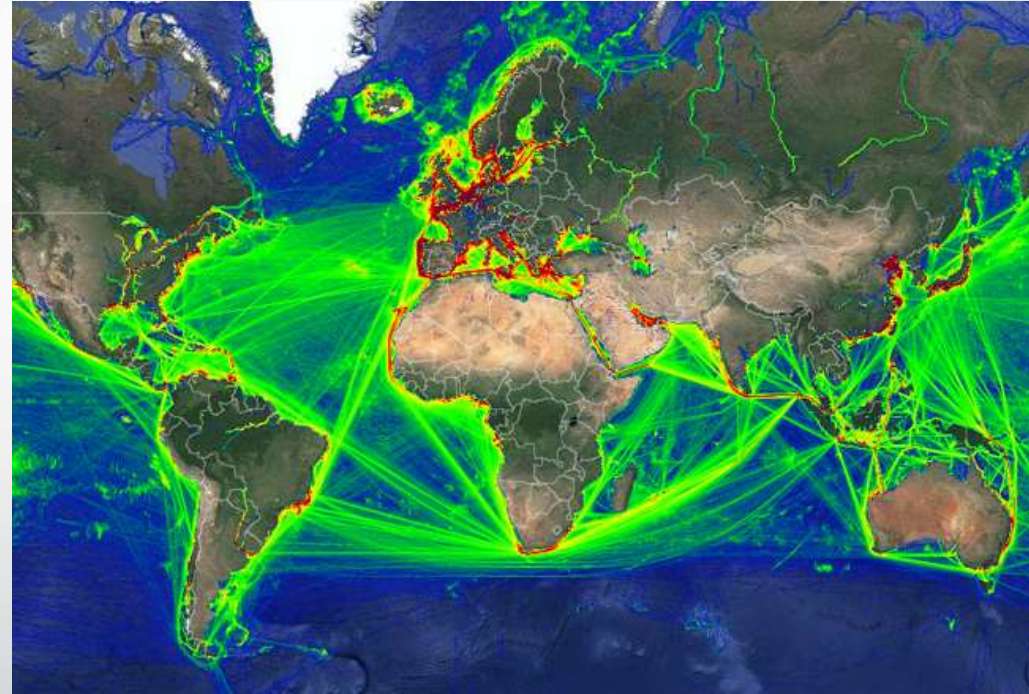
**Transportation  
Research Board**

A blue rectangular banner containing the event dates and location in white text.

January 12–16, 2020 > Washington, D.C.

# Uses of AIS Data

- AIS = Automated Identification System
- Consists of two data sets :
  - Vessel attributes: name, type, dimension etc.
  - Spatial-temporal information: the vessels coordinates at any given time
- Tracking travel time from origin to destination
  - Allows us to quantify traffic congestion and identify delays / problem areas
- Can be plugged into Agent based models in order to predict effects that different parameters may have on vessel traffic congestion
- Enables us to evaluate vessel safety / efficiency and identify potential risks



# Aids to Navigation (ATON) Strikes

Jonathon Hsieh of U.S. Coast Guard created a ATON Strike risk index based off a trend of ATON strikes

- All strikes on federal channel markers were recorded
  - 1,528 strikes on gulf coast
  - 306 strikes on east coast
  - 36 strikes on west coast
- Most strikes are related to freight vessels, but other instances include construction, and personal vehicles.
- Potential variables
  - Waterway Dimension (Width, Depth)
  - Environmental Factors
  - Cargo/Vessel Type
  - Interaction between vessels
  - Types of Aids to Navigation being used
  - Repeated Strikes (Aids hit multiple times)
  - Casualty Data
- Highlights specific problem areas where ATON markers could be improved or revised to avoid future strikes



# SEAHIVE Seawall

- PhD students at the University of Miami have been working on a project to design an ecofriendly modular shoreline protection system
- Testing facility can simulate Category 5 hurricane conditions in a 75' x 19' x 6.5' tank
- This structure was designed to allow wave energy to dissipate within the elements of the structure
- The design consists of interlocking hexagonal structures creating a system more effective at dissipating high energy tidal flow than a typical solid seawall.
- With an increasing amount of storms on the east coast, this could potentially be a more resilient system as well as create a ecofriendly environment for marine life.



Example of a seawall similar to SEAHIVE concept. The students results found a hexagonal shape for the SEAHIVE Seawall was most effective at dissipating wave energy



# Concrete pH Profiles in Marine and Freshwater Environments

- Experimental study considering how concrete in artificial reefs, piers etc. can impact the marine environment
- The experiment consisted of two tanks, one salt water one fresh water left uncovered with fresh concrete suspended within
- pH cloud forms in close proximity to concrete in both water tanks, however, the freshwater pH was raised much more drastically than the salt water tank.
- pH in freshwater needs to be carefully monitored because there are no minerals present to buffer the concrete carbonation.
- Important because freshwater fish like Salmon are very sensitive to varying pH.
- Conclusion: Artificial wetlands and oyster reefs out of concrete should be monitored to ensure proper pH for marine habitat.

Concentration of Hydrogen ions compared to distilled water		Examples
10,000,000	pH 0	Battery acid
1,000,000	pH 1	Hydrochloric acid
100,000	pH 2	Lemon juice, vinegar
10,000	pH 3	Grapefruit, soft drink
1,000	pH 4	Tomato juice, acid rain
100	pH 5	Black coffee
10	pH 6	Urine, saliva
1	pH 7	"Pure" water
1/10	pH 8	Sea water
1/100	pH 9	Baking soda,
1/1,000	pH 10	Great Salt Lake
1/10,000	pH 11	Ammonia solution
1/100,000	pH 12	Soapy water
1/1,000,000	pH 13	Bleach
1/10,000,000	pH 14	Liquid drain cleaner

# References

- Jonathan Hsieh; U.S Coast Guard : “An Evaluation of Variables, Data Sets and Risk Indexing Methodologies for Properly Evaluating Risk on Waterways in the United States utilizing Aids to Navigation data”
- Katherine Chambers, Marin Kress; U.S. Army Engineer Research and Development Center – Coastal & Hydraulics Laboratory: “ Automatic Identification System (AIS) Data: Enhancing Navigation Mission Readiness for the USACE”
- Mohammad Ghiasian; University of Miami: “Seahive – An Ecofriendly Modular Shoreline Protection System Experimentally Designed for High Energy Tidal Flow”
- Liv Haselbach; Lamar University “Concrete pH Profiles in Marine & Freshwater Environments” TRB Research Convention. 1/13/2020
- “Utilizing Agent-based Modelling to Evaluate Operational Impacts of an Incident & Possible Alternatives on U.S. Waterways” TRB Research Convention. 1/13/2020



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# DIVISION OF MULTIMODAL SERVICES

## MULTIMODAL GRANTS & PROGRAMS

**Shadman Mohammad**



# TRB Sessions Attended

- ☐ Current Research in Intermodal Freight Transportation
  - ☐ Railway Capacity and Performance
  - ☐ Future of North American Freight Rail Transportation
  - ☐ Future of Advanced Positive Train Control
  - ☐ Future Train Control Technologies
  - ☐ Improving Track Performance and Inspection
  - ☐ Advances in Freight Rail Transportation
- 





# Future of North American Freight Rail Transportation

- ❑ Effect of E-commerce on freight network
- ❑ More short haul rail freight network
- ❑ New Investment on Infrastructure and technology

## New technology in Rail Freight

- ❑ New Smart Track Inspection Methods
- ❑ Wireless Sensor Network, ETCS & PTC
- ❑ Precast Concrete Ties & Plastic Composite Ties

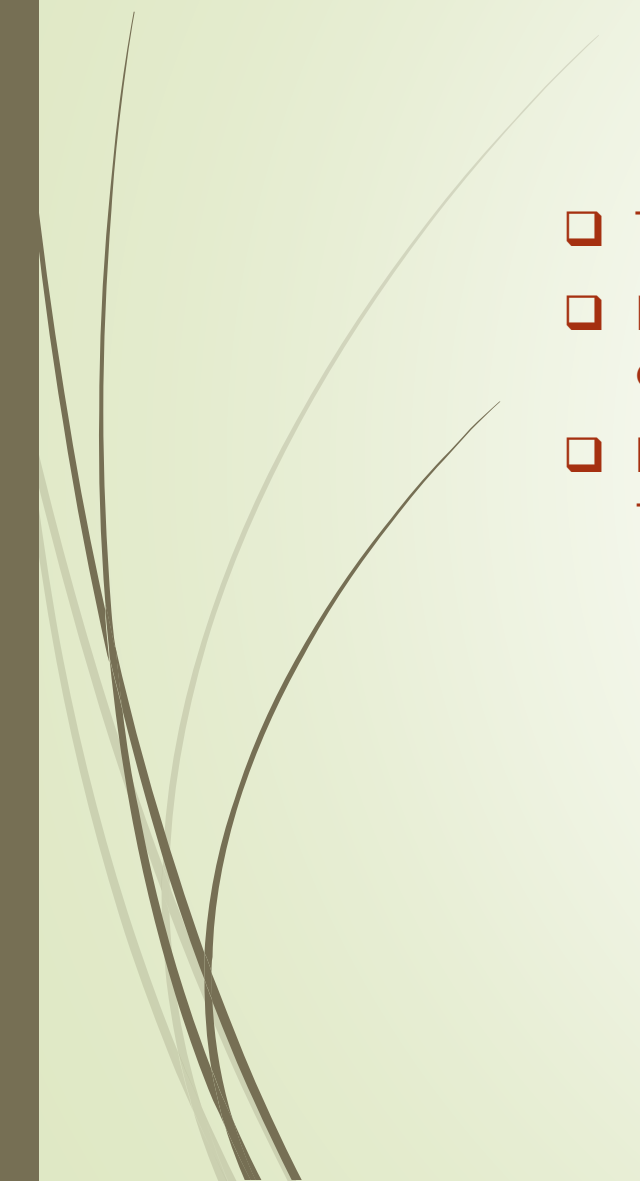
# Using Drones for Railway Maintenance, Safety, Security

- ❑ Drones for railways and real world benefits
- ❑ Drones have become new rail workers
- ❑ Drones will change the future of railways





# Takeaways

- ❑ Trucking industry is way ahead of Rail industry in terms of new technologies.
  - ❑ NJDOT providing financial assistance to Rail Freight Companies to be in competition with Truck.
  - ❑ It is time to provide assistance to rail companies to invest money on new technologies.
- 



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## DIVISION OF MULTIMODAL SERVICES

## BUREAU OF FREIGHT PLANNING & SERVICES

**Maryiam Kazmi, AICP, Transportation Planner**



# SESSION ATTENDED

**2019 TRB ANNUAL MEETING**  
CONVENING THE TRANSPORTATION COMMUNITY FOR 98 YEARS  
January 13–17, 2019 > Washington, D.C.

1

Increasing Truck Parking Supply  
and Availability

2

The Future of North American  
Freight Rail Transportation

3

Sustainable and Efficient  
Solutions for Last Mile  
Distribution



# SITE SELECTION PROCESS

- ❑ Driver Shortage- Millennials do not want to be truck drivers
- ❑ Clients are looking to be as close as they can to domestic intermodal facilities because they will save time & money
- ❑ The railroads are demanding that container must be picked up within 24-48 hours, or they will charge fee for storage
- ❑ This will trigger the demand for adding truck parking for existing and new warehouse location
- ❑ Less congestion areas – Hot Tertiary Markets (Savannah, GA- Charleston, SC)



# TRUCK PARKING

- ❑ 2019 TOP industry issues: **driver shortage, hours-of-service and truck parking.**

## Capacity

- ❑ Optimize existing pavement at rest areas and other public truck parking facilities (revise rest formula, site redesign)
- ❑ Encourage the use of underutilized truck parking spaces at weigh stations
- ❑ Collocate overnight truck parking with commuter park-and-ride lots in high demand areas
- ❑ Leverage and revise if needed the P3 legislation to develop new truck parking facilities

## Policy

- ❑ Dedicated funding for truck parking projects either through legislative request or by leverage NHFP funds (consider both capital and O&M cost)
- ❑ Provide guidance to MPOs and local municipalities to improve row and curbside management strategies and offer greater flexibility for freight parking options
- ❑ Work with MPOs and local communities to incorporate secure truck parking requirements at new freight generating facilities (land use ordinance)



# LAST MILE LOGISTIC TRENDS AROUND THE WORLD

**2019 TRB ANNUAL MEETING**  
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## Drones and robots for deliveries

- ❑ FAA recent approval for UPS on hospitals and campuses, test from Wing/Fedex/Wallgreens
- ❑ Swiss Post: delivery of pharmaceuticals in Zurich and Lugano
- ❑ Nuro robots for Walmart and Kroger

## Shared delivery lockers

- ❑ Pick-up points area n increasingly popular option
- ❑ Shared delivery lockers: Cubee (Belgium Post)

## Electrically assisted cargo bikes- mostly in Europe

- ❑ Urban warehouse for amazon prime now in Paris
- ❑ Electric Freight Barge on the Seine :Fludis
- ❑ Since sept 2019 new barge from west port to central Paris
- ❑ Cargo cycles on board
- ❑ Delivering parcels and pallets form Lyreco and Ikea on the way in and paper electronic waste on the way back









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# DIVISION OF STATEWIDE PLANNING

## BUREAU OF STATEWIDE STRATEGIES/MPO UNIT

**Monica Etz**  
**Brian Leckie**

# Travel behavior during Emergency Evacuations



- 58% will leave
- 45% will go to a shelter
- Wind is not the biggest danger
- Tourists act different
- Traffic jams
- Pets

➤ More data means better emergency planning



# Transportation Solutions in Parks and Public Lands



*Hanging Lake, Colorado*





# Transportation Solutions in Parks and Public Lands

## *The Study*

- A capacity analysis was done
- Visitor exit surveys
- Input from local stakeholders
- Strong partnerships

## *The Solution*

- On-line reservation system to limit visitors
- Staggered entrance times
- Lots of good publicity



- Great success! A whole different experience and traffic congestion eliminated.



*Acadia National Park, Maine*







*Acadia National Park, Maine*

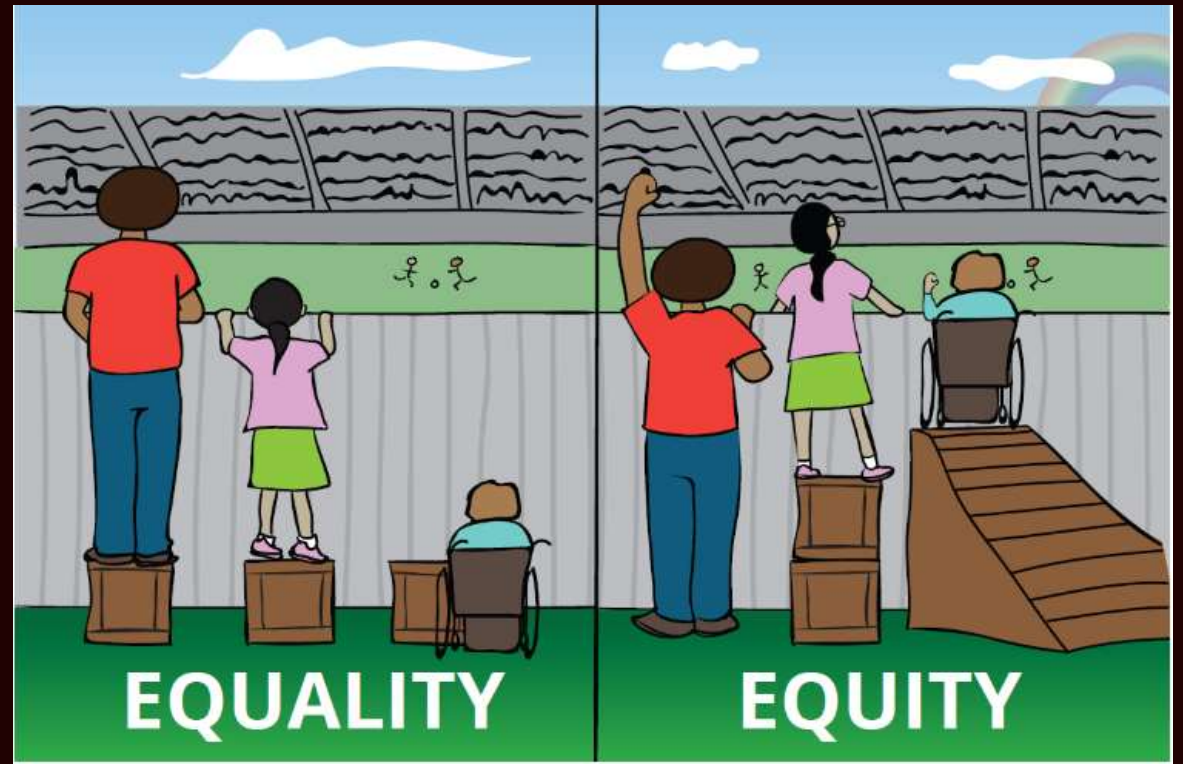
# Transportation Solutions in Parks and Public Lands





# Planning at a Crossroads

- PennDOT Connects
- Equity!
- Reliability!
- Go beyond compliance/checklist
- Long Range Plan challenges



# Right-Sizing

- “A process by which a transportation agency makes intentional decisions to adjust the size, extent, function and composition of its existing or planned infrastructure and service portfolio in response to changing needs over time.”
- Agency-wide or specific programs and projects
- Economically sustainable investments
- Roundabout-based road diet

**EFFICIENCY!**

# Examples of Right-Sizing

---

The Tennessee Department of Transportation implements an initiative to strategically relax design standards, saving the department over \$170 M on the first ten projects under the new policy.

Rochester, NY transforms an under-utilized sunken section of expressway into an at-grade "complete street" with private development creating over \$250 M of value in the local economy in addition to millions more in life cycle cost savings

An initiative in Dallas, TX identifies opportunities to generate nearly \$500 M in development by re-aligning routes and re-using highway infrastructure – boosting property values by about \$2.5 B, adding 40,000 jobs, and increasing property tax revenue by \$80 M





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**DIVISION OF STATEWIDE  
PLANNING**

**BUREAU OF RESEARCH**

**Pragna Shah  
Giri Venkiteela, PhD**



**Pragna Shah**



## TRB Sessions Attended

- FHWA Leadership in Innovation
- Visualization Lightning Talks
- Applying Organizational Management Practices to Transportation Agencies
- Visualizing National Transportation Library Repository Metrics
- State DOT CEO Roundtable: Towards Zero Deaths: State DOTs Renewing Focus on a Nation Public Health Crisis
- Moving Research into Reality: Pedestrian and Technology Transfer
- Hyperloop: Commuter Dream or Regulatory Nightmare?

## State DOT CEO Roundtable: Towards Zero Deaths: State DOTs Renewing Focus on a Nation Public Health Crisis

- **Missouri DOT**
  - Buckle Up Phone Down Campaign
    - Dozens of schools are challenging each other. Getting students involved.
    - Corporations and organizations have partnered with Missouri DOT enforcing company policies
    - Significant increase in safety belt use – increased by 6.4%
    - Goal is to bring this program nationwide – Get the culture change while we continue to develop the innovations and the techniques to improve engineering and to improve the safety of vehicles.





## State DOT CEO Roundtable: Towards Zero Deaths: State DOTs Renewing Focus on a Nation Public Health Crisis

- **Montana DOT: Focused on**
  - Impaired Driving
  - Rural Safety Behavior Initiatives: Peer Teen to Teen Safety
  - Lack of seatbelt use
  - Collaborate and coordinate with different communities, infrastructure builders and engineers.
  - Infrastructure Improvements: To reduce severity of roadway departure and intersection crashes: centerline rumble strips, roundabouts, cable median barriers
  - Chair of AASHTO Committee on Safety



## Hyperloop: Commuter Dream or Regulatory Nightmare?

- What is a Hyperloop?
- Can it meet energy and consumer demands?
- Is it Safe?
- Projects in the United States
- Policy and Legal Innovations



## Key Takeaways:

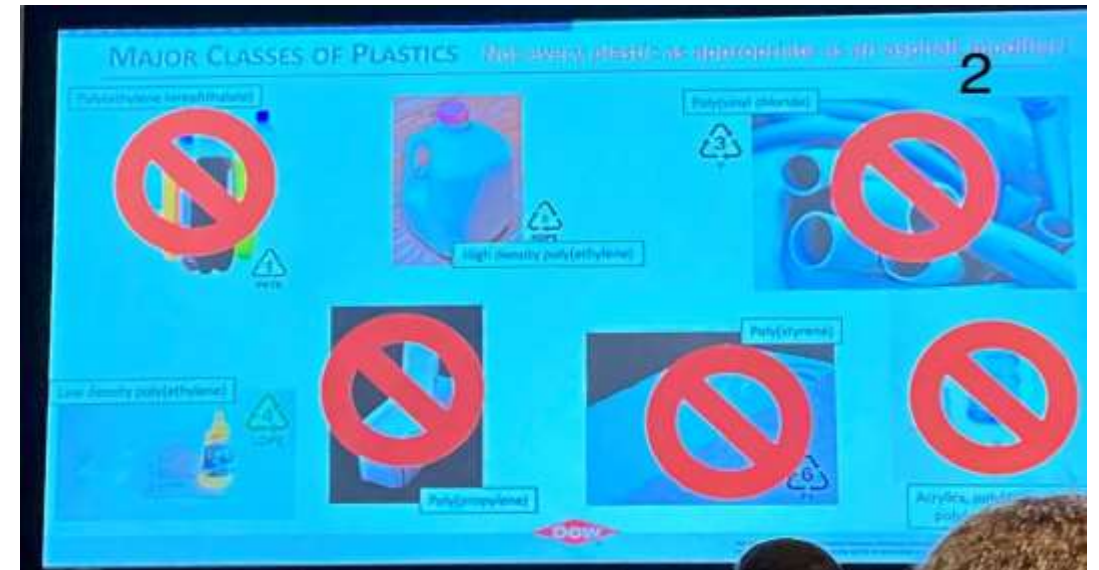
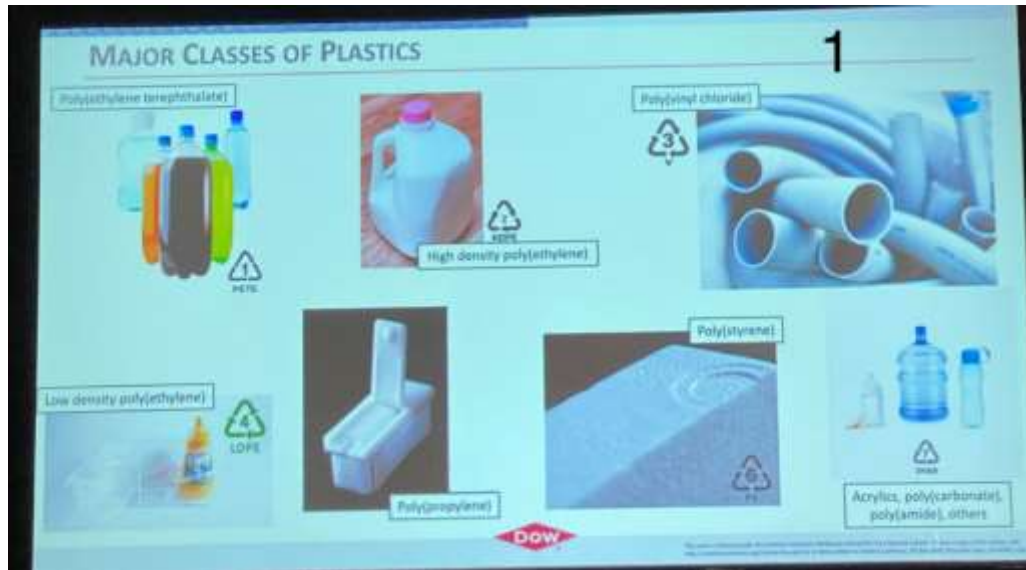
- Success of safety projects relies on the input by everyone
- Engage with the public to get the message across
- Join AASHTO committees
- States need to communicate with each other and with national agencies – Peers learn best from peers.





**Giri Venkateela, PhD**

## *Recycled plastics in pavements:*



Not all plastics are good for mixing with asphalt





## MI DOT PG64-28P - NO DIFFERENCES THAN NORMAL PAVING



4

## *Low cost ultra high performance concrete :*

### Why UHPC is getting popularity?

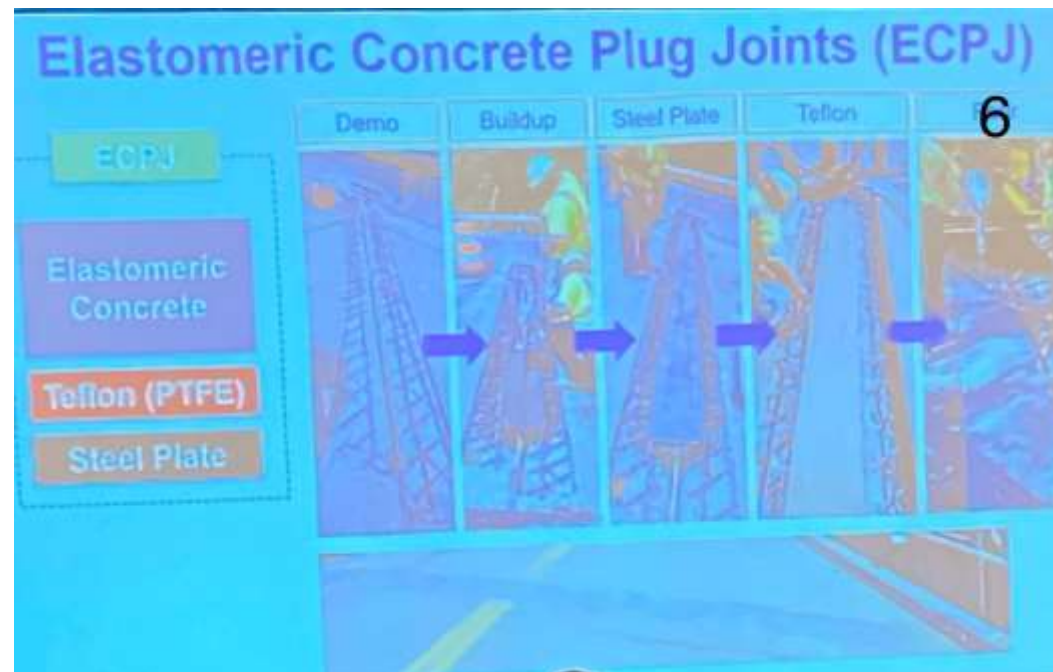
1. High compressive strength and tensile strength
2. Minimal long-term creep or shrinkage
3. Exceptional durability etc.

Because its high cost, currently not that many studies were conducted to better understand the material. If designed with low cost we can have many studies and understand this material better.



# VDOT bridge decks

VDOT is eliminating conventional bridge deck joints with elastomeric concrete plug joints (ECPJ)





VDOT showed a laser coating removal demonstration video





## Other sessions and committee meeting attended

1. Corrosion committee meeting ( member and research coordinator ).
2. Concrete bridge committee meeting ( member)
3. Attended sessions on shared mobility and concrete related materials.



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# TRANSPORTATION OPERATIONS SYSTEMS & SUPPORT

**Parth Oza, Operations Support and Engineering**  
**Asim Frank Zaman, MBEG, P.E.**



# St. Paul Minnesota - MnDOT

- No standardized approach
- Did massive community outreach
- Progressively moved people out to specified shelters
- Cleared and Grubbed the area to a depth of 1' (buried needles)
- Blocked the area off using Jersey Barrier and Fencing





What does  
NJDOT do?



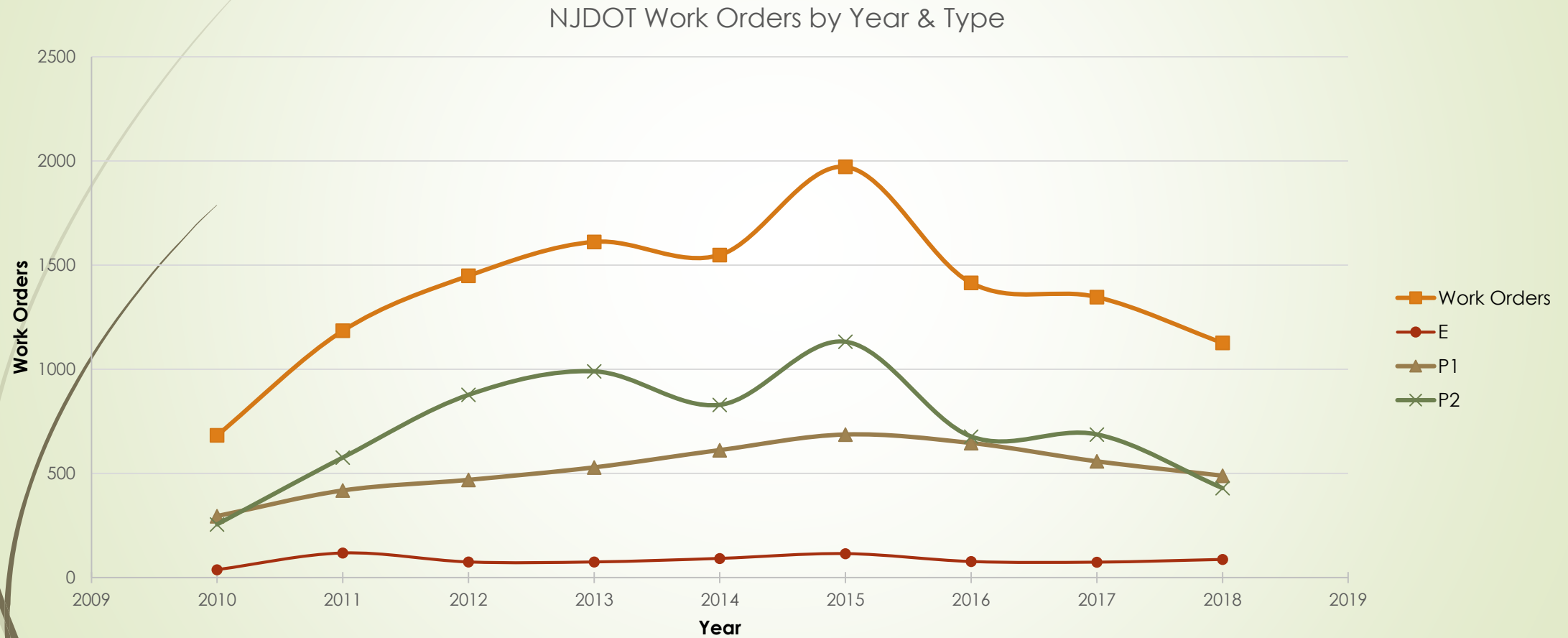
Started the system in 2010

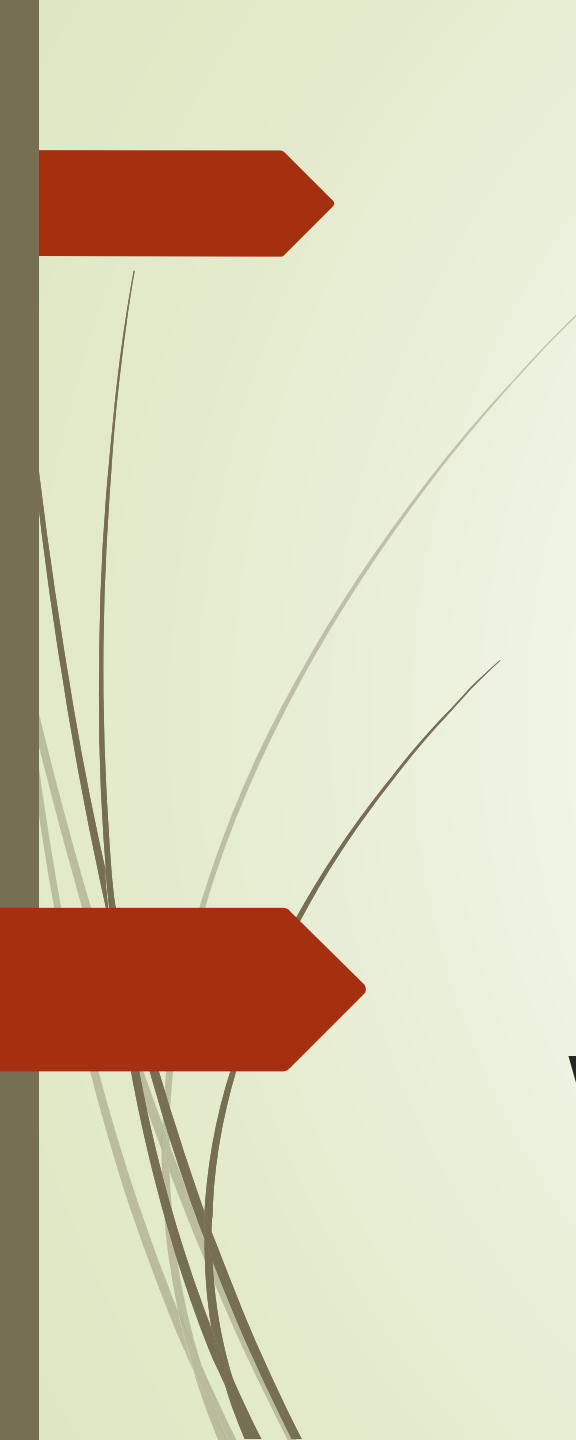
There have been 21,000  
work orders

Currently 4,700 open Work  
Orders

Work Order  
Status

# NJDOT Bridge Work Orders by Year





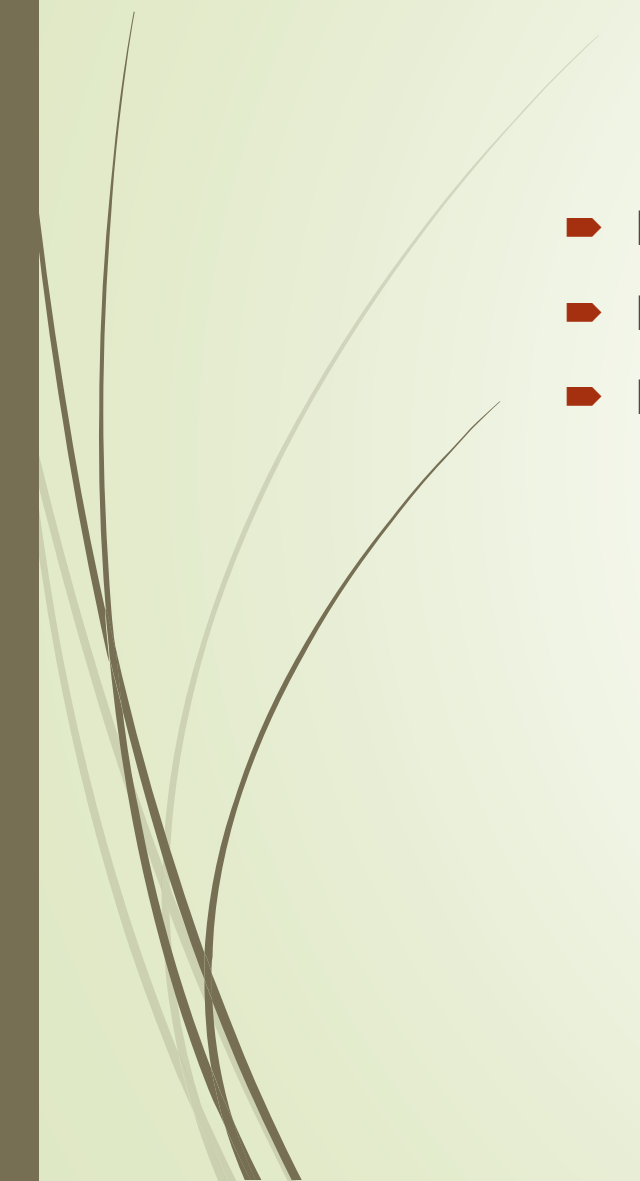
Total WO	21653	
Open WO	4712	
Max Open Homeless WO	30	0.6%
Max Total Homeless WO	74	0.3%

## Work Order Analysis





# Why is this a challenge?

- ▶ Homeless encampments → Fires → Structural Damage
  - ▶ Prevent access for maintenance and inspection activities
  - ▶ Pose danger to the homeless from traffic and other sources
- 

# Engineering Solutions

- MENNAS System
  - Non-Structural concrete to make bridge pedestals less habitable.
- PEDE Program is designing applications of this in...
  - Camden
  - Newark





# Other Solutions?

- Does NJDOT have a standardized procedure?
  - Do we have a library of outreach contacts to tackle these work orders?
- 



**PAVE**  
PARTNERS FOR AUTOMATED VEHICLE EDUCATION

## Partners for Automated Vehicle Education

@PAVECampaign

A coalition of industry, advocacy, academic & institutions informing the public the future of our roads. Safety. Mobility. Sustainability. #PAVEtheWay

[pavecampaign.org](https://pavecampaign.org) Joined September 2018

166 Following 1,666 Followers

Tweets

Tweets & replies

Media

Like

Pinned Tweet



Partners for Automated Vehicle Education @PAVECampaign · Dec 26, 2018

We are a broad coalition of #safety, #mobility and #sustainability advocates and industry participants engaging with the public in a conversation about the potential of #AV technology. We're a bet on the power of knowledge. #PAVEtheWay



Partners for Automated Vehicle Education  
PAVE is a diverse group of stakeholders from industry, academia, government, plus advocates for safety, mobility, and sustainability. [youtube.com](https://www.youtube.com/watch?v=...)

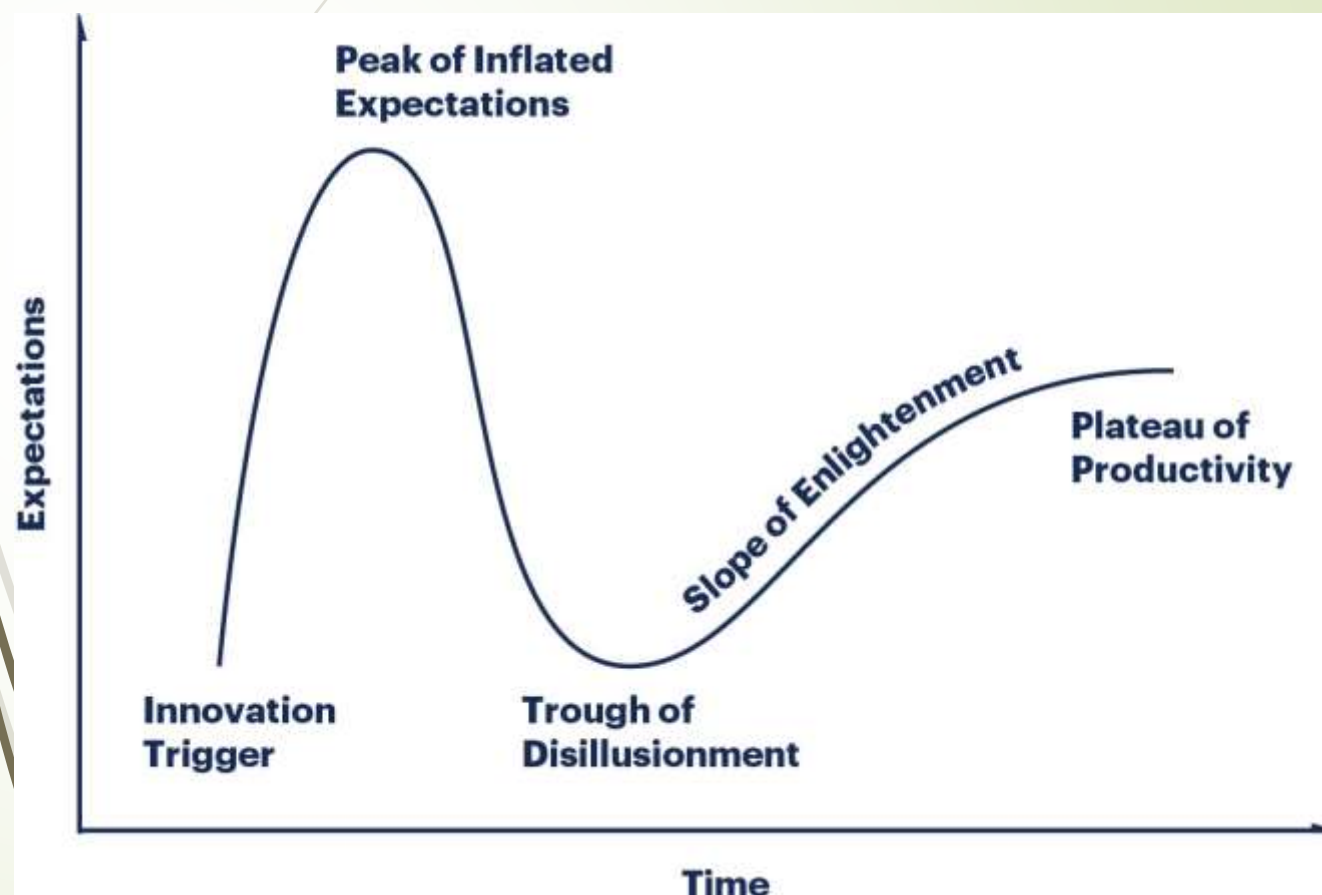


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# Public Acceptance Automated Vehicles





# Railroad Trespassing Detection



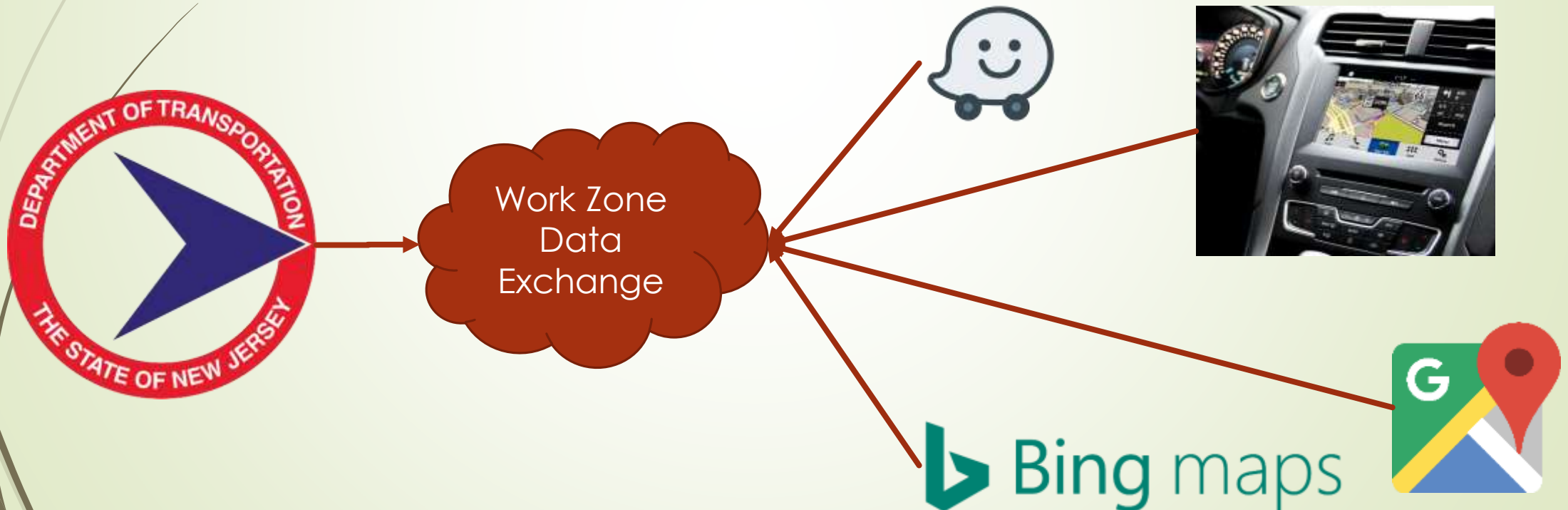
# Railroad Trespassing Detection



# Connected Autonomous Workzone

*"Harmonized specification for work zone data that infrastructure owners and operators can make available as open feeds that AVs and others can use"* – FHWA Round Table

<https://www.transportation.gov/av/data>







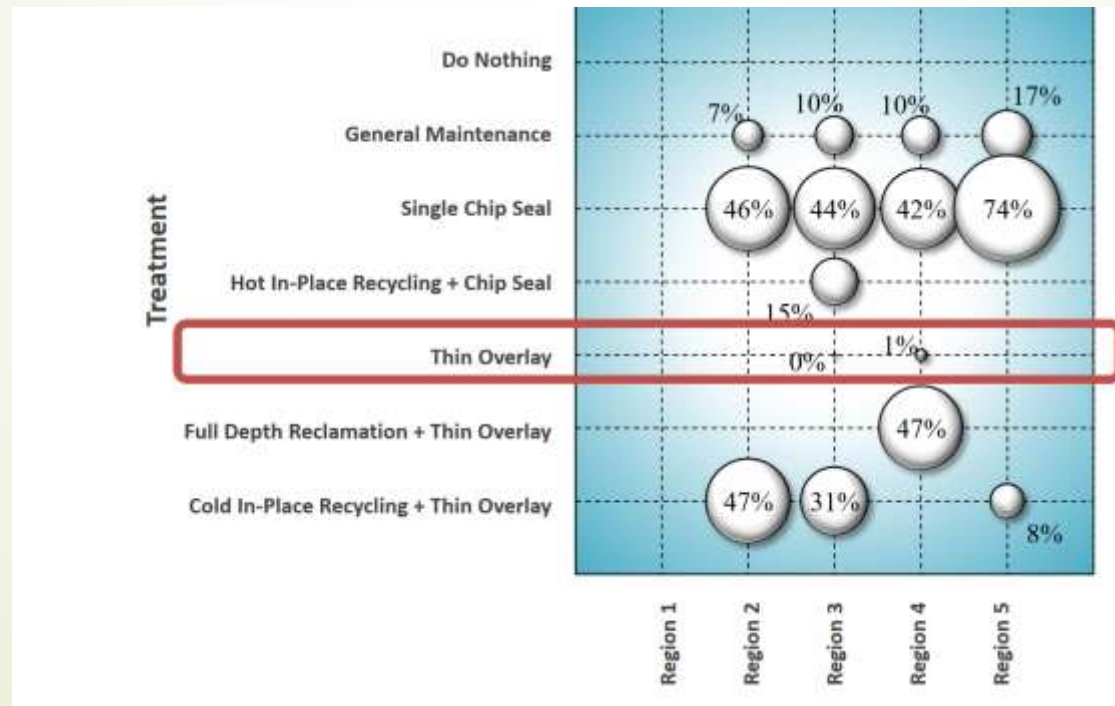
# **\$420 Billion**


# **Value of US road networks maintenance backlog**



# Optimizing Pavement Management Systems

- Study by University of Wyoming and Colorado State University
- Optimized Budget Allocations:





# **\$73.51**

## **Cost of road salt per ton**

Winter Maintenance Field Evaluation of Salt Brine Applications, University of Wisconsin – Madison

Boris Claros, Madhav Chitturi, Andrea Bill, David Noyce

# Benefits of Brining

## Comparison Analysis Salt Brine vs Granular Salt:

Description	Salt Brine Group	Granular Salt Group	Comparison	
Average Salt Usage (lb/ln-mi)	870	1,313	-443	-34%
Average Cost Material Salt Brine \$0.08/gal (\$/ln-mi)	\$38	\$49	-\$11	-22%
Average Time to Reach Bare/Wet Conditions (hr)	11.2	16.3	-5.1	-31%

Winter Maintenance Field Evaluation of Salt Brine Applications, University of Wisconsin – Madison

Boris Claros, Madhav Chitturi, Andrea Bill, David Noyce



# 149

# Number of Maintenance Facilities that MnDOT operates

Optimizing Maintenance Facility Location in Minnesota

William Holik, Paul Anderson, Texas A&M



# Optimizing Facility Locations

- Factors considered:
  - Location of current maintenance facilities
  - Maintenance routes
  - Amount of maintenance equipment
  - Equipment material capacities
  - Material application rates
  - Size and location of available land
- **Primarily driven by winter operations!**
- Results:
  - 58 facilities could be rebuilt on site
  - 89 could be relocated
  - 2 could be combined



<https://www.keloland.com/news/minnesota-family-builds-snow-dinosaur/>



# **DIVISION OF ENVIRONMENTAL RESOURCES**

## **BUREAU OF ENVIRONMENTAL PROGRAM RESOURCES**

**Caroline Birsner, Environmental Specialist 2**  
**John J. Riggi, Environmental Specialist 2**

# NEW JERSEY EXECUTIVE ORDERS AND ENERGY MASTER PLAN

- [Executive Order No. 89](#)
- [Executive Order No. 100](#)
- [Energy Master Plan](#)

The New York Times

## *With 130-Mile Coast, New Jersey Marks a First in Climate Change Fight*

Builders will be forced to take climate change, including rising sea levels, into account to win government approval for projects.



Gov. Philip D. Murphy, a Democrat, giving the State of the State address in Trenton, N.J., this month. Seth Wenig/Associated Press

# DECARBONIZATION

- Aggressive global, national, and regional targets for emissions reductions: **“Carbon-neutral by 2050”**
- Strategies:
  - Cap-and-trade / cap-and-invest
    - California State Transportation Agency
    - Transportation and Climate Initiative (TCI)
  - Electric vehicles / fuel efficiency standards
    - Norway, China
  - Leveraging pollution / air quality targets to co-benefit with emissions reduction targets
    - China, United Kingdom





## DECARBONIZATION (CONT.)

- Indicators of Federal support
  - America's Transportation Infrastructure Act (ATIA) – **federal funding bill**
    - \$10 Billion “climate title”
      - Formula grants
      - Discretionary grants
    - Increase in funding for non-motorized transportation
  - **FHWA guidebook** for state DOTs on emissions reductions (by end of CY 2020)

### **Key Takeaways from FHWA:**

- Most emissions reductions will come from **clean vehicle** and **fuel technologies**
- **Demand reduction** and **systems efficiency** strategies can reduce emissions another 5-20%
- Additional 2-3% reduction potential from DOT **construction materials, fuels/fleets, and buildings**
- GHG reduction targets of 75-80% by 2050 are challenging and will require widespread electrification and clean grid
- Most strategies require implementation at multiple levels (state, regional, local)

# DECARBONIZATION (CONT.)

## What are other state DOTs doing?

- Minnesota:
  - Reducing facilities emissions (building thermostats)
  - Prioritizing electric vehicles
- Washington State:
  - Reducing VMTs, reducing congestion
  - Promoting vehicle efficiency, electric vehicles, biofuels
- Texas
  - [Drive Clean Texas](#) campaign, toll credits for EV drivers
  - Teleworking, shortened work weeks for TXDOT employees
  - Clean operations: solar sign boards instead of diesel
  - Sustainable pavements: “warm mix” instead of hot mix asphalt, pavements with recycled products
  - Alternative fuel vehicles, electrifying corridors

## So, what can NJDOT do?

- Support **EV/AFV infrastructure, clean transit and fleets**
- Implement ITS/efficient **traffic operations**
- Support **alternative modes** of transport to reduce VMTs, **reduce employee VMTs** wherever possible (i.e., encourage teleworking)
- Adjust office building **thermostats**
- Use low-carbon, recycled/reused **construction materials** where feasible
- **Collaborate** with other state, regional, and local agencies to do everything within collective power

# RESILIENCE

- Risk and resilience assessment / modeling
  - Risk Analysis and Management for Critical Asset Protection (RAMCAP) model
    - Asset characterization
    - Threat characterization
    - Consequence analysis
    - Vulnerability analysis
    - Threat assessment
    - Risk/resilience assessment
    - Risk/resilience management
  - **Need quantitative data** in order to run models
- Design guidelines / manuals
  - City of New York [Climate Resiliency Design Guidelines](https://www1.nyc.gov/assets/orr/pdf/NYC_Climate_Resiliency_Design_Guidelines_v3-0.pdf)

**Table 3 - Determine the sea level rise-adjusted design flood elevation (DFE)<sup>86</sup>**

<b>Critical* Facilities</b>				
End of Useful Life	Base Flood Elevation (BFE) <sup>86</sup> in NAVD 88	+ Freeboard <sup>57</sup>	+ Sea Level Rise Adjustment <sup>58</sup>	= Design Flood Elevation (DFE) in NAVD 88
<b>2020s</b> (through to 2039)	FEMA 1% (PFIRM)	24"	6"	= FEMA 1% + 30"
<b>2050s</b> (2040-2069)	FEMA 1% (PFIRM)	24"	16"	= FEMA 1% + 40"
<b>2080s</b> (2070-2099)	FEMA 1% (PFIRM)	24"	28"	= FEMA 1% + 52"
<b>2100+</b>	FEMA 1% (PFIRM)	24"	36"	= FEMA 1% + 60"
<b>Non-critical Facilities</b>				
<b>2020s</b> (through to 2039)	FEMA 1% (PFIRM)	12"	6"	= FEMA 1% + 18"
<b>2050s</b> (2040-2069)	FEMA 1% (PFIRM)	12"	16"	= FEMA 1% + 28"
<b>2080s</b> (2070-2099)	FEMA 1% (PFIRM)	12"	28"	= FEMA 1% + 40"
<b>2100+</b>	FEMA 1% (PFIRM)	12"	36"	= FEMA 1% + 48"

[https://www1.nyc.gov/assets/orr/pdf/NYC\\_Climate\\_Resiliency\\_Design\\_Guidelines\\_v3-0.pdf](https://www1.nyc.gov/assets/orr/pdf/NYC_Climate_Resiliency_Design_Guidelines_v3-0.pdf)

## RESILIENCE (CONT.)

- Resilience and finance
  - Infrastructure financing and credit ratings
- Benefit-cost analyses, and the “business case”
  - Consider “the cost of doing nothing”
  - Attempt to quantify benefits from “avoided losses”
  - Focus on **smaller, cheaper improvements** rather than fortifying assets to the most extreme circumstances
- Funding: America’s Transportation Infrastructure Act





## FROM “LEVEL OF SERVICE” TO “QUALITY OF LIFE”

- Los Angeles DOT: “Green New Deal”
  - Goal of **zero-carbon** on-road transportation
  - Bike lanes: good
  - Roadway capacity projects: bad
- Utah DOT: “Community of Our Dreams”
  - **Mobility-focused** transformational shift
  - Moving cars → **moving people**
  - How will this affect environmental processes?
    - Importance of purpose & need statement
    - Modifying existing standards/protocols for NEPA, 4(f), 404



<https://www.burlingtonvt.gov/DPW/ProtectedBicycleLanes>

# TRB Special Task Force on Climate Change

- TRB is reorganizing. This task force will sunset & be incorporated into a committees and subcommittees under the Transportation and Sustainability section (AMS00)
  - One subcommittee will be focused on the hazards of climate change the other on energy related issues
  - New opportunities for engagement of committee
- NH course on resilience forthcoming next year from FHWA


# **Lectern 1241 – Current Trends in Landscape and Environmental Design**

- **Managing Urban Freeway Roadsides, Beverly Storey  
Texas A&M Transportation Institute**
  - **Urban Freeway Roadside (UFR) – high visibility urban freeways with limited pedestrian access, wider medians, interchanges, and overpasses**
  - **NCHRP Synthesis 20-05 Topic 49-06 for reference**

# Planning, Design & Management Issues

- **Access for maintenance personnel and equipment**
- Adjacent land uses
- Air pollution and particulate deposition
- Carbon sequestration
- Cooperative development/maintenance agreements
- Cost-effectiveness
- Disturbances caused by roadway repair, renovation and expansion
- Effects of de-icing agents, snow storage and ice
- Effects of structure shadowing
- Erosion control
- Fire risk/hazard
- Fixed object issues
- Graffiti opportunities on roadside art, retaining walls, noise barriers and other structures
- Headlight glare reduction
- Heat island effects of pavements, structures and buildings
- Highway alignment and design speed
- **Illegal encampments**
- Integration of historic, cultural, and scenic themes
- **Intelligent Transportation System technology placement, usage and maintenance**
- Lighting
- Multi-modal accommodations
- Noise and vibration
- Noxious and invasive weed management
- Outdoor advertising and other signage
- Plant species selection—native and adaptable
- Roadside appurtenances
- Safety clear zone
- Sight distance
- Soil requirements for pavement, subbase drainage and other infrastructure
- Soil requirements for sustainable landscape development
- Stakeholder expectations
- Stormwater management for quality and quantity
- Traffic volumes
- Utilities
- Views and screening
- Visual complexity
- Water and resource conservation
- Windbreak protection



- 
- Report surveyed state DOT's for UFR policy, plans, etc.
    - Some states unable to provide or did not respond
  - One new discovery ITS conflict w/proposed plantings and landscape design
  - Illegal encampments/trespassing a huge future issue to explore
    - Several intersections of policy, law, society, environmental issues
  - Develop a future UFR best management practice guide



## A Multifaceted Approach to Improve Conditions for Pollinators Along Washington State Highways, Raymond Willard, Washington State Department of Transportation

- WSDOT has an Integrated Vegetation Management plan for region offices
  - Pollinator habit modeling
  - Ecological design (life-cycle based management system)

# Integrated Roadside Design and Management

## VISUALIZING ROADSIDES AS TRANSPORTATION ASSETS



WSDOT owns and maintains approximately 100,000 acres of unpaved land.

As part of the agency's overall Transportation Asset Management Plan, WSDOT has classified and mapped roadside land use areas as shown on this poster.

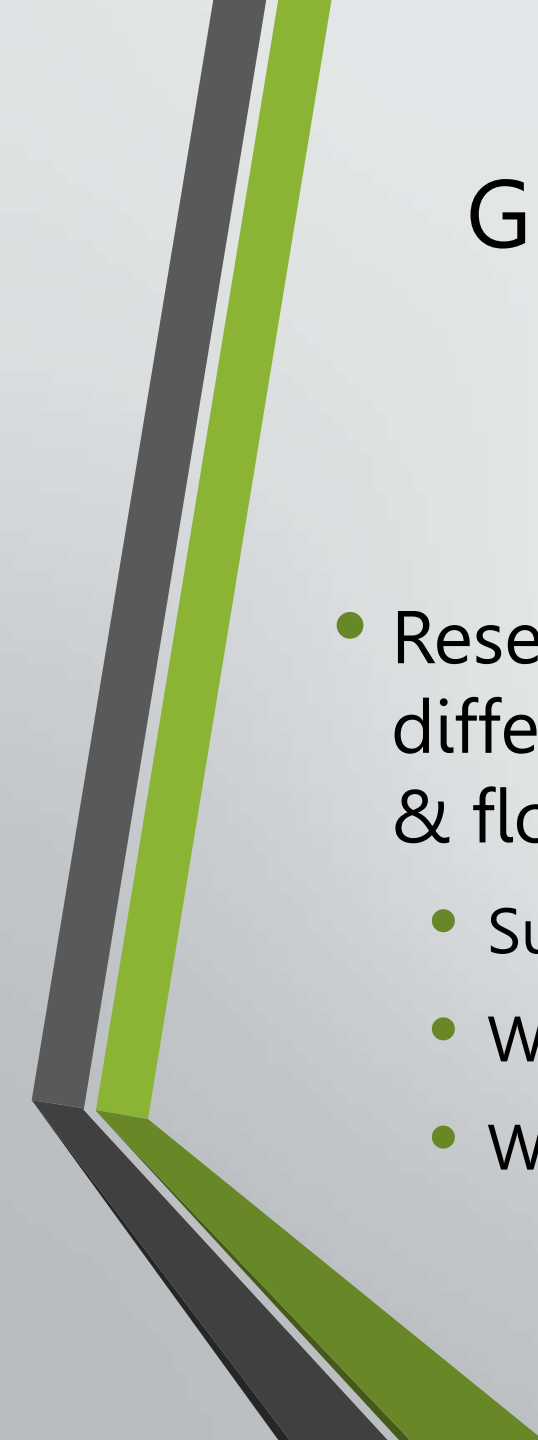
This geographic inventory of six specific roadside land use types provides the basis for budgeting, planning, tracking, monitoring, and evaluating maintenance actions, and for measuring agency performance.



*An ongoing quest to find the most sustainable site-specific solutions*



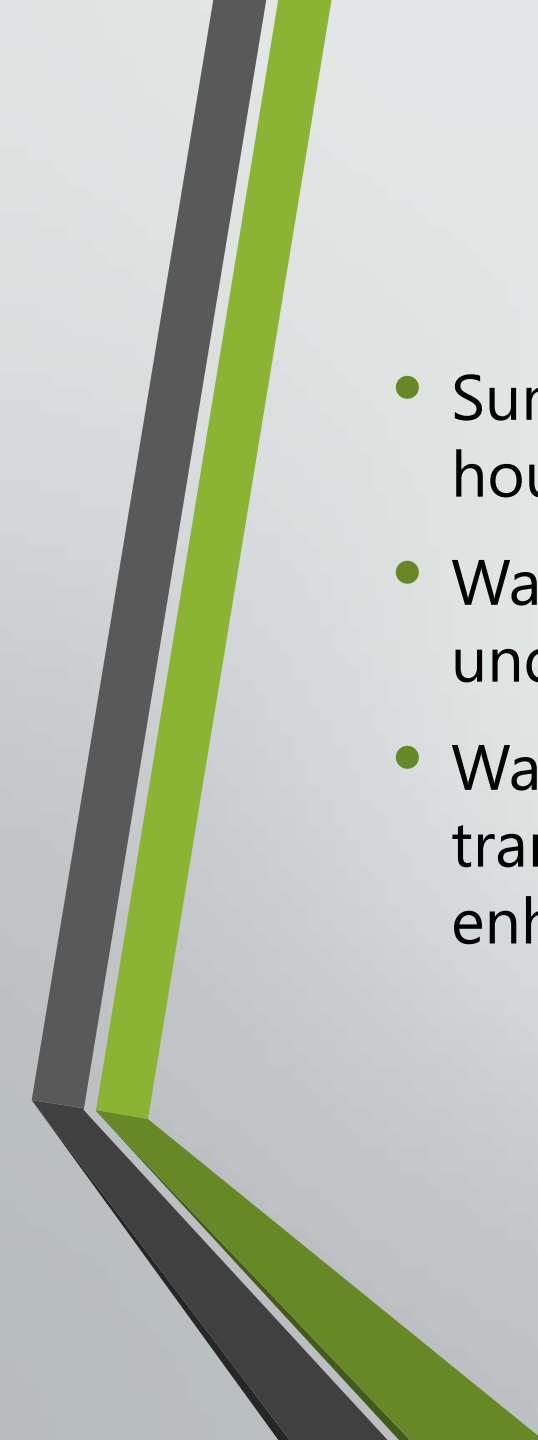
Washington State  
Department of Transportation

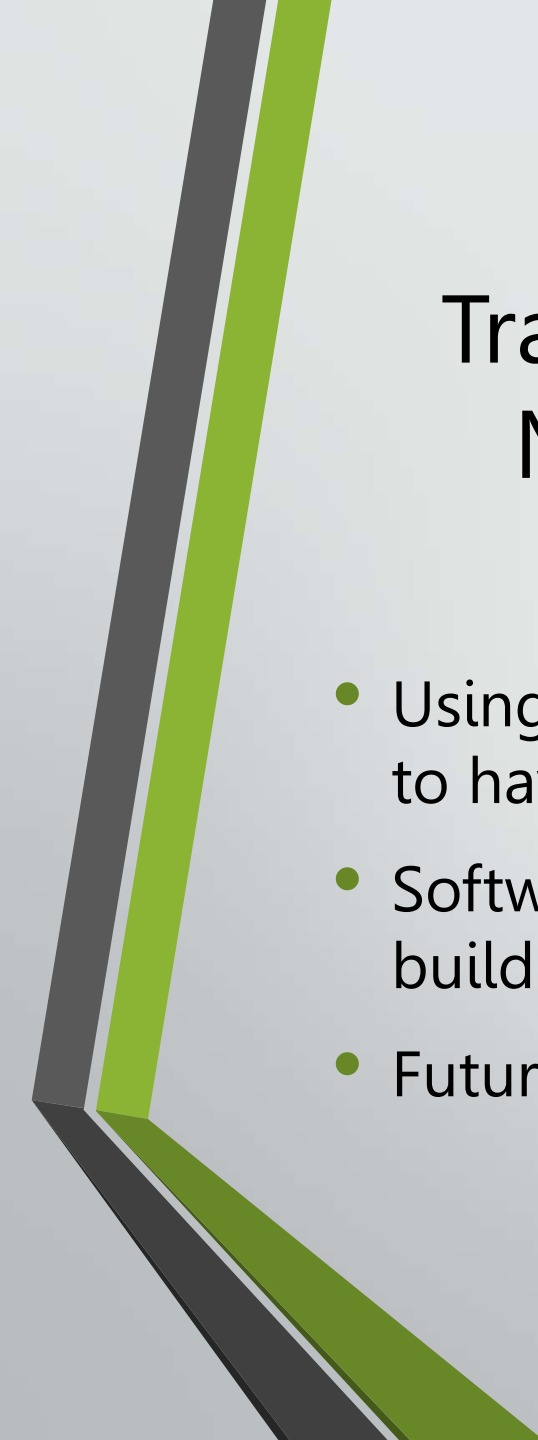


# Green Infrastructure and Living Shorelines: Adaption of Transportation Systems Wendy Meguro, University of Hawaii

- Researched three sites on the island of Oahu and evaluated different methods to address climate change, sea level rise & flooding
  - Sunset Beach north coastal highway
  - Waipahu TOD and rail station project
  - Waikiki beach



- 
- Sunset Beach – discussion of realignment of roadway, relocation of houses and restoration of historic dune structure
  - Waipahu TOD – green infrastructure (permeable pavement w/ underground drains, tree plantings, stream dechannelization)
  - Waikiki Beach – deal with king tide impacts (areas of safe to fail transportation), enhancing off shore breakwaters, coral reef enhancement and restoration.



# Virtual Reality for Evaluating Active Transportation Improvements for Roadways

Muhammad Habib, Dalhousie University

- Using VR interface (Oculus Rift VR headset) and VR software (Lumion) to have subject “interact” with a proposed streetscape
- Software is readily available and needs some coding (height of buildings, etc)
- Future needs in transportation jobs for compute science (coding)

## Methods - “Pocket Parks” Models



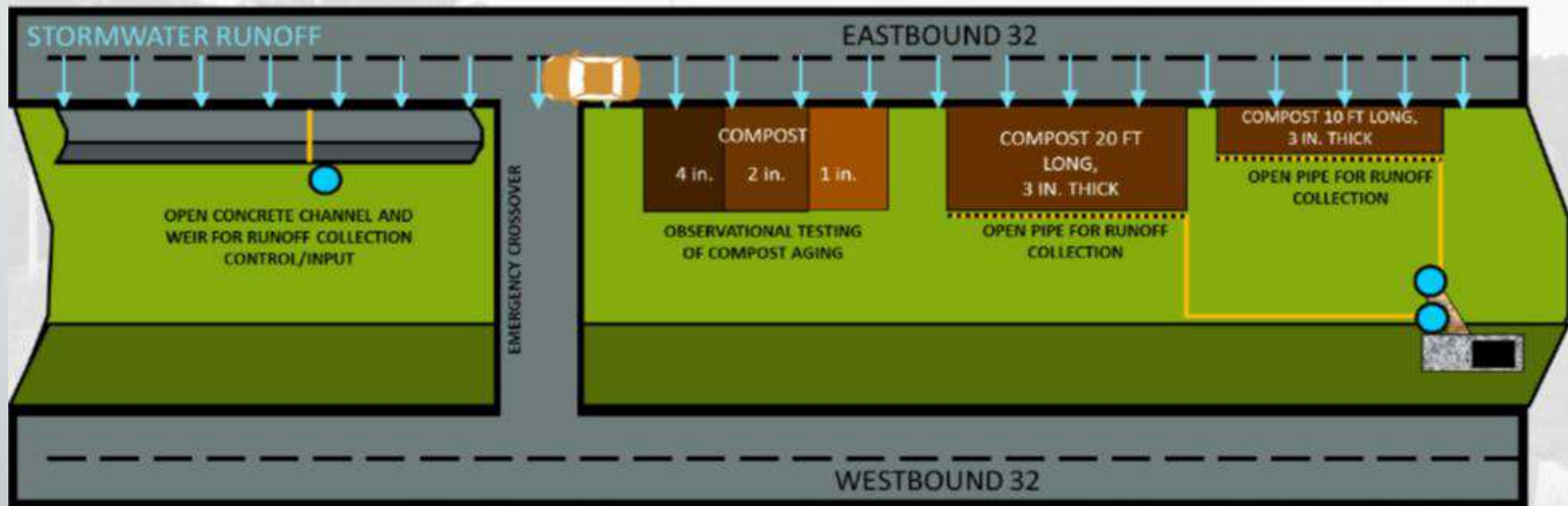


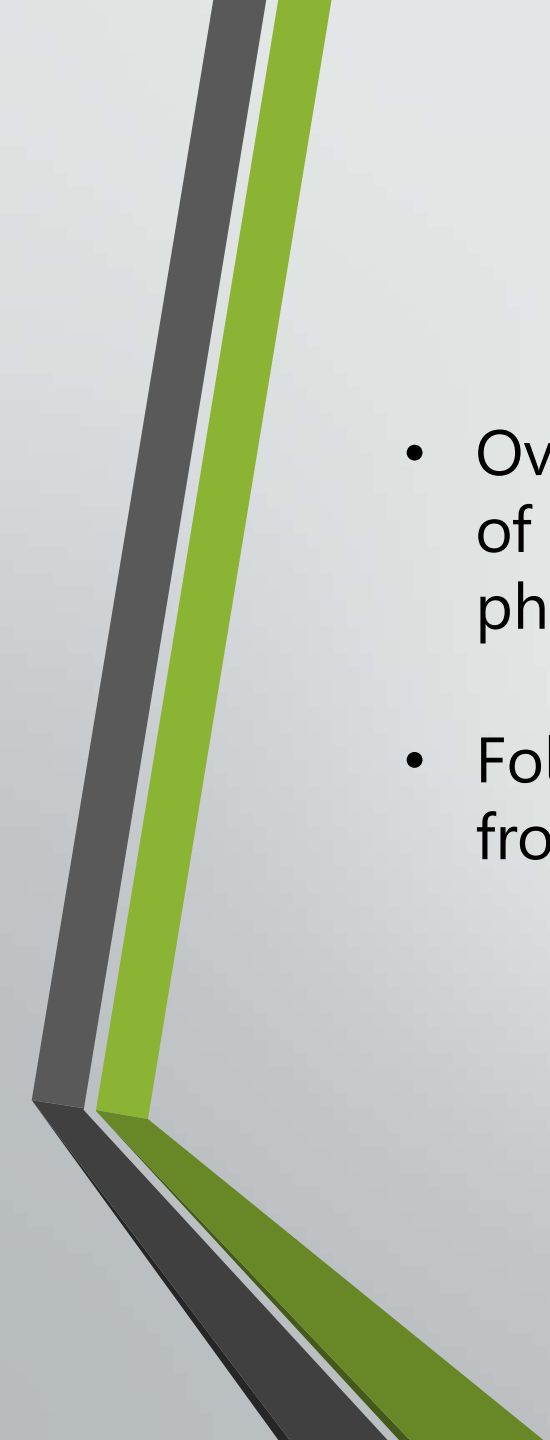
# Lectern Session 1376 Treatment of Highway StormwaterRunoff

- Preliminary Data on Vegetated Compost Blankets as Highway Stormwater Control Measures Erica Forgione, University of Maryland, College Park
- Studied section of Maryland Route 32 along with lab study
- Use vegetated compost blankets for removal of roadway contaminants



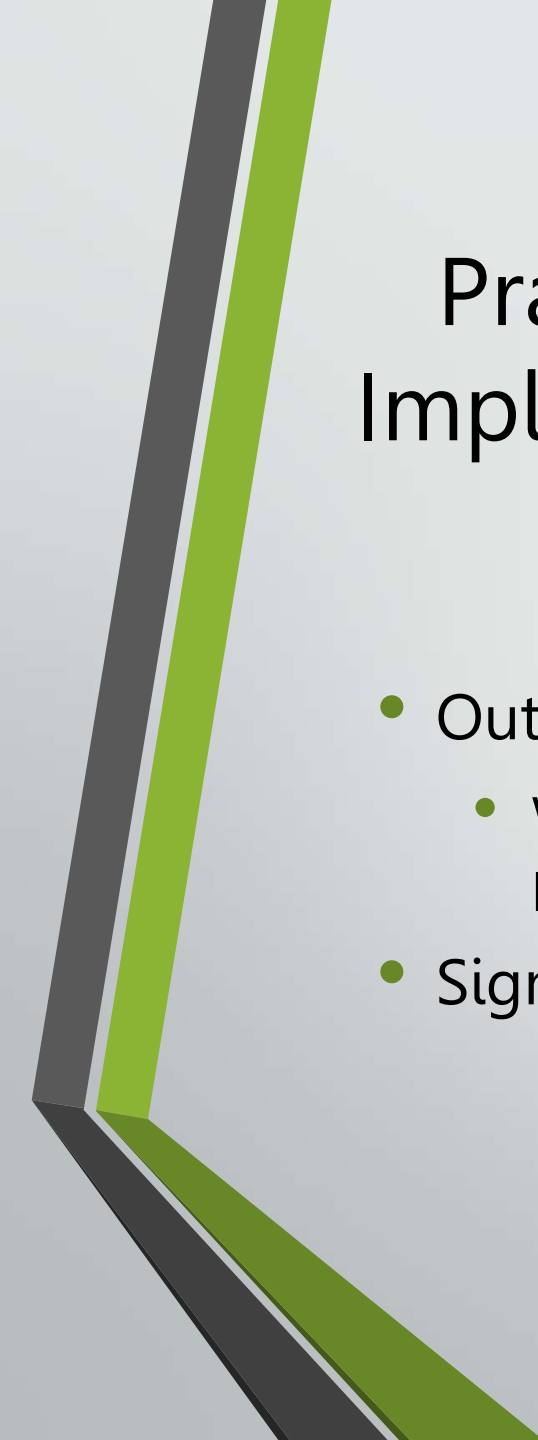
## FIELD SITE DESIGN



- 
- Overall the field locations for vegetated blankets showed removal of heavy metals from runoff. However, increase in nitrogen and phosphorous due the compost blanket itself.
  - Follow-up NCHRP 14-39 design guidance will be forthcoming from the study.

# Enhancement of Stormwater Infiltration, Water Retention, Nutrient Removal, and Plant Growth in Bioretention Media Through Biochar Amendment Paul Imhoff, University

- Study used a mix of biochar (think Kingsford but pellets) and sawdust, and other media to test the ability of the biochar to remove nutrients
- Delaware mix, North Carolina mix and ratios of biochar in study
- Biochar increased phosphate leaching in bioretention mix overall, greater infiltration in NC biochar study
- Secondary study on plants and bioretention media after creating labd "drought" conditions
- NC mix plants better suited and survived "drought" study



# Practical Lessons Learned on Design and Implementation of BMPs in the Right of Way

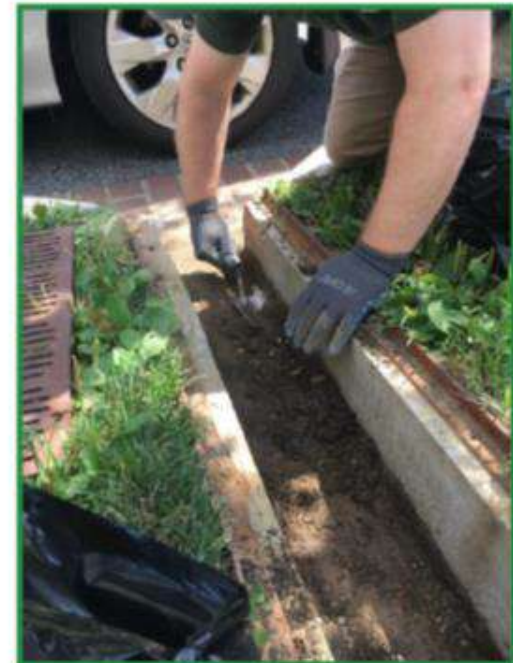
- Outreach with the public early and often
  - Why they are needed, the need for street sweeping (porous concrete), loss of parking
- Sign facilities (rain garden descriptions, do not mow)



## 2 DESIGN



- Keep maintenance in mind
- Involve the public
- Use underutilized space e.g., under the sidewalk



## 2 DESIGN



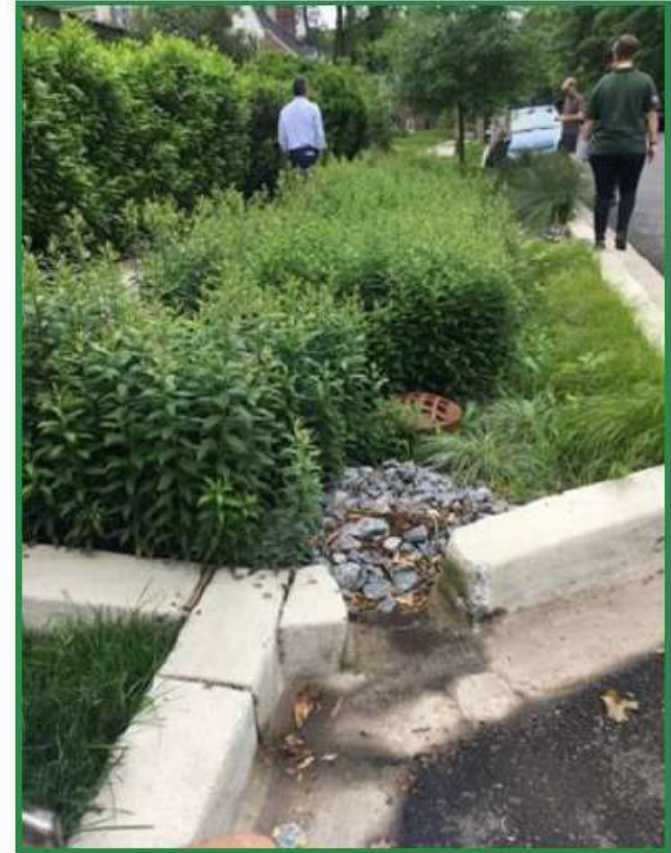
- Remember to take into account the area outside the ROW
  - Stormwater volume
  - Tree impacts
  - Homes





### 3 CONSTRUCTION

- Make lots of notes on plan sets
- Have staff on hand or construction management (preferably the designers)
- Keep in mind timing of construction
  - Minimize disturbance
  - Time of year



## 4 MAINTENANCE


### ➤ Plan for reconstruction





# Lectern Session 1452 Seasonal Climatic Effects on Transportation Infrastructure

- **Network-Level Risk Evaluation of Unbound Pavement Foundation Layers to Extreme Weather Events Using Remote Sensing** Joe Rosalez, California State University, Los Angeles
  - Used NASA Soil Moisture Active Passive (SMAP) satellite to analyze pavement stress from to Hurricane Harvey

- 
- Characterizing Influence of Water Access Condition During Freezing on Resilient Behavior of Base Course Materials Lin Li, Nanjing Forestry University
    - Study looked at the frost freeze cycle on Alaskan base course soils when they are saturated and how frost-freeze cycles effect their strength
  - Poroelastic Modeling of Pore Pressure Development in Unbound Pavement Bases Zhe Wan, University of Pittsburgh
    - Poroelastodynamic Finite Integration Technique (PEFIT) was used to show how increased pore pressure in saturated roads affects conditions
  - Microstructure-Based Random FEM Model for the Freezing Effects in Soils and Cold Region Retaining Walls Shaoyang Dong, Case Western Reserve University
    - Conclusions showed that not only having drainage of water in backfill but also insulation helped mitigate lateral frost heaving

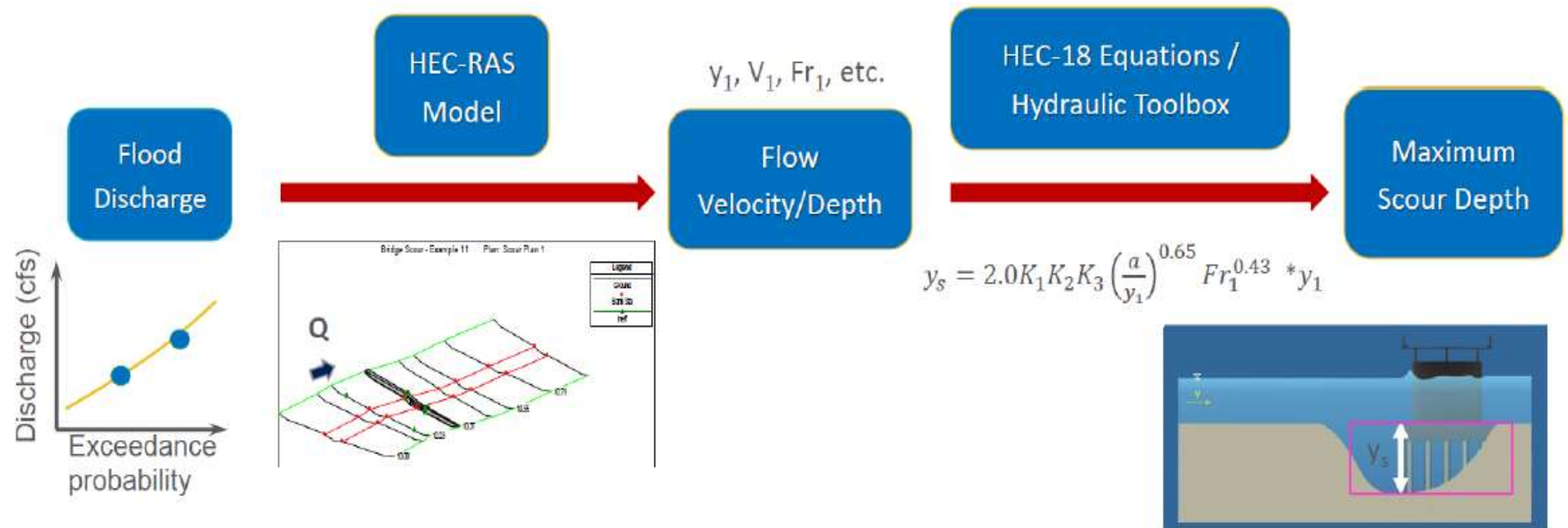
# Lectern Session 1524 New Directions in Hydraulic Scour Design

- The FHWA Scour Program Joe Krolak, Federal Highway Administration
  - Current standard uses HEC-18, assumes a uniform layer of soil for the site
    - Newer 2D modeling improves flow calculations
  - NextScour balances the two variables (flow and soil) for calculations

# HEC-18

## Hydraulics: What is Typical Hydraulic Design Practice?

### 1D Modeling & HEC-18

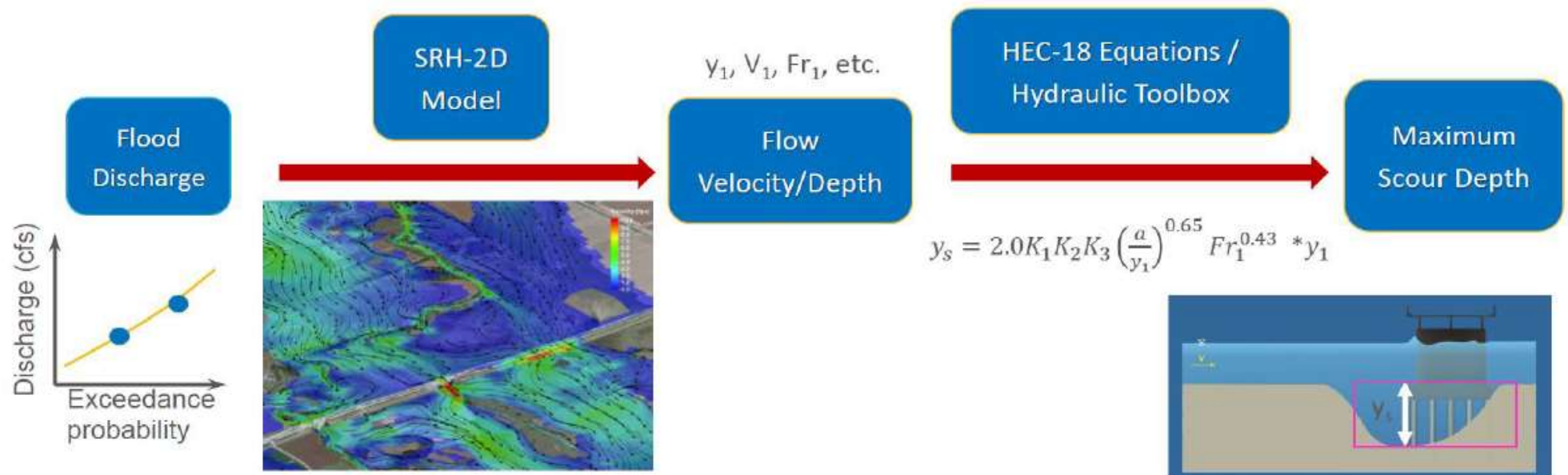




# 2D Modeling & HEC-18

## Hydraulics: What is Improved Hydraulics Design Practice?

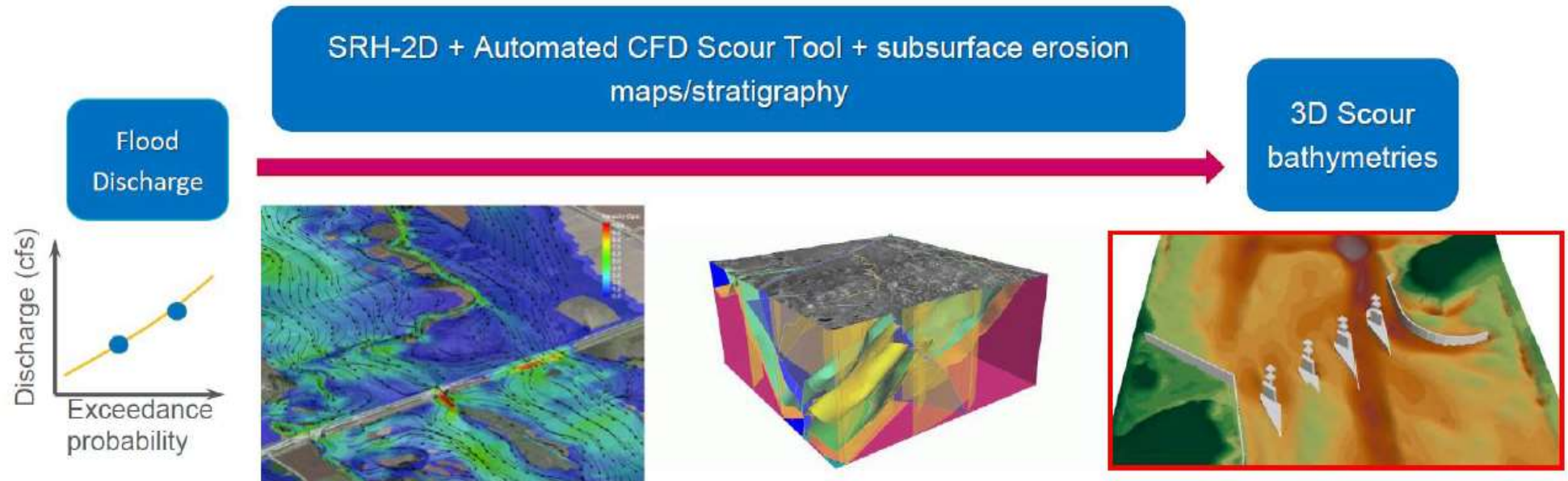
### 2D Modeling & HEC-18



# Automated CFD Scour Tool

## Hydraulics: What about a Future Design Practice???

### *Automated CFD Scour Tool*

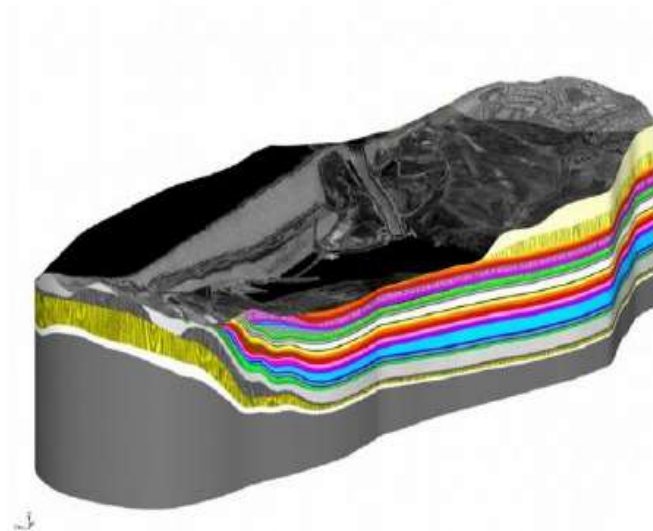


U.S. Department of Transportation  
Federal Highway Administration

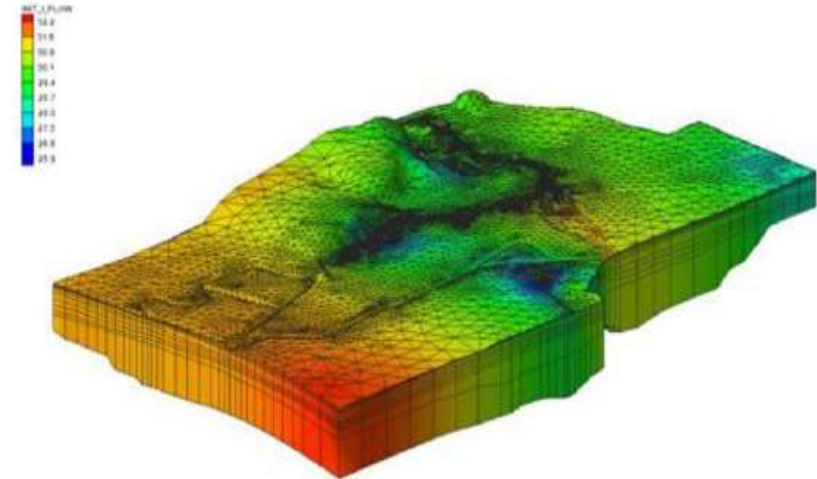
- NextScour uses testing of soils, erosion indexing and mapping to find out the strength of soils at each site location

## Geotechnical: Erosion Mapping

### *Stratigraphy Development*



### *Subsurface Erosion Maps*





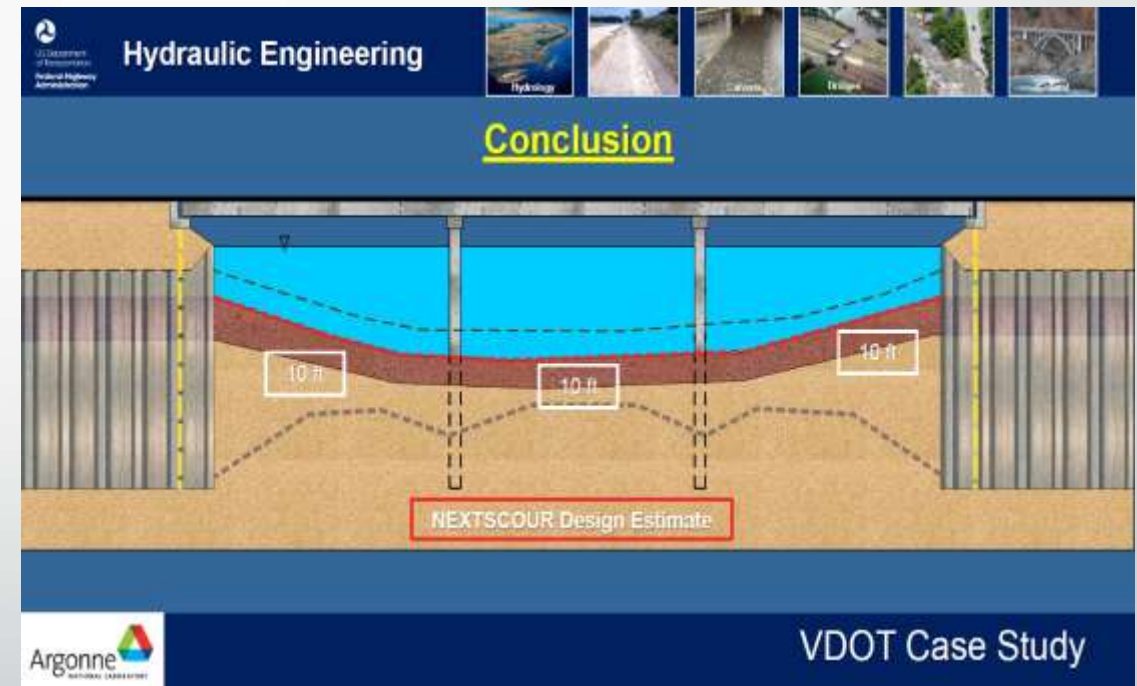
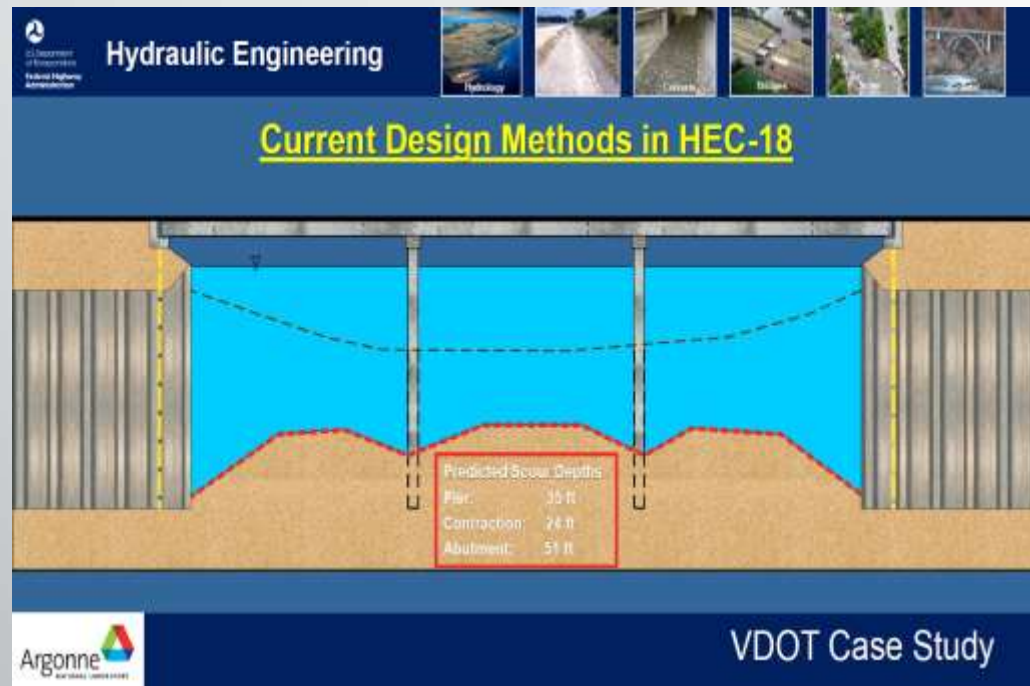
## **3D CFD Scour Calculations**

KornelKerenyi, Federal Highway Administration (FHWA)  
Marta Sitek, Argonne National Laboratory

- Study used a case study VA Route 671 Bridge Replacement over the Nottoway River in NextScour



# Comparison





# **FHWA HEC-25:**

## **Update to Highways in the Coastal Environment**

Scott Douglass, South Coast Engineers

- HEC-25 Manual Highways in the Coastal Environment will combine the 1st edition (2008) and 2nd edition (2014) into a new document in weeks
  - Revised document will have 28-pg glossary and new sections
  - Coastal Highway Vulnerability Assessment
    - Engineering Risks at the Coast
    - Analysis Methods for Vulnerability to Extreme Coastal Storms
    - Adaptations Strategies for Coastal Highways
  - NHI Course 135082 Highways in Coastal Environment highly suggested

# Lectern Session 1589 Current Practices in Highway Stormwater Management

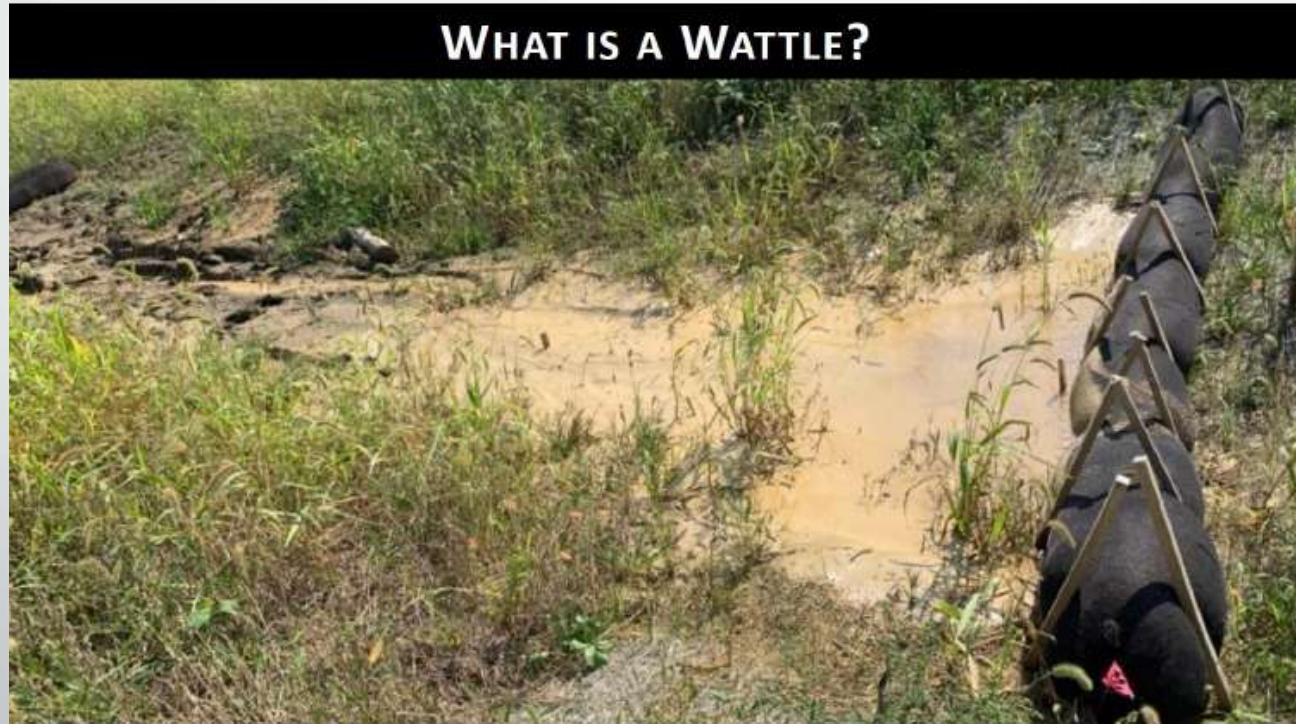
- **Evaluating Results from PennDOT's Statewide SCM Inspections**

Winnie Okello, PennDOT Jeffrey MacKay, NTM Engineering, Inc.

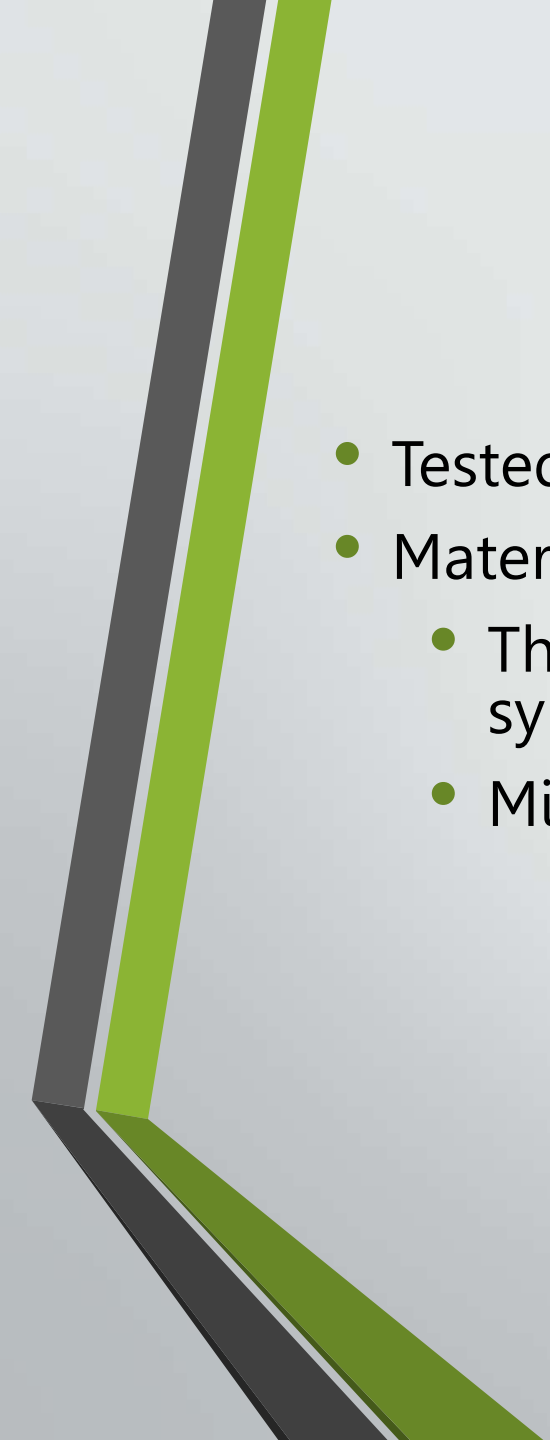
- PennDOT owns over 2,700 Stormwater Control Measures (SCM), adding 5-10% per year
- Has sites mapped by watershed and a set inspection, maintenance and training schedule
- PennDot SCM Maintenance Manual (Publication 888)
- Lack of construction QC and maintenance upkeep = SCM rehabilitation

# Hydraulic Performance Evaluation of Wattles Used for Erosion and Sediment Control

J. Whitman, Middle Tennessee State University





- 
- Tested impoundment ratio, subcritical length ratio for various materials
  - Materials ranged from straw, wood chips, coir, synthetic, miscanthus fiber
    - The standard Iowa DOT wattle (Excelsior) did not test as well as synthetic or miscanthus
    - Miscanthus had superior moisture and sediment absorption



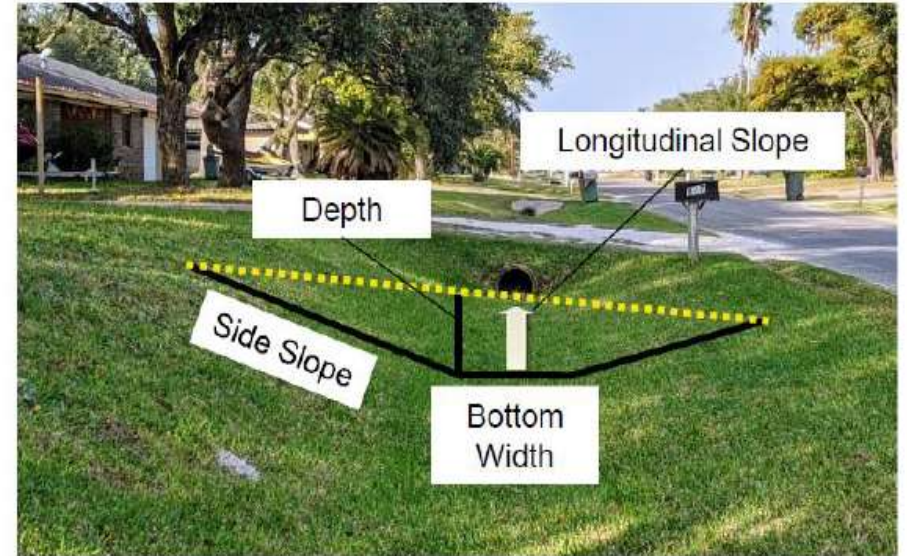
# **Forensic Evaluation of Roadside Ditches in Urban Settings Using Mobile LiDAR**

Nasir Gharaibeh, Texas A&M University, College Station

- Surveyed roadside channels in Sunnyside neighborhood (suburb of Houston, Harris) county
  - Truck mounted LiDAR driving at posted speeds.
- Measured 6 different attributes

# Attributes for Roadside Channels

1. Depth
2. Longitudinal slope
3. Bottom width
4. Side slope
5. Number of subsurface pipes/culverts
6. Length of subsurface pipes/culverts



# Lectern Session 1718 Panel Discussion on Collecting and Managing Vegetation Assets on the Roadway

- Raymond Willard, Washington State Department of Transportation
  - WSDOT has included a chapter on vegetation management in their TAMP, integrated vegetation management plans
  - Future research and report from standing committee on Roadside Maintenance Ops on integrated vegetation management
- John LeFante, DBI Services, Inc.
  - Private consulting firm that tracks, analyzes and perform roadside vegetation maintenance
- John Krouse, Maryland Department of Transportation
  - Track location and quantity of pesticide treatment along roadway for budgetary and regulatory requirements





**TRB**  2020  
ANNUAL MEETING

99<sup>TH</sup> Annual Meeting  
Washington, D.C.  
January 12–16, 2020

# DIVISION OF HIGHWAY & TRAFFIC DESIGN

BUREAU OF ROADWAY DESIGN

**Jhonatan Diaz-Santana**

# Workshops, Presentations, Events & Meeting

- Impacts Connected and Automated Vehicles Could Have on Geometrics
- Assessing the Effectiveness of Managed Lane Strategies for the Near-Term Deployment of Cooperative Adaptive Cruise Control
- An Update on NCHRP Project 20-24(112): Connected Roadway Classification System Development
- The Impacts of CAVs: Compromise Between Law and Design

# Workshops, Presentations, Events & Meeting

- Designing Safer Streets in Developing Countries: Hands-on Workshop
  - Road Safety Challenges for Pedestrians and Cyclists in Emerging Economies
- Introduction to the Global Street Design Guide
- Hands-on Workshop: Let's Redesign an Intersection

# Workshops, Presentations, Events & Meeting

- Geometric Design Research: Freeways, Intersections, and Alignments
  - Exploration- and Exploitation-Based Ant Algorithm for Optimized Vertical Highway Alignment
  - Design Optimization of Single-Lane Entrance and Exit Ramps
  - Roadside Safety Design Committee Meeting



# Workshops, Presentations, Events & Meeting

- Design of Barriers for Containment of Trucks
  - Development and Testing of Structurally Independent Foundations for High-Speed Containment Concrete Barrier
  - Design and Full-Scale Testing of New Mash Tl-4 Alaska 2-Tube Bridge Rail
  - Development and Testing of a Test Level 4 Concrete Bridge Rail and Deck Overhang
  - Development of a Test Level 4, Side-Mounted, Steel-Tube Bridge Rail

# Workshops, Presentations, Events & Meeting

- Advancements in Mapping and 3D Technologies Using LiDAR and Photogrammetry
  - Pothole Mapping and Patching Quantity Estimates Using LiDAR-Based Mobile Mapping Systems
  - Applicability of Photogrammetry for Inspection and Monitoring of Dry-Stone Masonry Retaining Walls
  - A Voxel-Based Methodology for Automated 3D Sight Distance Assessment on Highways Using Mobile LiDAR Data

# Workshops, Presentations, Events & Meeting

- Design and Analysis of Roadside Barrier Systems
  - Development of the NCHRP 17-43 Roadway Departure Database
  - In-Service Performance Evaluation of Median Cable Barriers and Strong-Post W-Beam Guardrails on I-85 in Alabama
  - Crash Testing and Evaluation of Culvert-Mounted Midwest Guardrail System
  - Evaluation of W-Beam Guardrail and Terminal Posts Installed in Metal Sleeves
  - Modeling and Simulation for the Design and Evaluation of Roadside Safety Hardware
  - European Rules for the Use of Virtual Testing and Examples

Thanks!







# Division of Bridge Engineering and Infrastructure Management

Bureau of Structural Engineering

**Xiaohua “Hannah” Cheng, Ph.D., P.E.**

# **NJDOT Recap of TRB Annual Meeting**

## **- Bridges and Structures**

Xiaohua “Hannah” Cheng, Ph.D., P.E.

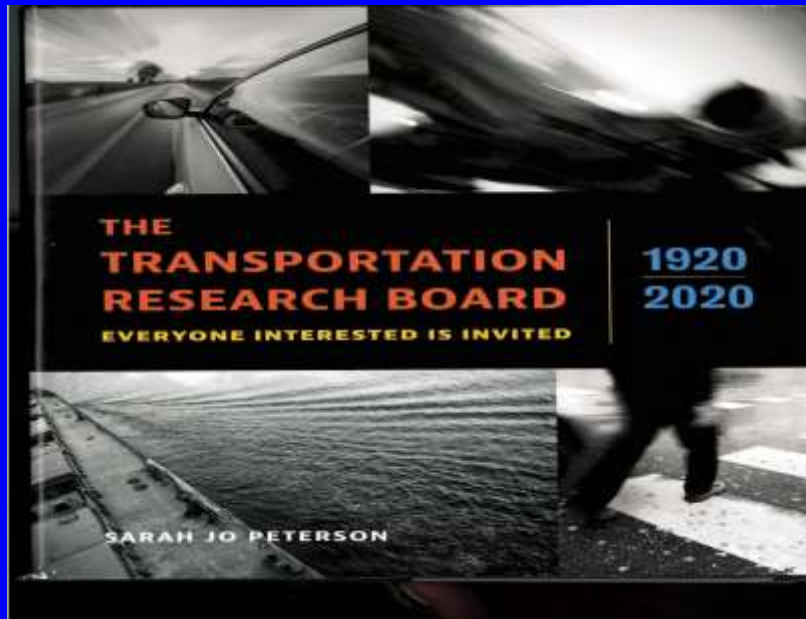
Bureau of Structural Engineering,  
Division of Bridge Engineering and Infrastructure Management,  
NJDOT



Feb. 13, 2020, NJDOT MPR



# TRB is Celebrating 100 Year Anniversary



2020:

- Total attendees: ~13,800
- Papers submitted: 6000+

Following is recap of Workshops, Sessions, Events, and Committee Meetings I attended.

# Workshops

- **Workshop 1086 – “Employing Weigh-in-Motion Data to Design, Rate, Manage, and Preserve the Nation’s Bridge Structures”**
  - Recent Truck OS/OW research topics (*FHWA Report; Permit Load; Load Factor/LRFR; FAST Act EV; SHV evaluation; Truck platoon*)
  - WIM sites/Traffic data (ADTT); Truck regulation; Bridges; Roads; Traffic pattern;
  - Case study: LADOT; NYSDOT
  - Takeaway: 1) Site-specific WIM for bridge evaluation;  
2) Statewide WIM for NJDOT Permit Vehicle update
- **Workshop 1780 – “Resilience, Safety, and Security of Bridges and Tunnels: US and International Topics”**
  - FHWA Bridge Security Manual updates (to include vulnerability analysis)
  - FHWA Bridge Security Research Gaps
  - Tunnel Safety
  - **Case study and Consequence of Bridge Fire (e.g. NJTPA)**
  - PIARC/WRA Program to Improve Resilience of Roads
  - FIU Pedestrian Bridge Collapse analysis (other than NTSB report)



# Lectern Sessions and Event

- **#1265 – “FHWA Long-Term Bridge Performance Program” (LTBP)**  
*(Historical design/construction changes; Climate change cycles; NBIS data implementing; Phase III data collection/analysis; Search in InfoBridge™)*
- **#1110 – “Advances in Bridge Engineering and Performance”** *(Link slab; LRFR for EV; Adhesive anchor bolts; skew bridge)*
- **#1184 – “Corrosion Evaluation and Preservation in Transpt Structures”**  
*(MSE wall; CFRP PS tendon; A1010 stainless bridge)*
- **#1591 – “Current Topics in Steel Girder Bridges”** *(AWS D1.5 weld inspection PAUT; Simple for DL Continue for LL for seismic app; Curved steel girder integral abutment bridge; Long span bridge steel/concrete connection mass concrete control)*
- **#1668 – “Seismic Bridge Engineering Research, Analysis, and Design”**
- **#1712 – “Seismic Bridge Engineer: Historic Perspective”** *(USGS seismic hazard maps evolution; Lessons learned from Earthquakes; AASHTO seismic design code evolution)*
- **Chair’s Luncheon Key Note - Transportation Secretary Elaine Chao**
  - **Autonomous vehicles DOT-WH initiative (AV 4.0)** *(Data-sharing partnership program b/t government and private sector)*
  - New pilot program to deploy V to V and V to infrastructure communication (V2X) for emergency response

# Committee/Subcommittee Meetings

- **AFF10 – “General Structures”** (*AFF80 FRP merged; BIM modeling; Information delivery modeling; FDOT WIM; Bridge aesthetics*)
- **AFF10(1) – “Traffic Structures” Subcommittee** (NCHRP; KSDOT HMLT)
- **AFF20 – “Steel Bridges”** (NSBA update; ASTM update; A1010; RNS)
- **AFF40 – “Testing and Evaluation of Transpt Structures”**
- **AFF50 – “Seismic Design and Performance of Bridges”**
- **AFH70 – “Fabrication and Inspection of Metal Structures”**
- **TRB AFF00/AASHTO CBS/FHWA Structures Collaboration**
  - FHWA Bridge Office: *Proposed new rules on bridge inspection – risk based intervals & critical findings; NTSB on FIU bridge collapse investigation*
  - FHWA R&D updates: *e.g. 3D printing for bridges*
  - NCHRP project updates: *e.g. MASH implementation; AASHTO CBS Roadmap for implementation*
  - AASHTO CBS vs TRB matching committees



# DIVISION OF TRANSPORTATION MOBILITY

**Jeff Rockower**  
**Ridwan Ahmed**

# TRB

& the future of transportation

## TRANSPORTATION MOBILITY

JEFF ROCKOWER

RIDWAN AHMED





# TRB 2020 – Sessions Attended

Jeff Rockower

134

1. 1022 Evolution of Project Delivery Information Systems: Where We Were and Where We Are Headed
2. 1051 Data Governance Issues for Transportation Agencies
3. 1097 Blockchain: Opportunities and Challenges for the Transport Sector
4. 1163 Chief Information Officers Roundtable: The Pressing Issues and Concerns from Our Leaders
5. Task Force on Data Privacy, Security, and Protection Policy
6. 1314 Best Practices for Handling and Responding Before, During, and After a Cyber Attack or Data Breach
7. Cyber Security Subcommittee, ABR10(7)
8. 1455 Using Artificial Intelligence to Unlock the Hidden Value of Asset Management Data: Transforming Data into Advanced Decision Making
9. 1582 Evaluations and Applications of Emerging Crowdsourced Data Sets
10. 1663 Mainstreaming Resiliency: Physical Security Faces New Challenges
11. 1707 Keeping Our Nation's Transportation Assets Secure from Cyber Attacks
12. 1739 Digital Asset or Digital Liability
13. **1741 Data Governance is a Journey, Not a Destination**
14. 1770 Research Data Management for State DOTs

# Best (and worst) practices in data governance.

JEFF ROCKOWER

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136

- ▶ Data Governance is a discipline that provides clear-cut policies; procedures; standards; roles; responsibilities; and accountabilities to ensure that data is well-managed as an enterprise resource. —from the DGPO Data Governance Glossary
- ▶ “Data Governance is a system of decision rights and accountabilities for information-related processes, executed according to agreed-upon models which describe who can take what actions with what information, and when, under what circumstances, using what methods.” — from the Data Governance Institute
- ▶ When you refer to governance, be careful! Depending on the context, “Data Governance” could refer to:
  - ▶ organizational bodies
  - ▶ rules (policies, standards, guidelines, business rules)
  - ▶ decision rights (how we “decide how to decide”)
  - ▶ accountabilities
  - ▶ enforcement methods for people and information systems as they perform information related processes.

# Best (and worst) practices in data governance.

137

## Necessities of Good Data Governance

- ▶ 1.) You need to develop your own definition of Data Governance.
  - ▶ It's Meaning
  - ▶ It's Purpose
  - ▶ It's Value to the Organization



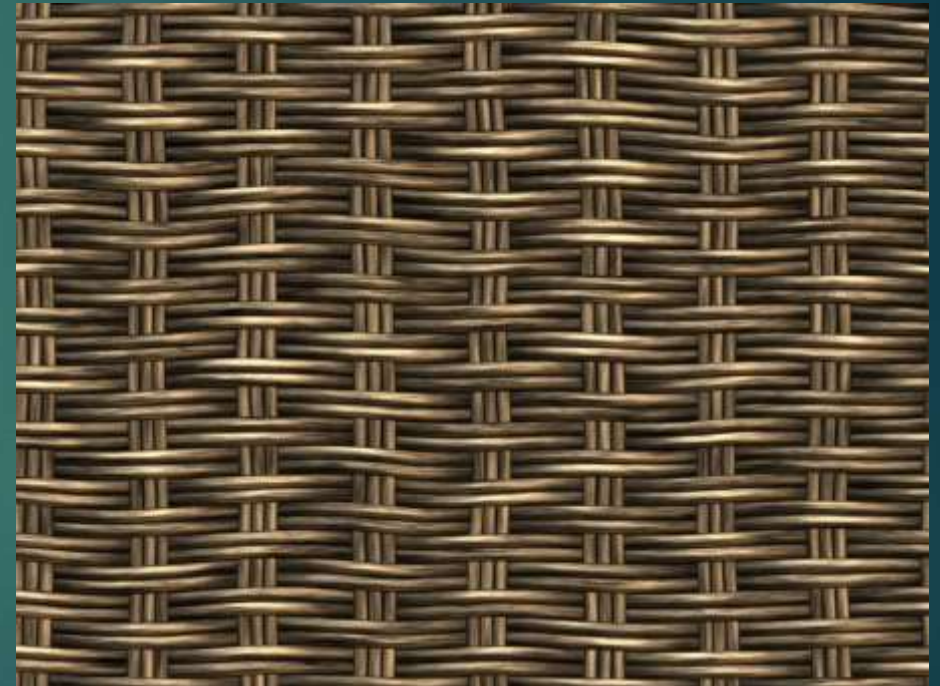


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138

## Necessities of Good Data Governance

- ▶ 2.) You need to develop a strategic and tactical plan that not only considers conventional components but:
  - ▶ Organizational Culture
  - ▶ Organizational Structure
  - ▶ Organizational Readiness
  - ▶ Organizational Decision Making
- ▶ Data Governance needs to be woven into the organization



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139

## Necessities of Good Data Governance

- ▶ 3.) You need to realize that Data Governance is a Journey:
  - ▶ Technology rapidly changing(ML & AI)
  - ▶ Data in motion vs. Data at rest
  - ▶ Changing role of organization
    - ▶ “Construction Co.” vs. “Mobility Maximizer”
    - ▶ Identity
  - ▶ Data Governance –Prescribed to Distributed to Emergent
  - ▶ 3<sup>rd</sup> Party Data



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140

## Necessities of Good Data Governance

- ▶ 4.) You need to be adequately resourced/supported to succeed
  - ▶ Given the complexity and long term effort, dedicated staff must be assigned
  - ▶ Can't continue to load someone's plate
  - ▶ Executive sponsorship/involvement necessary as barriers are encountered or to reinforce guiding Principles.





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141

## Necessities of Good Data Governance

- ▶ 5.) You need to be Collaborative and have Good Communication Skills
  - ▶ First and foremost, this is an enterprise activity
  - ▶ No one individual has the ability to see the complete “whole”
  - ▶ The vision for data governance needs to be Communicated in a clear, compelling way
- ▶ Data Governance is not an end in itself. It is not only about allowing us to integrate data, but integrating the organization. It also is a powerful force that can align your organization to its mission and vision. One in which you can truly engage your workforce to help create a successful future.





## **TRB 2020 - Sessions Attended :**

### **Ridwan Ahmed**

- 1. Autonomous Vehicles and Travel Behavior- 1101**
- 2. Evaluation of Signs and Markings Based on User Needs – 1191**
- 3. Traffic Control Devices Challenge: Connected and Autonomous Innovations for Improving Work Zone Safety—Hybrid Session – 1252**
- 4. Technology Assisting to Make Better Work Zones -1309**
- 5. Speed Feedback Signs, Curve Warning Treatments, and the History/Future of Traffic Control Devices -1388**
- 6. Public Transit Innovation: Past, Present, and Future -1466**
- 7. Autonomous Vehicle and Unmanned Aerial Systems Education and Training: The Future Is Now -1511**
- 8. Information and Communications Technologies and the Evolution of Travel Choices – 1584**
- 9. Driving and the Technology of Weather -1672**
- 10. Highway Safety Performance Research- 1721**

# Public Transit Innovation: Past, Present, and Future -1466

## The Evolution of Transit

### Regional Transportation Commission (RTC), Southern Nevada

#### Objective:

A crash prevention pilot program along a key corridor of Interstate 15 in Las Vegas, Nevada

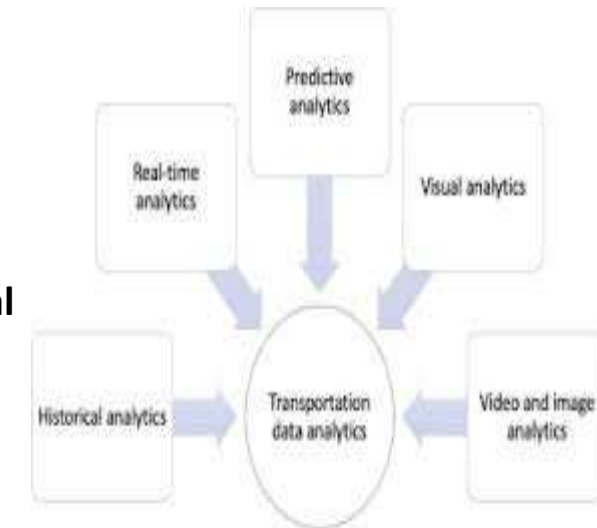
#### Involved Agencies:

The pilot was led by Waycare, an AI-driven mobility solutions provider, in partnership with the Regional Transportation Commission of Southern Nevada (RTC), Nevada Highway Patrol (NHP) and the Nevada Department of Transportation (NDOT).

#### Goals:

- Connect People
- Congestion Capacity & Safety
- Data Driven Solutions

By: Ridwan Ahmed



## Data Sources:

Waycare system uses data from

- Connected cars
- Road cameras
- Apps like Waze
- Social Media
- Historical Data



## Benefits:

- Number of primary crashes **reduced by 17 percent** along the Interstate 15 Las Vegas.
- Predictive analytics, gave the city's safety and traffic management agencies the ability to take preventative measures in high risk areas.
- Preventative measures were deployed **91 percent** of drivers reduced their speed to below 65 MPH
- Waycare has been providing traffic agencies with alerts detailing when and where it **predicts an accident** is likely to take place. RTC then uses a message board system to deliver alerts to drivers, advising them to reduce their speed and drive with extra caution.
- **12 minutes average faster response** time by law enforcement



By: Ridwan Ahmed

## Evaluation of Signs and Markings Based on User Needs – 1191

### Freeway Traffic Sign Design for Interstate 80 Smart Corridor in California: A Driving Simulator Study

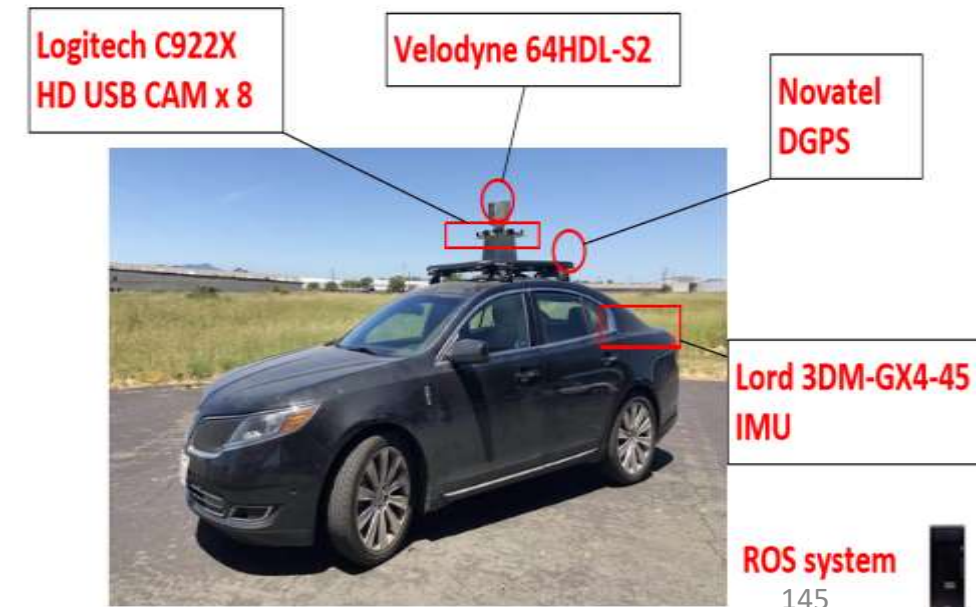
California PATH, UC Berkeley

#### Background:

- The Interstate 80 Smart Corridor under this study
- Caltrans installed Information Display Boards (IDBs) at six strategic decision points along the corridor
- Display innovative concepts of signs

#### Method of the Simulator Testing:

- Collect video data on I-80 corridor using instrumented car
- Replace IDB signs in the video with the IDB designs to be evaluated.





## Traffic Sign Categories and Design Factors:



Message Categories	Design Factors
1. Travel time and up to six lines messages	<ul style="list-style-type: none"><li>• Number of lines of messages</li></ul>
2. Transit travel time messages	<ul style="list-style-type: none"><li>• Transit logo vs. Text only</li><li>• Symbols for BART</li></ul>
3. Single-link GRIP	<ul style="list-style-type: none"><li>• Orientation: top-bottom vs. bottom-top</li><li>• With or without roadwork legend</li><li>• Number of destinations</li></ul>

### Testing procedure:

- Provide participants with one destination before each trip.
- Randomly displayed one sign in each trip.
- Participants control the speed of the simulator.

### Subjective questions :

After completing each trip, the following questions were asked about each sign.

- What is the sign about?
- Detailed information about the destination.
- Is it easy or difficult for you to understand the sign? (rating scale: 1-5)



## Findings:

### ❖ Up to six lines messages

- Five or six lines of messages were significantly harder to understand comparing with the 3-line travel time message.

### ❖ Transit travel time messages

- Transit logos were preferred.
- It was hard to understand the origin of the transit travel time.
- Likely to think the time is “driving to the station” because of seeing the sign while driving on freeway.

### ❖ Single link GRIP

- Bottom-top orientation was mostly preferred.
- Legend helped to understand the traffic, but also made the sign busy and more likely to be perceived inaccurately.
- Single link GRIPs with four destinations were more likely to be perceived inaccurately comparing with single link GRIPs with three destinations.



# Traffic Control Devices Challenge: Connected and Autonomous Innovations for Improving Work Zone Safety-Hybrid Session –1252

## “Connected” Temporary Traffic Control Devices

### Oregon State University

#### Introduction:

Work zones present a unique challenge in transportation safety because they disrupt standard traffic flow through an area.

According to Bai and Li (2007):

- Over half of fatal work zone crashes were due to driver inattention

According to National Work Zone Safety Information Clearinghouse:

- 94,000 work zone crashes in the United States in 2017
  - 25,000 - injury only
  - 710 - fatality

#### Causes of work zone crashes:

92% of work zone crashes are from human error (University of Kansas)

- 52% - inattentive driving
- 25% - speeding
- 15% - other human errors

8% - non-human error





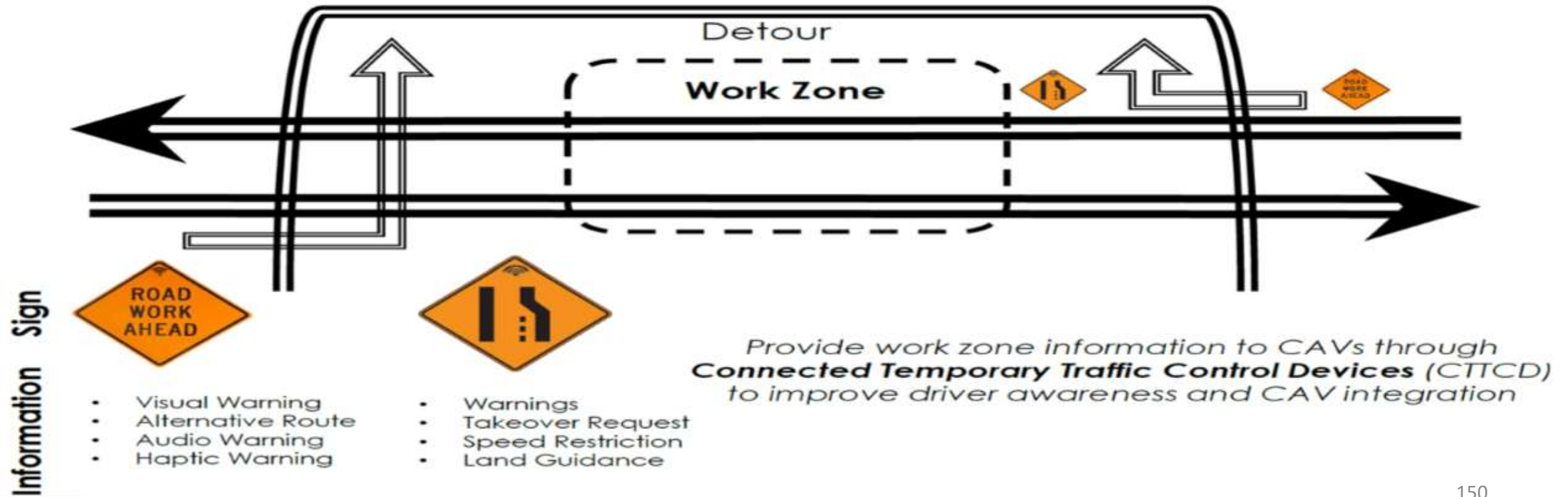
## Solution:

The connected capability of the “Connected” Temporary Traffic Control Device (“C”-TTCD) facilitated using Dedicated Short-Range Communications (DSRC) technology. A modified MUTCD sign that utilizes DSRC via a Roadside Unit to

- Push upcoming road work conditions to CAVs
- Alert the driver, as well as the vehicle, to make a change in driving behavior or navigation
- Increases Attention
- Reduces Speed



W20-1  
(w/ WIFI symbol)



### **Feasibility/ Applicability:**

**Connected” Temporary Traffic Control Device (“C”-TTCD) are feasible and applicable for deployment in the near and long term because:**

- **“C”-TTCDs are resilient to various weather conditions, roadway types, and environments.**
- **The “C”-TTCD concept is easily transferable to other roadway projects**
- **Alterations to legal MUTCD sign definitions should cause no difference in understanding for non-CAV vehicles.**

# TRB

& the future of transportation

Transportation Mobility

# Thank You

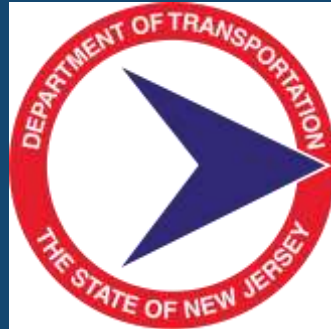


PLEASE WAIT  
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QUESTIONS?





THANK YOU!