

Research Idea Form

9. Impact

If research is successfully completed, what benefits, both quantitatively and qualitatively, will SHA gain?

- Discuss how the potential research can be used to inform policy and/or practice.
- Discuss how potential research can be used to educate the public and/or stakeholders.
- Discuss the impact of the potential research for SHA.
- Discuss implementation potential within SHA.

Here is an example of the impact and implementation potential of a transportation research project on a Complete Streets project:

Implementing a research project focused on Complete Streets within the Maryland State Highway Administration (SHA) holds the promise of a wide range of benefits, spanning reduced traffic incidents, improved accessibility, policy refinement, heightened public engagement, increased economic efficiency, and enhanced community living standards. Research indicates a concerning 46% increase in annual pedestrian fatalities from 2009 (4,109) to 2016 (5,987) but implementing Complete Streets policies effectively could reverse this trend. Thoughtfully designed complete streets have the potential to yield a notable 40% decrease in pedestrian fatalities, while prioritizing active transportation modes such as walking and cycling. Additionally, the integration of traffic calming measures holds promise for up to a 15% reduction in traffic congestion, thereby potentially decreasing commute times. These findings are anticipated to galvanize public and stakeholder support, emphasizing the concrete benefits that Complete Streets can deliver. Integrating these insights into SHA's existing guidelines ensures that Complete Streets principles become a cornerstone of Maryland's transportation planning and development, fostering safer, more inclusive, and accessible urban environments across the state. *

Enter your answer

Research Idea Form

10. Urgency Ranking (1-3) *

Note: 1=Moderate, 2=High, 3=Critical

- 1. **Moderate:** Moderately urgent and should be addressed in a timely manner
- 2. **High:** Highly urgent and requires prompt attention and action
- 3. **Critical:** Extremely urgent and demands immediate and top-priority action

1 2 3

Thank you for completing the form.

The Research Team at OPR will contact you if there are any questions about the proposed research project.

The completed form will be provided to one of your senior managers to confirm urgency and potential implementation of this research need.

APPENDIX M. MDOT SHA – PROPOSAL EVALUATION FORM

Please answer the following questions. Provide comments as appropriate and be sure to indicate any modifications that should be made to the proposal before a notice-to-proceed is issued. **Comments are required for all NO responses. If PARTIALLY is selected, indicate in the comments if additional information is needed.** The scores assigned to each section will be added together to provide an overall score for the submission. Submit completed review forms to research@mdot.maryland.gov. Please do not submit handwritten forms.

Reviewer Name(s)	Reviewer Office(s)	Reviewer Phone Number(s)

Proposal Information		
Project Title	RFP #	Proposal ID

			1. Does the proposal contain a clear and concise description of the problem to be solved?
			2. Does the proposal demonstrate a good understanding of the problem and provide possible solutions?
			3. Does the proposal demonstrate the researcher's knowledge of the topic?
Internal Comments:			Feedback for Researcher:

			1. Does the proposal clearly identify the technical objectives upon which the research team will focus?
			2. Are the goals of the research clearly defined?
Internal Comments:			Feedback for Researcher:

Yes	Partially	No	Research Plan	
			1. Is the research methodology described in sufficient detail to determine the probability of achieving the objectives?	
			2. Is the scope of work commensurate with the expectations of the problem statement?	
			3. Does the proposal describe the findings of preliminary literature searches?	
			4. Is the current state of practice clearly described in the proposal?	
			5. Does the work plan include tasks/data to be performed or supplied by MDOT SHA?	
			a. If yes, will MDOT SHA be able to provide the noted assistance? If so, provide the name(s) and phone number(s) of the individual(s) who can provide the assistance.	
			b. Will MDOT SHA incur costs that need to be funded as a result of these tasks (i.e., MoT, soil borings, etc.)?	
			Name 1:	Assistance type:
			Phone 1:	Assistance type:

			6. Does the proposal describe the division of work between the prime contractor and the subcontractor(s)?
Internal Comments:			Feedback for Researcher:

Yes	Partially	No	Implementation and Training Plan
			1. Does the proposal provide a preliminary discussion on how MDOT SHA may implement the results of the research?
			2. Is the potential application realistic and appropriate for the scope of work proposed? Please explain in the comments section.
			3. Is the anticipated result in-line with the proposed research plan?
Internal Comments:			Feedback for Researcher:

Yes	Partially	No	Deliverables
			1. Does the proposal list all expected products and reports that will be provided to MDOT SHA during and at the conclusion of the research?
Internal Comments:			Feedback for Researcher:

Yes	Partially	No	Project Schedule
			1. Is the project schedule complete and reasonable? Identify concerns in the comments.
			2. Is a graphical representation of the scheduling included?
Internal Comments:			Feedback for Researcher:

Yes	Partially	No	Itemized Budget
			1. Is the proposed budget reasonable and correct for the scope of work as defined in the proposal? List any needed modifications below.
			Suggested Modifications:
Internal Comments:			Feedback for Researcher:

Yes	Partially	No	Equipment & Facilities
			1. Does the proposal demonstrate that the researcher has access to facilities and equipment required to complete this work?
			2. If it is absolutely necessary to purchase equipment using project funds, a. Is the itemized cost information included in the budget? b. Is a justification provided?

Internal Comments:	Feedback for Researcher:
---------------------------	---------------------------------

Yes	Partially	No	Research Team
			1. Does the proposal demonstrate that the research team has the capability to successfully perform this research?
			2. Does the proposal explain each team member's role on the project?
			3. Based on your knowledge of the PI's existing project commitments, are you confident that the PI has enough time available for this project?
Internal Comments:			Feedback for Researcher:

The following chart depicts evaluation weights, as applied to the proposal from a holistic evaluation perspective.

Category:	Rating	Weight
	1-10	
Problem Statement & Background - indication of a good understanding of the scope of work		20%
Objectives & Research Plan - consider consistency with the objectives described in the problem statement and the scientific and practical aspects of the research methodology		30%
Implementation and Training Plan - a realistic appraisal of the prospects for successful implementation of project objectives		5%
Deliverables & Schedule – a complete list of deliverables and a reasonable schedule		5%
Budget - total estimated cost of the project is reasonable for the work described		15%
Facilities & Equipment - research agency has necessary equipment and facilities to complete the project		5%
Research Team (Qualification & Availability) - researchers have demonstrated experience in the subject area, are qualified to perform the work required, and have enough time available for the project.		10%
Proposer's Past Performance - researchers have demonstrated good performance on past projects with MDOT SHA (see the last page for a list). Use neutral rating (5) for proposers who have never worked with SHA before.		10%
TOTAL		100%

Yes	No	GENERAL RECOMMENDATION
		1. Do you recommend this proposal for funding? If Yes, go to next section. If No, provide explanation for your decision below. This feedback will be provided to the researcher as explanation for non-selection.
		Explanation for Non Selection:

GENERAL RECOMMENDATION FOR SELECTED PROPOSAL	
	The proposal is acceptable as is. No modifications are needed.
	The proposal is acceptable with modifications as explained in the Feedback for Researcher sections above.
Internal Comments not noted above:	Additional Feedback for Researcher not noted above:

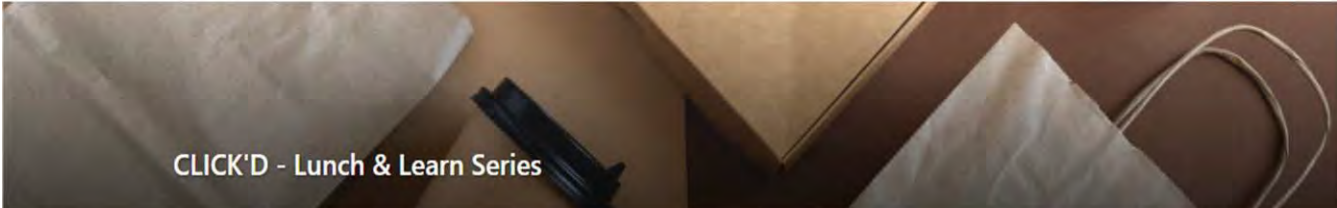
APPENDIX N. MDOT SHA – CLICK'D LUNCH & LEARN INTRANET LANDING PAGE

CLICK'D Main Landing Page

[Office Of Policy and Research](#) [SHA Intranet](#) [Research](#) [Knowledge Management](#) [AASHTO Publications](#) [PIA & Correspondence](#)

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CLICK'D - Lunch & Learn Series

Welcome!

The Knowledge Management Division is proud to present SHA's **CLICK'D** Lunch & Learn Series! Here we have educational and informative sessions that enrich knowledge both professionally and personally.

Ever have a moment where something wasn't quite clear, and then with a bit more context or information, it "clicks"? That's what we aim to do here!

'CLICK'D' Stands for:

- C** - Communication: We're effectively communicating our topics.
- L** - Learning: Participants are learning something new about the agency.
- I** - Information: The information is valuable to you either professionally, personally, or both!
- C** - Clarification: We encourage participants to ask questions, so things are clear.
- K** - Knowledge: Participants gain & retain knowledge about a process or office.
- D** - Driven: Our team is driven to ensure the above goals are achieved!

Join us to learn something new, gain additional knowledge about other SHA offices & processes, and enjoy your lunch while doing it!

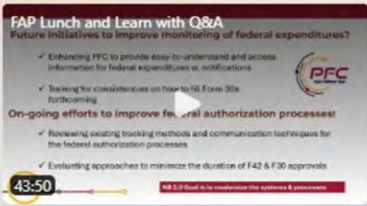
The next Lunch & Learn series will be held: TBD



Featured Lunch & Learns for 2025:

In case you missed the meeting, check out the recordings below!:

FAP Recorded Video 3/6/25



FAP Lunch and Learn with Q&A
Future Initiatives to Improve monitoring of federal expenditures?

- Enhancing PFC to provide easy-to-understand and access information for federal expenditures w/ notifications
- Testing for consistencies on how to fill Form 30s forthcoming
- On-going efforts to improve federal authorization processes!
- Reviewing existing tracking methods and communication techniques for the federal authorization processes
- Evaluating approaches to minimize the duration of F42 & F30 approvals

43:50 [View recording](#)

Lunch & Learn Flyers:



FEDERAL AID PROGRAM
NEW CHECKLISTS FOR FEDERAL AUTHORIZATION REQUESTS:

- PLANNING
- PRELIMINARY DESIGN
- FINAL DESIGN
- RIGHT-OF-WAY
- UTILITIES
- CONSTRUCTION
- XS/XQ CONTRACTS

This Lunch & Learn is to ensure a timely review and authorization of your federally-funded project.

Thursday, March 6, 2025
Time: 11:30 AM - 12:30 PM
Microsoft Teams

Federal Aid Program L&L 3/6/25

PowerPoint Slides / Q&A from Lunch & Learns:



Spring Clean Event - Records Disposal L&L 5/7/25



Spring Cleaning Event - Records Disposal PowerPoint

Season 1 of our Lunch & Learn Series:

Office Of Policy and Research
SHA Intranet
Research
Knowledge Management
AASHTO Publications
PIA & Correspondence

SHA
Knowledge Management
Office of Policy and Research (SHA)
Policies, Directives, and SOPs
Knowledge Sharing Center
Edit
Following
Site access

+ New
Promote
Page details
Preview
Analytics
Draft saved 7/8/2025
Share
Edit
Republish



lunch & learn

Hello!

Missed out on one of the lunch & learns from our amazing first season? Not to worry, we have the videos and presentation materials right here! Check out the first season of The Knowledge Management Division's CLICK'D Lunch & Learn Series!

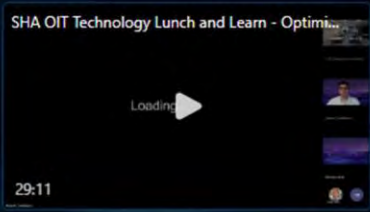
All the materials below are from 2024. We encourage you to scroll through and check out these informative sessions. If you have any questions, please email the KM Team via the link below.



All recordings from Season 1:



36:21



29:11



46:34

Lunch & Learn Flyers:



First CLICK'D Lunch & Learn - April 17, 2024



Optimizing Microsoft 365 - OIT
April 23, 2024

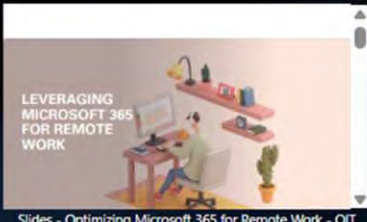


Connected and Automated Vehicles - OTMO
May 8, 2024

PowerPoint Slides / Presentation Materials from Lunch & Learns:



Q & A from Knowledge Management Lunch & Learn



Slides - Optimizing Microsoft 365 for Remote Work - OIT



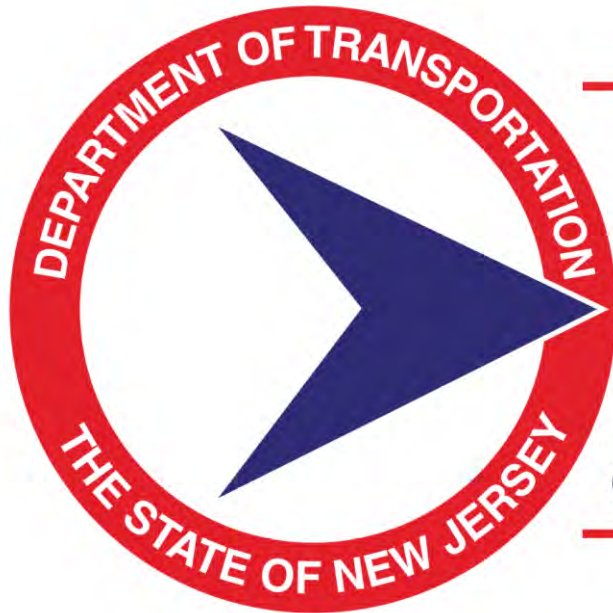
Slides - Connected / Smart Work Zones - OTMO

APPENDIX O. NJDOT – IN-HOUSE RESEARCH

In-House Research

Giri Venkiteela, PhD

BRIIT, NJDOT



**BUREAU OF
RESEARCH, INNOVATION
& INFORMATION TRANSFER**

Outline

- ❑ What is In-House Research for DOTs?
- ❑ NJDOT In-House Research
- ❑ NJDOT Challenges and Solutions
- ❑ Conclusions

What is In-House Research for DOTs?

Type of in-house research for DOTs:

1. Infrastructure Design and Maintenance
2. Traffic Management and Optimization
3. Safety Research
4. Pavement and Materials Research
5. Environmental Impact and Sustainability
6. Transportation Systems
7. Economic Impact Studies
8. Policy and Regulatory Compliance
9. Technology Integration
10. Disaster Preparedness and Emergency Response
11. Bicycle and Pedestrian Infrastructure
12. Freight and Logistics Research
13. Community Engagement and Equity



In-House Research –Pros and Cons

In-house research pros:

1. Control Over Research Process
2. Protection of Intellectual Property
3. Customization and Alignment with Organizational Goals
4. Quick Iteration and implementation
5. Direct Communication and Collaboration
6. Confidentiality and Security

Cost Benefits

- Initial perception of lower costs
- Utilization of existing staff
- No external agency fees

Internal Knowledge

- Deep understanding of DOT processes
- Familiarity with stakeholders
- Direct data access



In-House Research –Pros and Cons

In-house research cons?

- 1.Limited Resources and Expertise
- 2.Potential for Bias
- 3.Slower Speed to Innovation
- 4.Risk of Tunnel Vision
- 5.Challenges in Keeping Pace with Industry Advances
- 6.Overhead and Administrative Burden

Hidden Costs

- Staff time diversion
- Training expenses
- Platform maintenance
- Analysis infrastructure

Quality Concerns

- Potential bias
- Limited expertise
- Data quality risks
- Reduced credibility



NJDOT

In-House Research

□ BRIIT In-house research includes:

- Preliminary literature searches
- Basic analysis
- Support funding for internal staff to perform research
- STIC- internal DOT innovation
- Leadership special assignments
- Publishing journals/articles

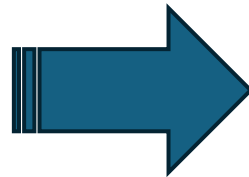
Challenges for us

❑ In-house research silos:

- Dilemma in allocating funds for certain projects and
- Lack of research and innovation ideas

❑ SPR resource centers:

- o Bridge
- o Pavement
- o ITSRC
- o Bicycle and Pedestrian Safety
- o Geo Technical



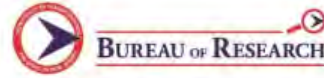
Multi year /SPR
funds

Getting low
responses on
research and
innovation ideas
request calls



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Sample RFP for resource centers



New Jersey Department of Transportation
Division of Bridge Eng. & Infrastructure Mgmt.
Bureau of Structure & RR Engineering Services, Capital
Program Management
Support Program Request for Proposal
2021-2024 Program

- c. Evaluate and recommend best practices for performing Load rating on superstructure members, substructure members and Riveted/Bolted and Welded Gusset Plates.
- d. Refine and finalize draft of Load Rating Manual for Bridges.
 - i. The Principal Investigator and his/her team should have the enough experience in developing the load rating Manual in LFR/ASR and LRFR. Principal Investigator needs to document team's previous experience in developing the load rating manual in the proposal.

3. Innovative Material and Technology

- a. Review, test and pilot study of new products and technologies in the areas of structural engineering, bridge design and bridge preservation to enhance performance and constructability.
- b. Assist in the development of related design guidance, construction specifications and quality assurance test procedures to aid in the successful implementation of new methods and technologies.

4. On-Call Services

- a. Rapidly respond to NJDOT's needs for advanced bridge engineering tools and services to address ongoing bridge design, construction field issues, or maintenance issues. Perform in-depth structural inspection and evaluation using innovative testing technology to investigate structural emergencies due to unforeseen and/or special events for individual structures as well as any other structures within the corridor and provide recommendations.
(The Principal Investigator (PI) will respond to the request within one day and develop an appropriate work plan to supply the needed support and respond to NJDOT's request within 3 days).
- b. Assist in investigating the applicability of new AASHTO, TRB/NCHRP and other industry guidelines to NJDOT Standards and Specifications specifically; recommend changes to NJDOT standards, specifications, and existing policies; develop guidelines as required.

5. Technology Transfer

- a. Provide technology transfer and training to NJDOT's Division Bridge Engineering & Infrastructure Management staff on topics pertaining to but not limited to new products, policy guidelines and research products for Bridge design, construction, maintenance and preservation.
- b. Provide Ethics course for renewal of Professional Engineer license to NJDOT & FHWA staff annually.

Solutions we found

- Close monitoring of scope and budgets of resource centers
- Participation in progress meetings
- Annual research and innovation report
- Support tech transfer activities
- Offering Implementation support

New language included in the RPFs

1.3 Special Instructions

1.3.1 Progress Meetings and Annual Reporting

Progress Meetings: Bureau of Research, Innovation and Information Transfer (BRIIT) shall be included in Bridge Resource Program-1 progress and programmatic review meetings.

Annual Reporting: Bridge Resource Program-1 shall submit an annual 10–15-page summary report of complete and ongoing activities to BRIIT. A sample template specific to all NJDOT resource centers/support programs will be provided.

1.3.2 Pilot, Testing, and Demo Projects

BRIIT staff shall serve as an extended branch of Bridge Resource Program-1 staff by providing funding and/or management of any identified pilot/testing projects. BRIIT can assist in applying for and managing special grants that would be beneficial to Bridge Resource Program-1 efforts

1.3.3 Build on BRIIT's Technology Transfer Program

1. Bridge Resource Program-1 & BRIIT shall work together to identify topics and content
2. BRIIT Tech Transfer program, including but not limited
 - A. Articles
 - B. Promotional Videos
 - C. Tech Talks
3. Cross posting between NJDOT Tech Transfer and Bridge Resource Program-1 webpage

Conclusions

❑ We recommend hybrid strategy for successful research projects

❑ In-house:

- Routine data collection/analysis
- Some publications
- Quick assessments
- Quick Implementation projects

❑ External partnership:

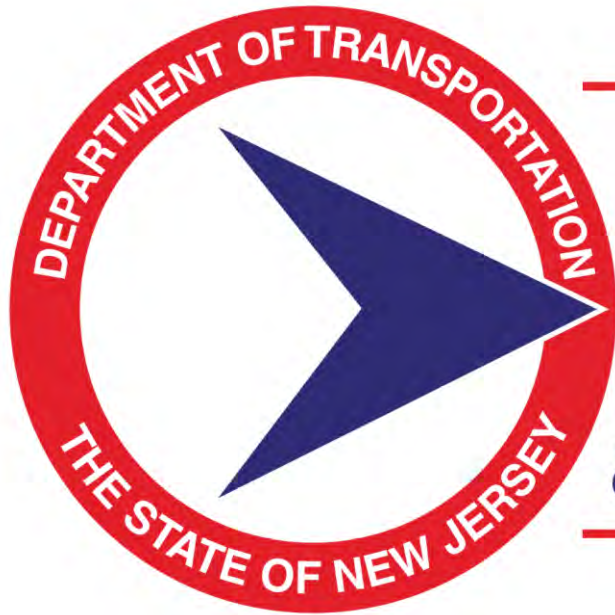
- Complex projects
- Benchmarking
- Independent validation
- Advanced analytics

If you have a research silos like us – collaboration and constant interaction with SMEs will help a lot



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& INFORMATION TRANSFER

Thank you



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APPENDIX P. CTDOT – IN-HOUSE RESEARCH



In-House Research

Mauricio Garcia-Theran
Research Unit Supervisor
Connecticut Department of Transportation
New Jersey DOT Peer Exchange
June 25, 2025

What is Research?

ChatGPT Definition:

- A systematic process of investigating and studying materials, sources, or data to discover new information, reach new conclusions, or solve problems
- It involves critical thinking, careful observation, and structured methods to gather, analyze and interpret information

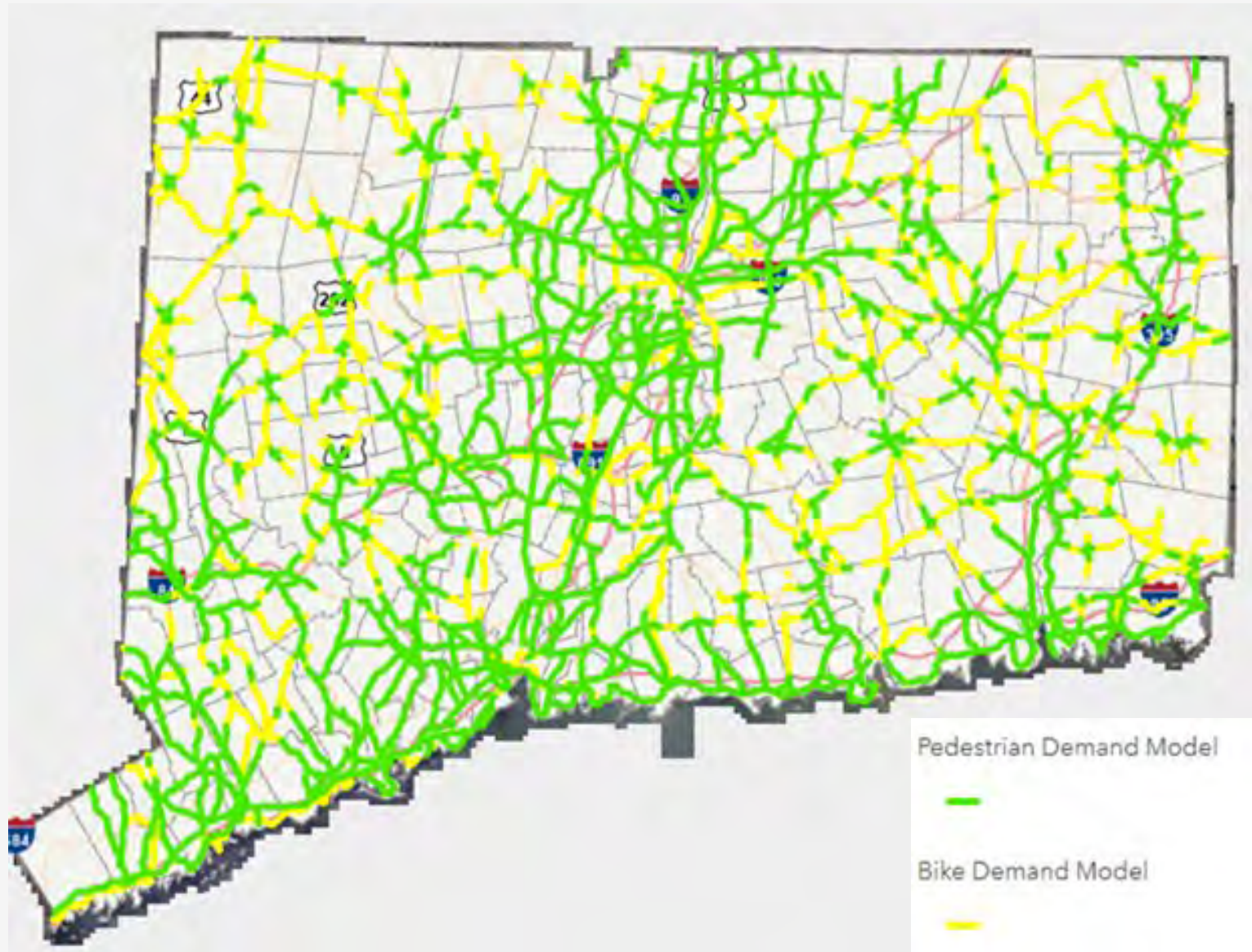
In-House Research at CTDOT

- Currently no dedicated staff conducting “traditional” research projects
- Research Office Used to have around 20 Research Engineers in the past
 - One in-house Research Project remains active
 - Monitoring of Cathodic Protection Systems on Structures
- To some extent, other groups may be performing certain research tasks
 - Traffic Signal Lab
 - Enterprise GIS, Analytics and Data Management
 - Roadway Inventory and Traffic Monitoring
 - Pavement and Materials
 - Other Planning Groups



Active Transportation Planning – Complete Streets

CT State
Routes with
High Likelihood
for Pedestrian
and Cycling
use



Pedestrian Demand for Project Prioritization

Pedestrian Demand Rank Viewer

DEMANDRANK FILTER

Min: 10



Max: 88

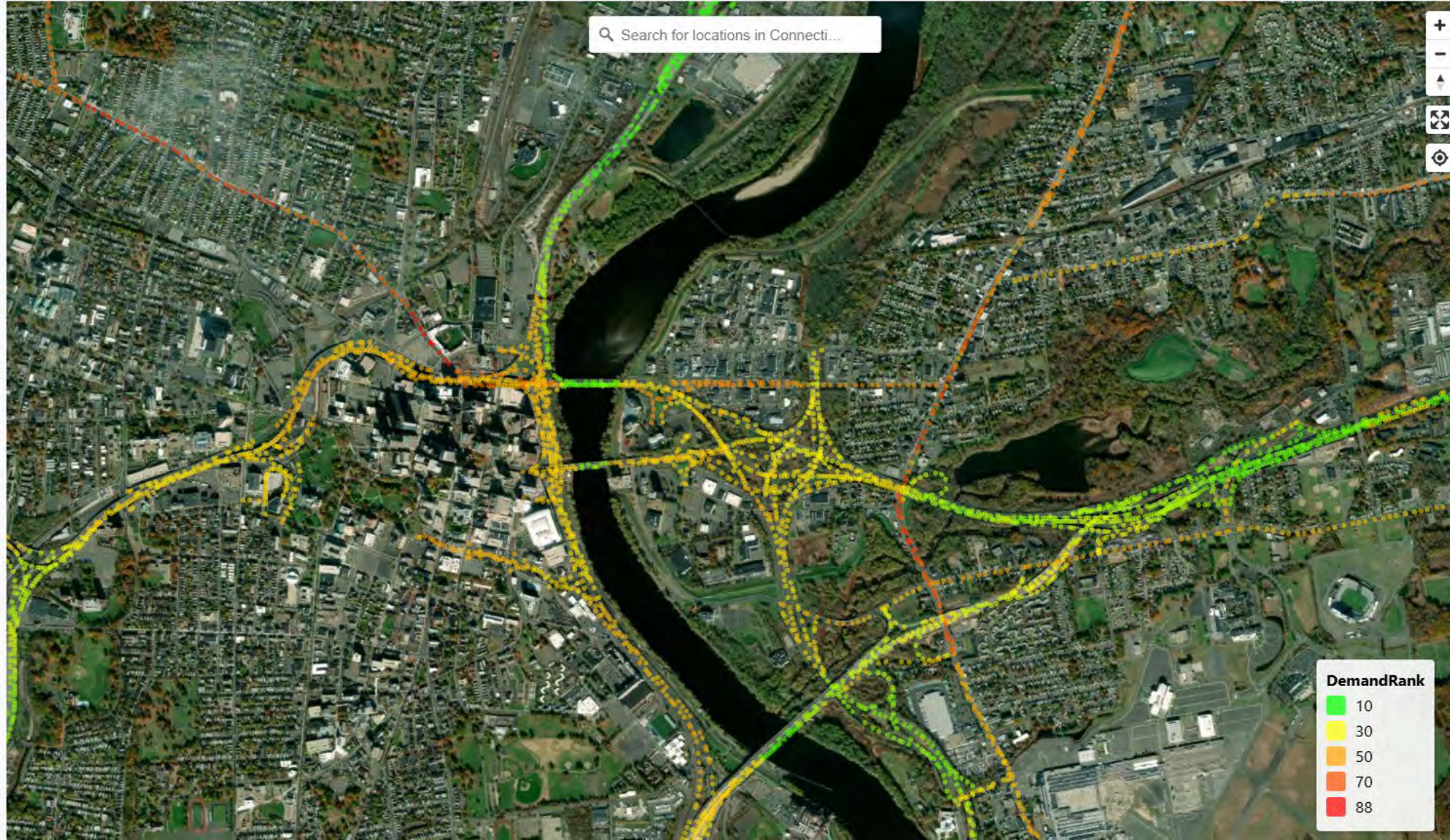


INFRASTRUCTURE

- ☐ Sidewalk Gaps
- ☐ Remove Ramps
- ☐ Pedestrian Feasible Only
- ☐ Near High Usage Bus Stop
- ☐ High Employment Density

ABOUT

This app shows the DemandRank for milepoints on state routes in Connecticut.



In-House Research at CTDOT (Cont.)

- Is the previous type of project considered Research?
 - Did literature reviews and searched for best practices
 - Identified a need/gap for Connecticut DOT
 - Collected CT data (e.g. demographics, road attributes, context, etc.)
 - Conducted GIS analysis and parametric analysis
 - Documented their methodology and made recommendations
- What is missing?
 - Prepared a formal research report, paper and present at a conference?
- Difference between Engineering and Planning Research?



In-House Research at CTDOT (Cont)

- Combined Effort (External and In-House)
 - SPR Part B may fund a portion of the project
 - Project may continue In-House outside the Research Unit
 - Continuing Project/Program – Pavement Group
- Literature Reviews
 - Conducted by the Research Unit to assist other offices
 - Depends on current research staff's ability, skills and availability
 - May lead to quick implementation ideas (modified chip seal treatment for bicycle routes)



Historic Bridge Inventory Project

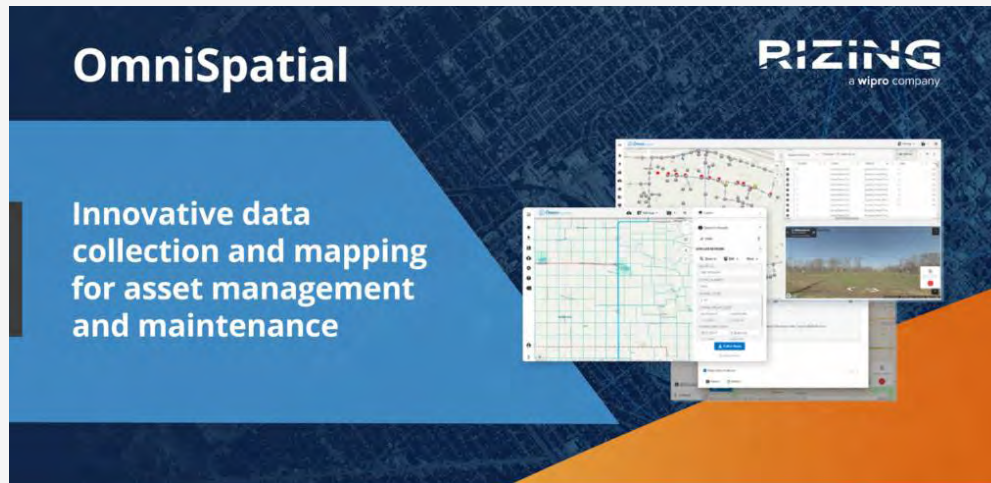


Washington Bridge – Route 1 Milford – Stratford

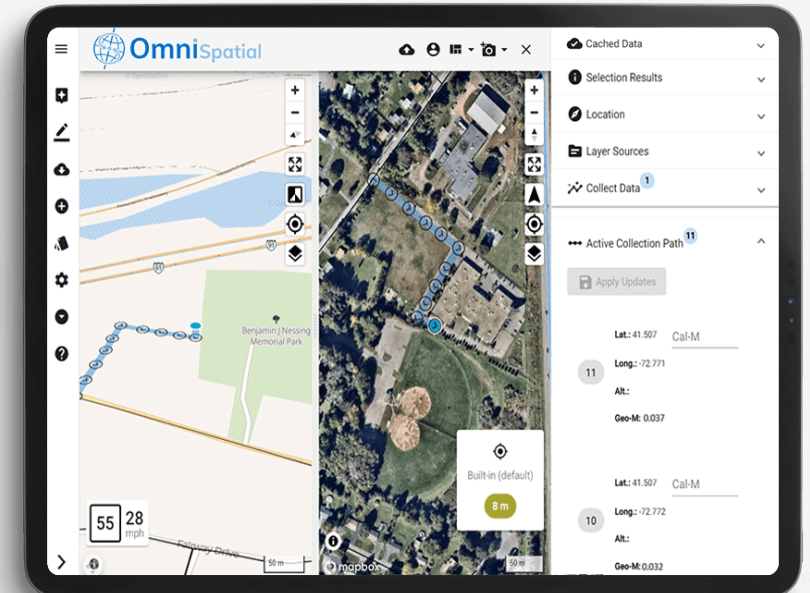
- SPR Part B Funds
- Office of Environmental Planning-Cultural Resources Unit
- Update Inventory within CTDOT ROW
- Streamline Section 106 process of the National Historic Preservation Act
- Provide guidance on treatments that would avoid adverse effects
- Significant effort in-house analyzing past reports, collecting data and writing report
- SHPO participation

MAVRIC (Mobile Asset Verification and Roadway Inventory Collection)

- Collaboration between CTDOT Enterprise GIS, UConn, and Rizing
- Aims to collect field data of roadway geometry and asset information, and integrate this data with the Linear Referencing System
- Utilizes SPR part B funds for task 1 (Software Customization for CTDOT)
- Task 2 to be performed in-house by Roadway Inventory Office
- Measure effectiveness in data collection processes (current versus MAVRIC)



Source: OmniSpatial - Rizing



Analyzing NPMRDS Using Advanced Machine Learning to Enhance System Performance

- SPR-B funds and conducted by a University
- Expected completion date September 2025
- Extract National Performance Management Research Data Set (e.g. travel time) using AI and ML techniques
- Gain insights and forecasting of various aspects of systems performance such as safety, speed, travel time reliability, congestion, public health
- **Limitation: Isolated highway segments were considered (Framework)**
- A network of interconnected road segments is critical for practice
- Expected to continue in-house (Qualified staff currently available)



Pavement Research

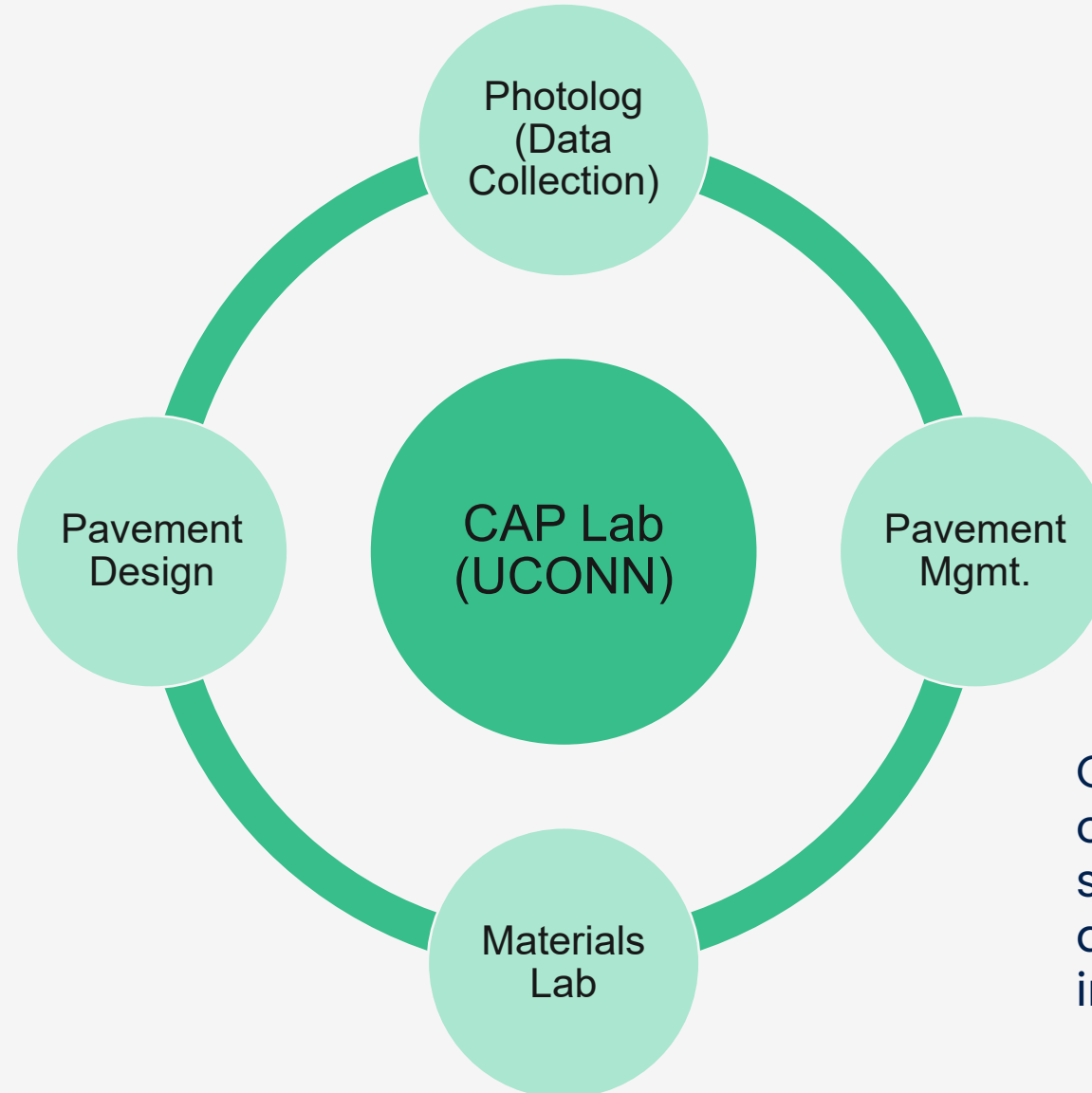
Photolog Unit

- Annual State Network surveys performed with Automatic Road Analyzer (ARAN) vans
- Photolog is responsible for collection and QC
- CTDOT has been performing photolog surveys of the State network since 1985
- Pavement Management is responsible for quality acceptance of pavement data



Pavement Research (Cont.)

Collaborative effort involving 4 CTDOT groups and the Connecticut Advanced Pavement (CAP) lab



CAP Lab may rely on data from the supporting units and conduct more in-depth research

Literature Reviews (Research Unit)

Working groups at CTDOT request a synthesis report

- Bridge strike prevention – Traffic Engineering
- Native dual-language signage – Traffic Engineering
- Park and ride signage – Public Transportation
- Vehicle-to-X infrastructure – Policy and Planning management



Bridge strikes at the E. 60th/61st Street overpass on the FDR Drive are down 56% since the treatment was installed, the greatest reduction of any pilot location.

Annualized Incidents Per Year

	Before	After	% Change
FDR Drive at E 60 th /61 st St*	2.7	1.2	-56%
HRP at Westchester**	6.8	7.2	+7%
Belt Parkway at 17 Ave Bridge**	2.3	1.6	-30%

* Bridge treatment installed March 2008
** Bridge treatment installed August 2008

33

Typical applications of native dual-language signs

Border/ Boundary Sign Example



Street Name Sign Example

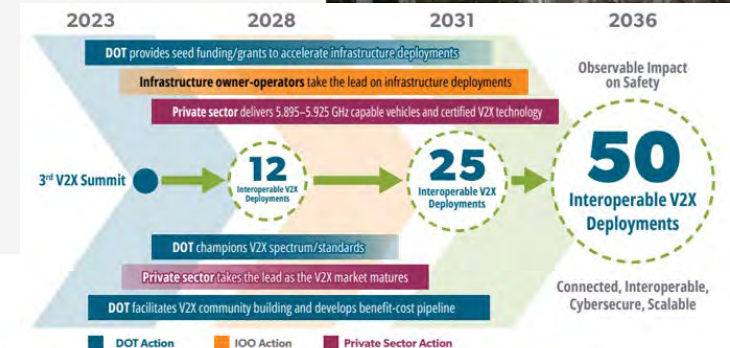
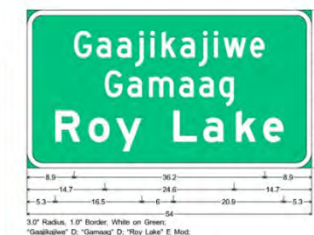


Figure 5. Strategic, Coordinated Actions of Key Stakeholders Create Momentum Towards Secure, Interoperable V2X Deployments

Source: DOT

Complete Streets Screening for Resurfacing Projects

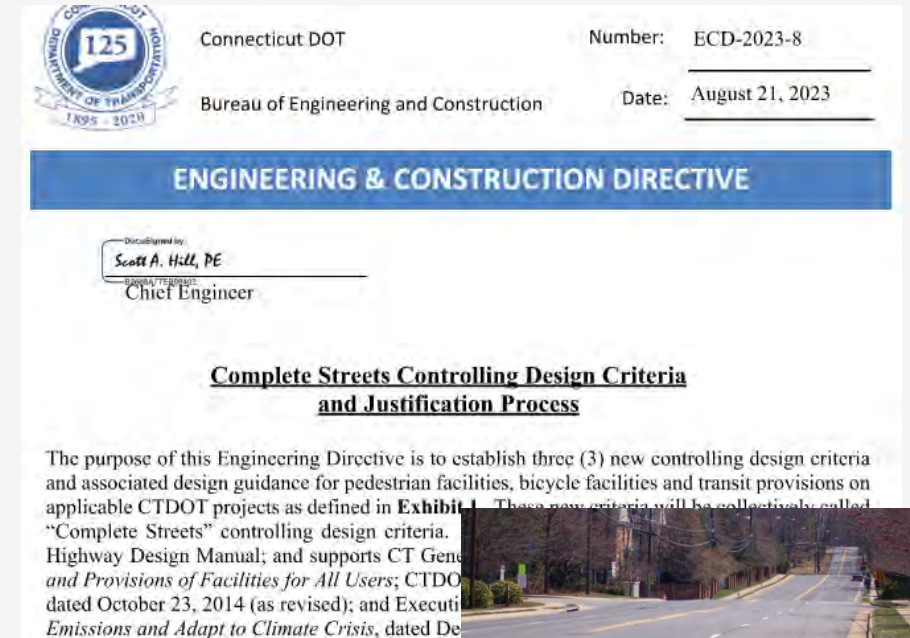
How can we expand cycle and pedestrian facilities, and improve road safety in a cost-effective manner with our existing programs?

- Road diets
- Buffered shoulders/bicycle lanes

What roadways contexts are appropriate for these counter-measures? (AADT, posted speed, land use)

Can these features be incorporated into the existing roadway width?

Research established a data-driven process to answer these questions



**Incorporating
On-Road Bicycle Networks
into Resurfacing Projects**



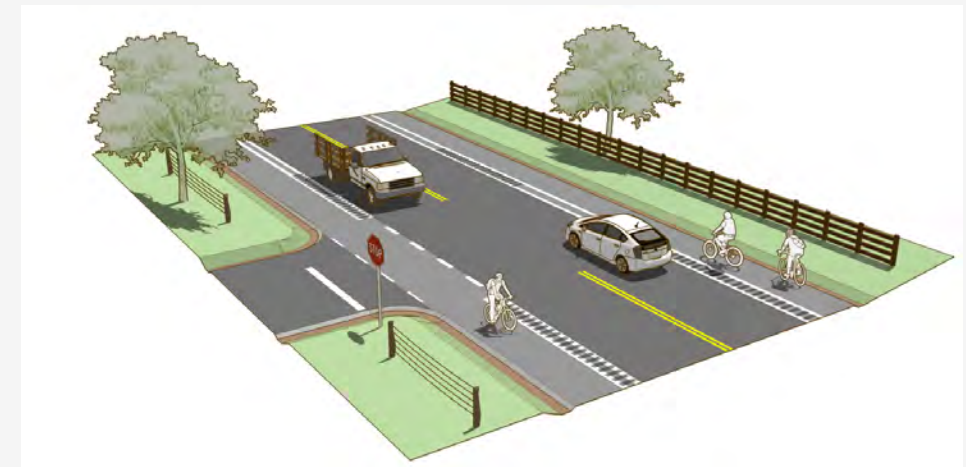
Best Practices – Complete Streets Directive



- ADA Compliance?
- Maintenance Responsibilities
- Logical Termini
- Where buffered shoulders?



Source: FHWA, Walkways



Source :Small Town and Rural Multimodal Network Guide (2016)

Summary

- Full in-house research projects are not currently conducted at CT DOT
- Other groups outside the Research Unit may be conducting research tasks even if their role is not officially defined as “Research”
- A combined effort approach (External and In-House) has been used by certain groups to conduct projects using research funds
- In-house literature reviews can be conducted in the Research Unit as requested by other offices
- Literature reviews should be considered research, and can be a very good way to support other offices across the agency



Thank you!



APPENDIX Q. MAINEDOT – NTRC RESEARCH PEER EXCHANGE – TOPIC 2: IN-HOUSE RESEARCH

NTRC RESEARCH PEER EXCHANGE TOPIC 2: IN-HOUSE RESEARCH

June 25, 2024

Maine Presentation

– Jeff Pulver and Ulrich Amoussou-Guenou

IN-HOUSE RESEARCH OUTSIDE OF RESEARCH PROGRAM

WHICH BUSINESS AREAS WITHIN YOUR DOT CONDUCT IN-HOUSE RESEARCH
OUTSIDE OF THE TRADITIONAL RESEARCH PROGRAM CHANNELS?

- Materials Testing and Exploration

- Fabrication and Bridge

- Traffic Engineering

- Safety

- Highway Management / Results and Information Office

- Planning

- Environmental Office

IN-HOUSE RESEARCH OUTSIDE OF RESEARCH PROGRAM

WHAT ARE THE CHALLENGES OF THIS ADDITIONAL RESEARCH TAKING PLACE OUTSIDE YOUR RESEARCH OFFICE?



We do not want to stop or slow innovation or add extra process requiring our involvement or oversight.



We want to know about these activities as a central point for research and innovation.



Staying informed helps us support SME needs, connect them with peers solving similar issues, and highlight the work they are doing.

IN-HOUSE RESEARCH OUTSIDE OF RESEARCH PROGRAM

HOW REGULARLY DOES SUCH RESEARCH HAPPEN?



MTEx in winter
when paving stops.



**Safety and Results
and Information**
can happen any
time of the year.

More likely in the
winter after projects
have been submitted
to the Work Plan.



Traffic tries new
things every
summer.



Other offices these
efforts are more
intermittent on a
case-by-case
situation.

IN-HOUSE RESEARCH OUTSIDE OF RESEARCH PROGRAM

IS THE RESEARCH OFFICE REGULARLY INFORMED OF SUCH RESEARCH?

Some projects done by others, we are informed about but not in a formal / required way.

Sometimes we can have a problem with lack of communication, and we don't even know this research by other groups is happening.

We have a few strategies to improve this coordination.



IN-HOUSE RESEARCH OUTSIDE OF RESEARCH PROGRAM

WHAT STEPS HAS YOUR RESEARCH OFFICE TAKEN TO IMPROVE COMMUNICATION, COORDINATION, AND COLLABORATION?

- Department-wide Innovation program.
- “Share and tells” during meetings.
- Opportunities to fund small pilot projects.
- Research and Innovation Showcase in 2026.
 - Will feature some activities from TPFs

WHAT CONSTITUTES IN-HOUSE RESEARCH?

- We consider in-house research to be any research which we can do completely (or mostly) with MaineDOT staff.

Activities can include:

- Literature reviews
- Surveys
- Pilot projects
- Before and after studies
- Data analysis
(outside of normal workflows)
- Excel tool development
- GIS data visualizations
- Observation and documentation of new methods
- Field measurements / data collection, etc.



Work can often begin immediately with limited administrative burden.



No need to set up new project numbers or contracts.



Some problems do not require long research projects or advanced statistical modeling.

In this case, results can be turned around quicker at a lower cost.

BENEFITS OF IN-HOUSE RESEARCH?

BENEFITS OF IN-HOUSE RESEARCH?



Conducting in-house research allows staff to practice problem solving and technical skills, making work more interesting and more satisfying.



Leadership and other staff see you and your team members directly contributing and solving problems.

CHALLENGES OF IN-HOUSE RESEARCH

Time
commitment and
staff limitations.

Adds to your
plate which may
already be full.

Sometime cannot
go as deep as we
want to or as
deep as
researchers can
go.

Researchers have
some skills,
knowledge, and
facilities /
equipment
beyond what we
can accomplish.

HOW TO GET STARTED WITH IN-HOUSE RESEARCH

Start with data analysis and basic GIS skills

- Advanced Excel Skills
 - A lot can be learned in one afternoon.
- Get an ArcGIS Online user license from your GIS group.

Share with others that your office can complete literature reviews and surveys to other states as a service.

HOW TO GET STARTED WITH IN-HOUSE RESEARCH

Some skills are not difficult to pick up, but other staff has never learned.

Staff is caught up in the day-to-day. They do not have time to think about or work on big picture ideas and improvements.

EXAMPLES ON IN-HOUSE RESEARCH IN MAINE

Speed Limit Setting Tool



Crash Severity Comparison Tool

Intersection KA Potential Dashboard 2024



Applicability: Results are only accurate when comparing crashes at intersections

Instructions: Add data from dropdown list wherever a red 0 is indicated. Unnecessary questions are colored black. These questions may uncover and become visible based on data entered in other fields.

Crash A		Crash B	
Crash A Input (Choose From Dropdown List)		Crash B Input (Choose From Dropdown List)	
Intersection Control	Traffic Signal	Intersection Control	All Other Intersection Controls
Primary Road Speed Limit	35	Primary Road Speed Limit	50
Crash Type	Pedestrian	Crash Type	Intersection Movement
		Collision Angle	Right Angle (Frontal Impact)
		Did the frontal impact occur on the driver side?	Yes - Driver Side
Crash A Calculated Values		Crash B Calculated Values	
Fatal and Serious Injury Probability	19.71%	Estimated Fatal and Serious Injury Probability	11.23%
Average Crash Cost Per Crash	\$467,622.99	Crash Cost Per Crash	\$382,701.45
Crash Severity Comparison			
K+A Probability Comparison	Crash A is 75% more likely to lead to a fatal or serious injury crash.		
Theoretical Kinetic Energy Comparison	The kinetic energy for Crash B is 2 times higher.		
Crash Cost Comparison	The crash cost for Crash A is 22% higher.		

Notes:

Use engineering judgement to adjust the speed limit used based on observed speeds.

Example: Increase the speed limit used for calculations by 5 MPH when the 50th percentile speed is 10 MPH or more above the speed limit.

Kinetic Energy Assumptions: Non-Frontal Impact assumes a 30 degree collision. A speed of 15 MPH is assumed on intersection movement crashes at all-way stops where neither driver runs the stop sign.

MaineDOT Speed Management Toolbox (Draft)

Enter the Target Speed Limit

25

Enter the Existing 85th Percentile Speed

34

Select the Context

Rural town

Select the Federal Functional Classification of the Road

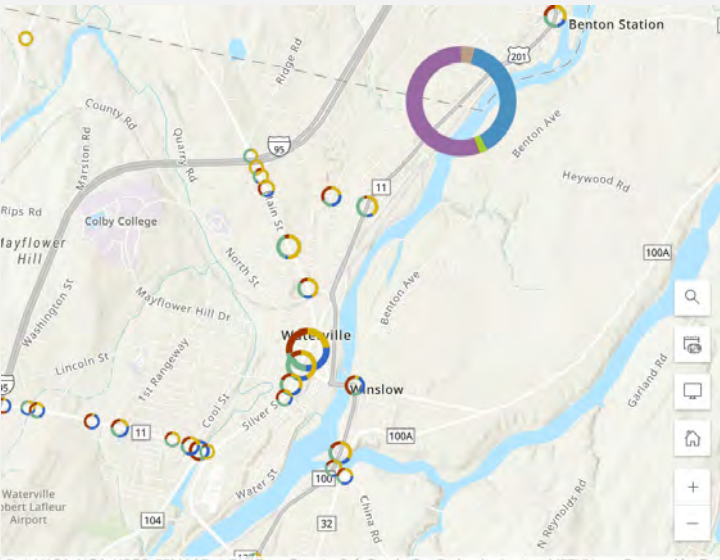
Principal arterial

Do you want to use advanced filters?

Please see a list of appropriate speed management strategies below.

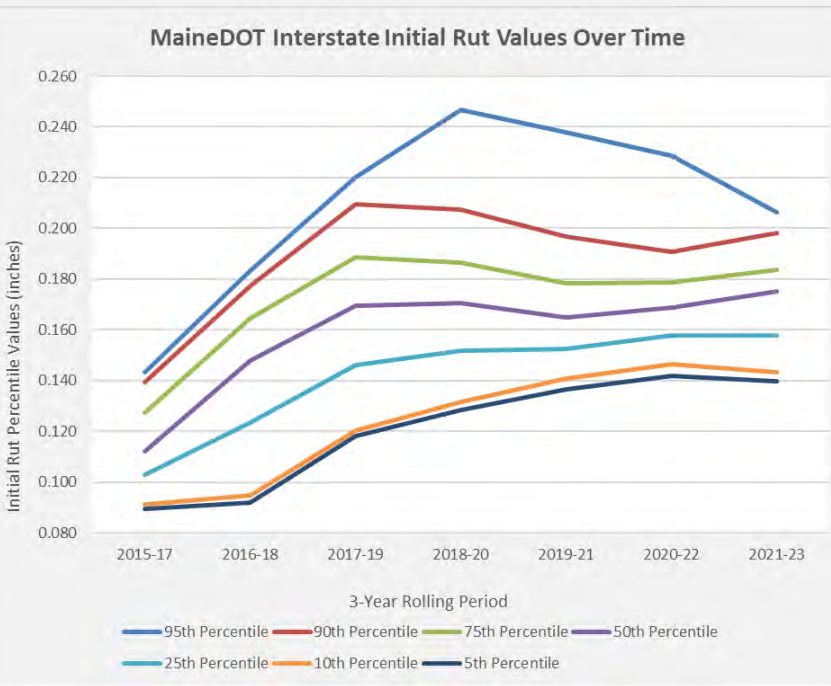
Traffic Calming Category	Traffic Calming Feature	Effectiveness	Cost Range	Seasonal/Permanent	Possible Impacts or Demographics
Bump Outs / Curb Extensions	Chokers	Effective	Medium	Either	Yes
Vertical Deflections	Speed Cushions	Effective	Medium	Either	Yes
Vertical Deflections	Speed Tables	Effective	Medium	Permanent	Yes
Continuous Road Narrowings	Removing Pavement (to 13 ft in each direction)	Effective	Medium	Permanent	No
Bump Outs / Curb Extensions	Pedestrian Crossing Bump Outs	Effective	High	Permanent	Yes
Chicanes	Chicanes (No Directional Restrictions With Median)	Effective	High	Permanent	No
Vertical Deflections	Raised Crosswalks	Effective	High	Permanent	No
Chicanes	Chicanes (No Directional Restrictions Without Median)	Effective	High	Permanent	No
Continuous Road Narrowings	Narrowing with Curb (to 13 ft in each direction)	Effective	Very High	Permanent	Yes
Roundabouts/Traffic Circles	Full Modern Roundabouts	Effective	Very High	Permanent	No
Sidewalks	Install Sidewalk on Both Sides	Effective	Very High	Permanent	No
Other Pavement Markings	Optical Speed Bars	Somewhat	Very Low	Permanent	Yes
Vertical Elements Within the Clear Zone (In Road)	In-Street Pedestrian Crossing Signage	Somewhat	Very Low	Seasonal	Yes

Mapping Pedestrian Volume Data



Interstate Rutting Data Analysis

Interactive Speed Management Toolbox



Northbound														
Primary/Route	Route Number	Town	Interstat eBMP	Interstat eBMP	Length	2015	2016	2017	2018	2019	2020	2021	2022	2023
0295X	H1970	So. Portland-Scarboro	0	5	4.43	0.169	0.184	0.173	0.210	0.230	0.236	0.334	0.355	0.147
0295X	H1970	Portland	5	10	5	0.211	0.157	0.155	0.208	0.236	0.276	0.310	0.328	0.149
0295X	H1970	Falmouth	10	15	5	0.265	0.131	0.140	0.205	0.241	0.282	0.322	0.369	0.402
0295X	H1970	Yarmouth-Cumberland	15	20	5	0.247	0.138	0.142	0.202	0.247	0.292	0.331	0.369	0.431
0295X	H1970	Freeport	20	25	5	0.242	0.290	0.333	0.183	0.198	0.217	0.282	0.303	0.327
0295X	H1970	Brunswick-freeport	25	30	5	0.263	0.306	0.347	0.186	0.208	0.241	0.279	0.314	0.356
0295X	H1980	Topsham-Brunswick	30	35	5	0.273	0.321	0.357	0.175	0.186	0.241	0.278	0.322	0.345
0295X	H1980	Bowdoin-Topsham	35	40	5	0.267	0.314	0.360	0.164	0.201	0.237	0.264	0.306	0.332
0295X	H1980	Bowdoinham	40	45	5	0.271	0.330	0.374	0.178	0.217	0.262	0.285	0.340	0.345
0295X	H1980	Richmond	45	50	5	0.267	0.309	0.348	0.170	0.215	0.262	0.292	0.325	0.356
0295X	H1980	W. Gardiner-Gardine	50	52.5	2.5	0.261	0.293	0.310	0.173	0.205	0.255	0.282	0.293	0.325
0095X	H1700	Hallowell	107.6	110	2.398	0.701	0.114	0.127	0.206	0.278	0.404	0.492	0.575	0.642
0095X	H1790	Augusta	110	115	5	0.526	0.113	0.111	0.175	0.238	0.323	0.416	0.507	0.579
0095X	H1790	Sidney	115	120	5	0.639	0.109	0.116	0.188	0.260	0.368	0.454	0.567	0.638
0095X	H1790	Sidney	120	125	5	0.488	0.112	0.113	0.190	0.274	0.376	0.460	0.545	0.611
0095X	H1800	Oakland-Waterville	125	130	5	0.215	0.241	0.250	0.226	0.303	0.502	0.567	0.173	0.229
0095X	H1800	Fairfield-Waterville	130	135	5	0.220	0.205	0.226	0.275	0.307	0.446	0.506	0.187	0.229
0095X	H1800	Clinton-Benton	135	140	5	0.212	0.207	0.214	0.252	0.299	0.420	0.461	0.173	0.226
0095X	H1800	Pittsfield-Clinton	140	145	5	0.470	0.527	0.588	0.121	0.160	0.184	0.236	0.250	0.301
0095X	H1800	Pittsfield	145	150	5	0.480	0.517	0.549	0.141	0.173	0.214	0.244	0.311	0.351
0095X	H1800	Palmyra-Pittsfield	150	155	5	0.464	0.497	0.523	0.131	0.175	0.219	0.258	0.301	0.381
0095X	H1800	Newport-Palmyra	155	160	5	0.157	0.157	0.181	0.210	0.268	0.383	0.142	0.207	0.252
0095X	H1810	Plymouth	160	165	5	0.153	0.154	0.186	0.227	0.283	0.367	0.130	0.209	0.254
0095X	H1810	Carmel-Etina	165	170	5	0.155	0.165	0.207	0.252	0.306	0.428	0.123	0.220	0.276
0095X	H1810	Carmel	170	175	5	0.357	0.396	0.434	0.527	0.592	0.800	0.132	0.219	0.272
0095X	H1810	Hampden	175	180	5	0.181	0.196	0.253	0.307	0.319	0.432	0.266	0.381	0.210
0095X	H1810	Bangor-Hennox	180	185	5	0.245	0.280	0.327	0.390	0.458	0.599	0.148	0.242	0.326
0095X	H1710	Veszie-Bangor	185	190	5	0.369	0.455	0.512	0.593	0.214	0.345	0.427	0.536	0.235
0095X	H1710	Orono	190	195	5	0.294	0.373	0.393	0.478	0.170	0.262	0.364	0.315	0.215
0095X	H1710	Gileston	195	200	5	0.253	0.329	0.322	0.340	0.178	0.241	0.292	0.383	0.410
0095X	H1710	Argyle Twp-Alton	200	205	5	0.437	0.446	0.491	0.515	0.524	0.312	0.231	0.306	0.358
0095X	H1710	Argyle Twp	205	210	5	0.415	0.453	0.472	0.488	0.323	0.163	0.227	0.294	0.341
0095X	H1710	Edinburg	210	215	5	0.406	0.514	0.531	0.563	0.583	0.177	0.166	0.214	0.251
0095X	H1720	Howland	215	220	5	0.325	0.375	0.371	0.401	0.437	0.499	0.142	0.204	0.275
0095X	H1720	Mattamiscottis Twp	220	225	5	0.368	0.425	0.448	0.467	0.484	0.584	0.167	0.247	0.328
0095X	H1720	T2 R8 NWP	225	230	5	0.334	0.394	0.380	0.441	0.461	0.559	0.183	0.221	0.274
0095X	H1720	T2 R8 NWP	230	235	5	0.362	0.412	0.411	0.467	0.528	0.604	0.160	0.220	0.272
0095X	H1720	T2 R9 NWP	235	240	5	0.333	0.399	0.389	0.423	0.472	0.565	0.154	0.198	0.251
0095X	H1720	Medway-T2 R9 NWP	240	245	5	0.321	0.380	0.356	0.386	0.413	0.485	0.137	0.185	0.242
0095X	H1730	Medway	245	250	5	0.365	0.425	0.416	0.432	0.485	0.550	0.123	0.168	0.229
0095X	H1730	T1 R6 WELLS	250	255	5	0.299	0.338	0.347	0.369	0.350	0.437	0.118	0.154	0.215
0095X	H1730	Herseytown Twp	255	260	5	0.332	0.354	0.393	0.410	0.187	0.189	0.171	0.187	0.262
0095X	H1730	Sherman-Herseytown	260	265	5	0.298	0.320	0.354	0.397	0.404	0.157	0.154	0.198	0.275

- Analyzing the effectiveness of new paving initiatives.
 - HMA with Hydrated lime (Stripping & Rutting)
 - 1% hydrated lime added to the drum at the same time as the mineral filler.
 - Use of FORTA FI fiber in HMA (rutting & cracking)
 - WMA vs HMA (Emissions & fuel usage reduction)
 - UTBWC (faster and cheaper compared to HMA)



Hydrated Lime's silo



Delivery, Placement and Compaction of ULFGA

- Documenting experience with new strategies, materials, and technologies
 - ULFGA
 - Modular Expansion Device



Steelflex Modular Expansion Joint

- Product Evaluation Investigations
- Assist with piloting new tech, evaluating the data as needed.



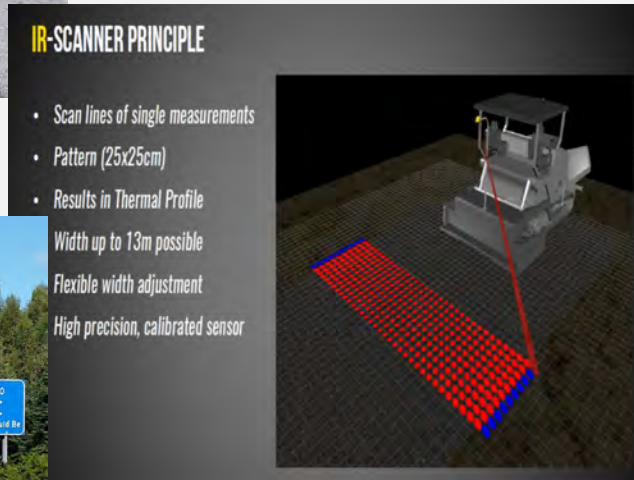
Scanning using DPS



Blue Hill Falls Bridge picture using a drone



Drone pilot training

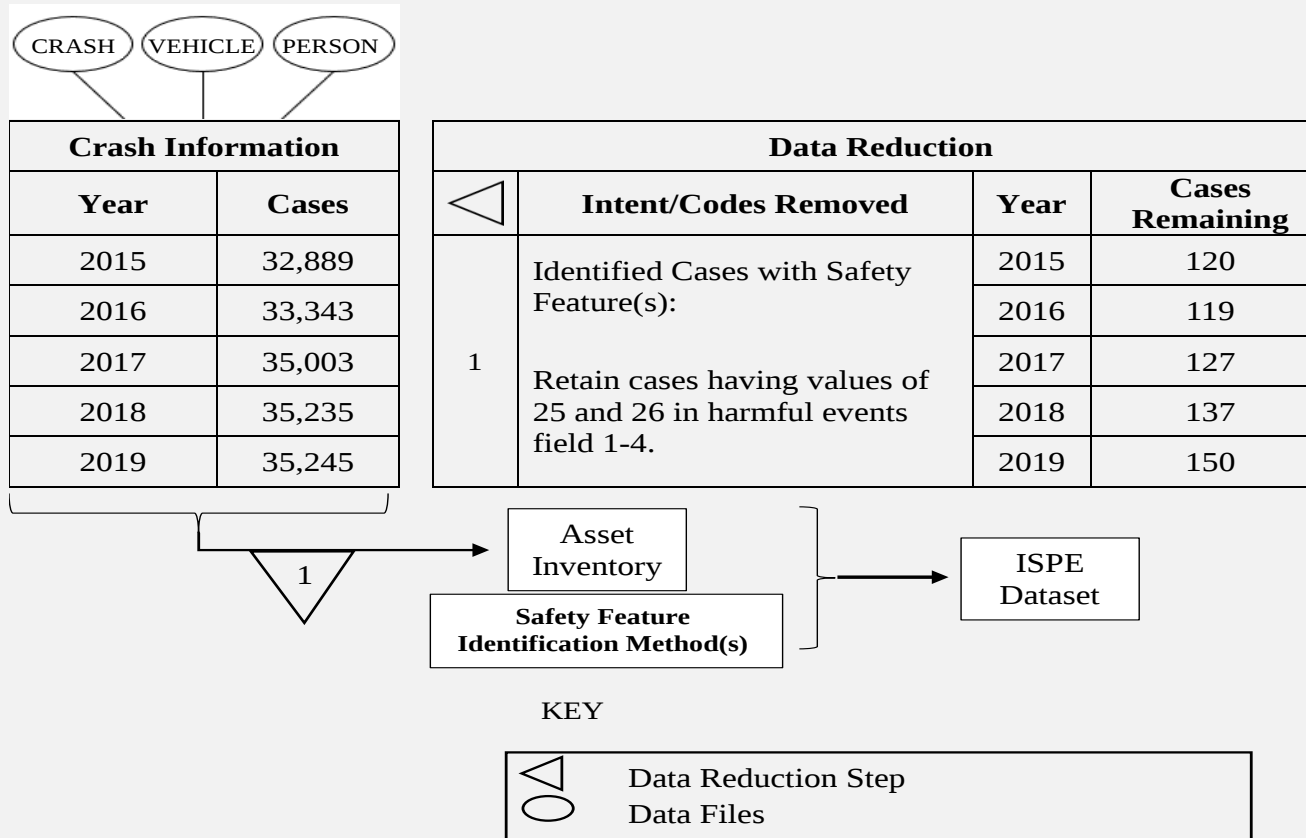


Scanning using PMTP

- Leading experimentation with pavement intelligent construction and related data analysis.
 - Density Profiling System
 - Paver-Mounted Thermal Profiling
 - Intelligent Compaction



- Guardrail end treatment evaluations
 - Piloting new inspection process.
 - Conducting in-service performance evaluations.

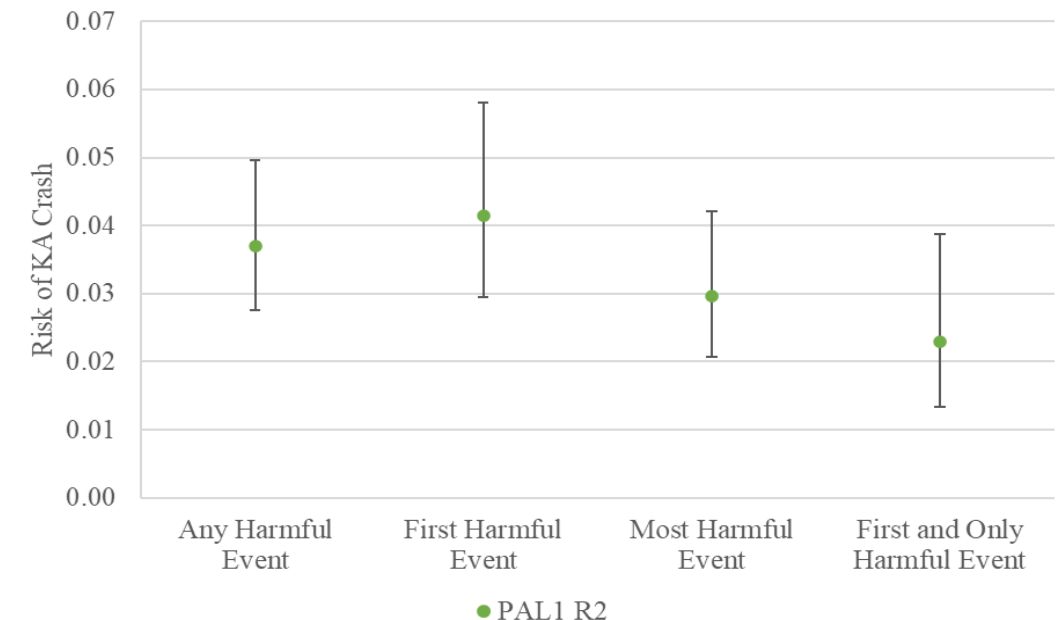


Dataset Assemblage and Reduction

	2018 data		2019 data		2020 data		2022 data		2023 data	
Characteristics	No	Pct.	No	Pct.	No	Pct.	No	Pct.	No	Pct.
No Issue	0	0%	18	38%	7	44%	4	50%	5	22%
1 Issue	10	53%	30	63%	5	31%	3	38%	4	17%
2 Issues	4	21%			2	13%	0	0%	1	4%
3 Issues	1	5%			1	6%	1	13%	3	13%
4 Issues	2	11%			1	6%	0	0%	5	22%
5 Issues	0	0%				0%	0	0%	3	13%
At least 6 Issues	2	11%				0%	0	0%	2	9%
Total	19	100%	48	100%	16	100%	8	100%	23	100%

At least one issue	100%	63%	56%	50%	78%
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MSKT - Results Statistics from 2018 to 2023



Proportion of KA crashes in various phases of the SOE

UPCOMING IN-HOUSE RESEARCH IN MAINE

- Identifying trends and creating visualizations of WIM and vehicle classification data
- Documenting the “history of the interstate”
 - Compiling project history in an improved interface
 - Conducting knowledge management interviews and mapping results.
- Reviewing bridge condition data to update service life estimates
- Literature reviews and survey about UTBWC and interstate paving treatments
- Out of state travel knowledge capture process

APPENDIX R. NYSDOT – IN-HOUSE RESEARCH



Department of
Transportation

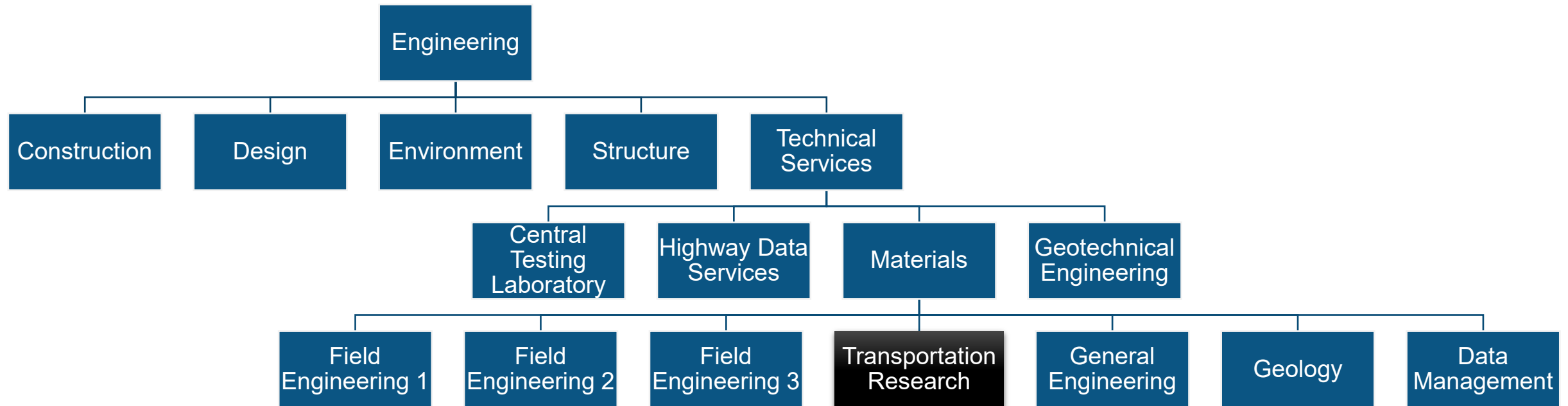
NYSDOT In-House Research

New Jersey DOT Research Peer Exchange 2025
Princeton, NJ

Salma Sultana
Assistant Engineer
Materials Bureau – Transportation Research Section

June 25, 2025

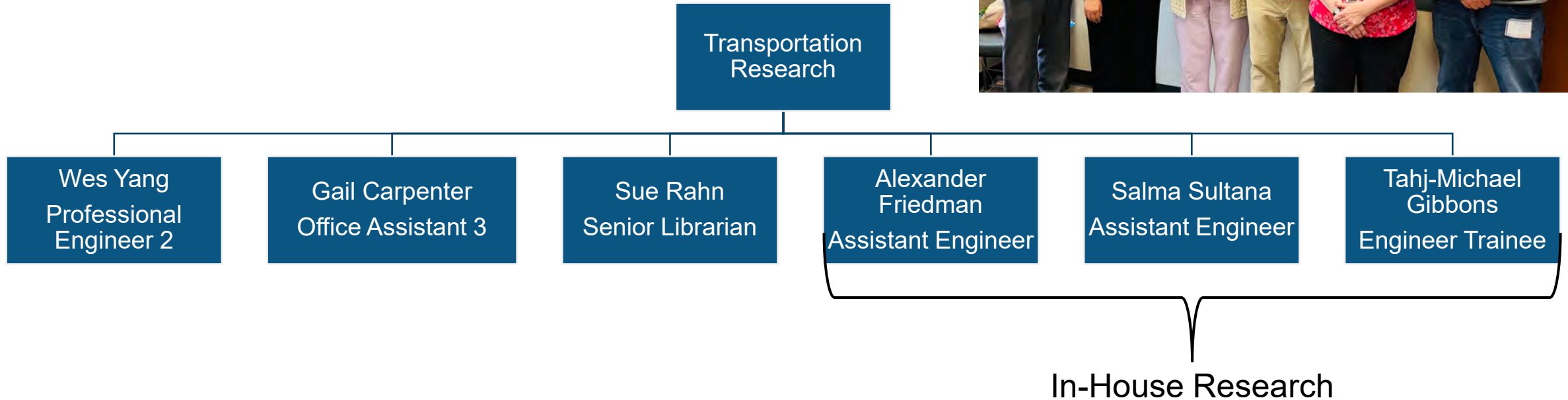
Where are we?



What do we do?

- NYSDOT's Library
- Local and Technical Assistance Program (LTAP)
- Transportation Pooled Fund
- NYSDOT's AASTHO Technical Service Programs
- Research Advisory Committee (RAC) at AASHTO Research and Innovation (R&I) committee
- TRB and NCHRP
- STIC and EDC
- New Product Evaluation
- In-house Research

Who are we?



In-House Research at Materials Bureau: Introduction

- All program areas do some in-house research. The focus of this presentation is on in-house research done at the Materials Bureau.
- If anything is initiated within different program areas that affects specifications (materials methods, materials procedures), Transportation Research gets involved (on behalf of the Materials Bureau).

In-House Research at Materials Bureau: Background

- Transportation Research conducts the research in collaboration with other Materials Bureau sections.
- Typically, different Materials Bureau sections will approach with their problem or interest, and a research project is initiated.
- A kickoff meeting is held, and the scope and a work plan will be decided. Most of the time, the projects don't have any solid deadlines.
- Staff hours are funded through the SPR-B fund.
- If research-specific software or other relevant things (equipment, materials, etc.) are needed, the funds allocated to the Transportation Research section can fund them.
- The projects can be initiated anytime they're needed.

In-House Research at Materials Bureau: Function

- Statistical consultation
- Specification updates
- Data collection
- Experiments
- New product evaluation
- Review of published research
- Synthesis of literature review

In-House Research at Materials Bureau: Challenge

- Time constraints and shifting priorities often push documentation to the back burner, causing valuable insights and methods to be forgotten or siloed.
- Lack of standardized documentation practices leads to inconsistent records that are hard to reference or build upon.
- Sometimes, skills needed to advance projects are typically within the program area, but the in-house research staff is responsible for advancing the research project.



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Questions?



Thank You



Department of Transportation