



NORTH CAROLINA
Department of Transportation

North Carolina Department of Transportation – Research & Development

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Research & Development Unit

February 7, 2024

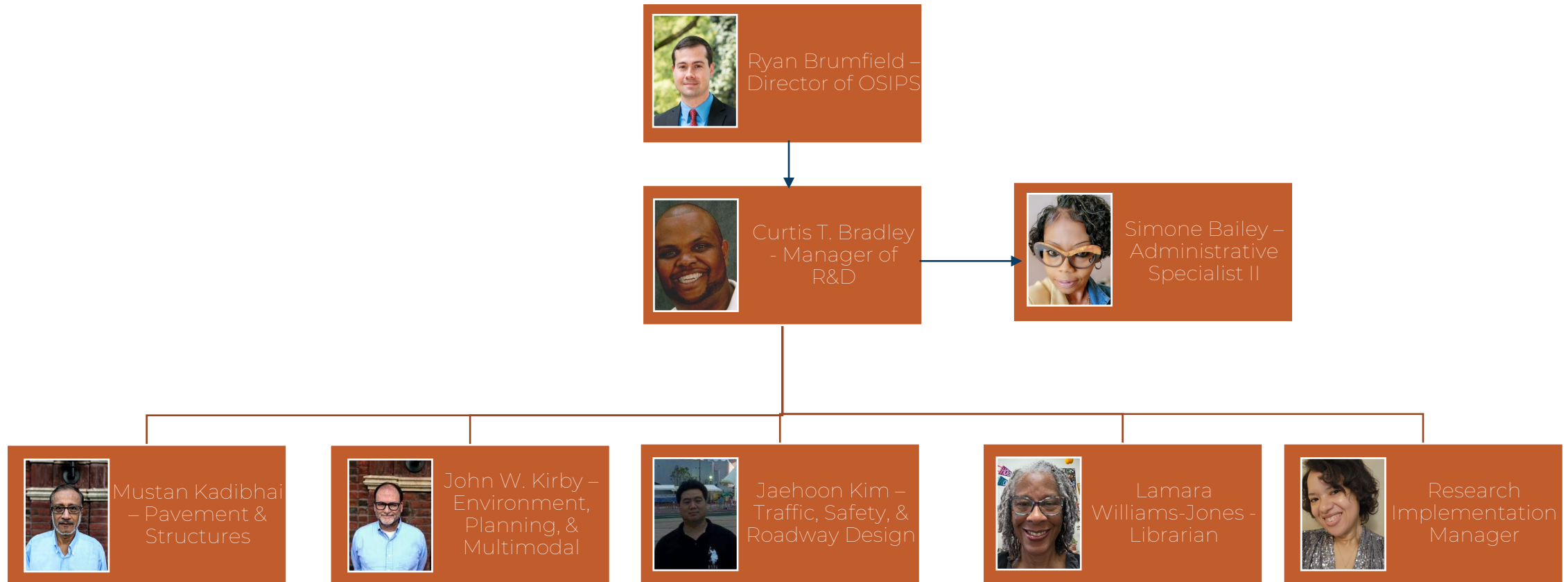
Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

Overview of the Research Program

-  Overview of Research & Development
-  Project Management
-  Research Program
-  Library
-  Questions

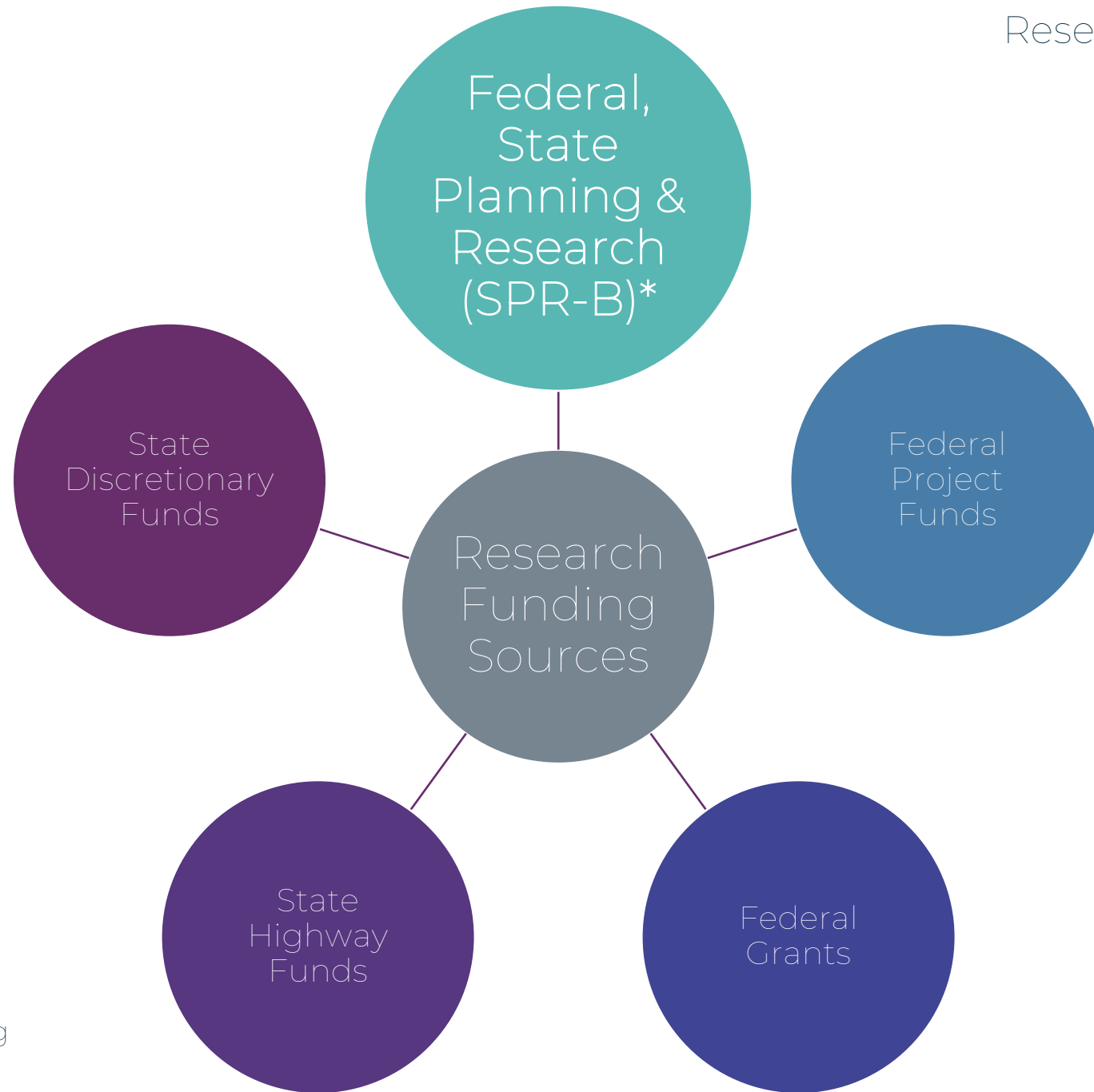
Overview

Meet our Team



What kinds of projects does NCDOT Research?





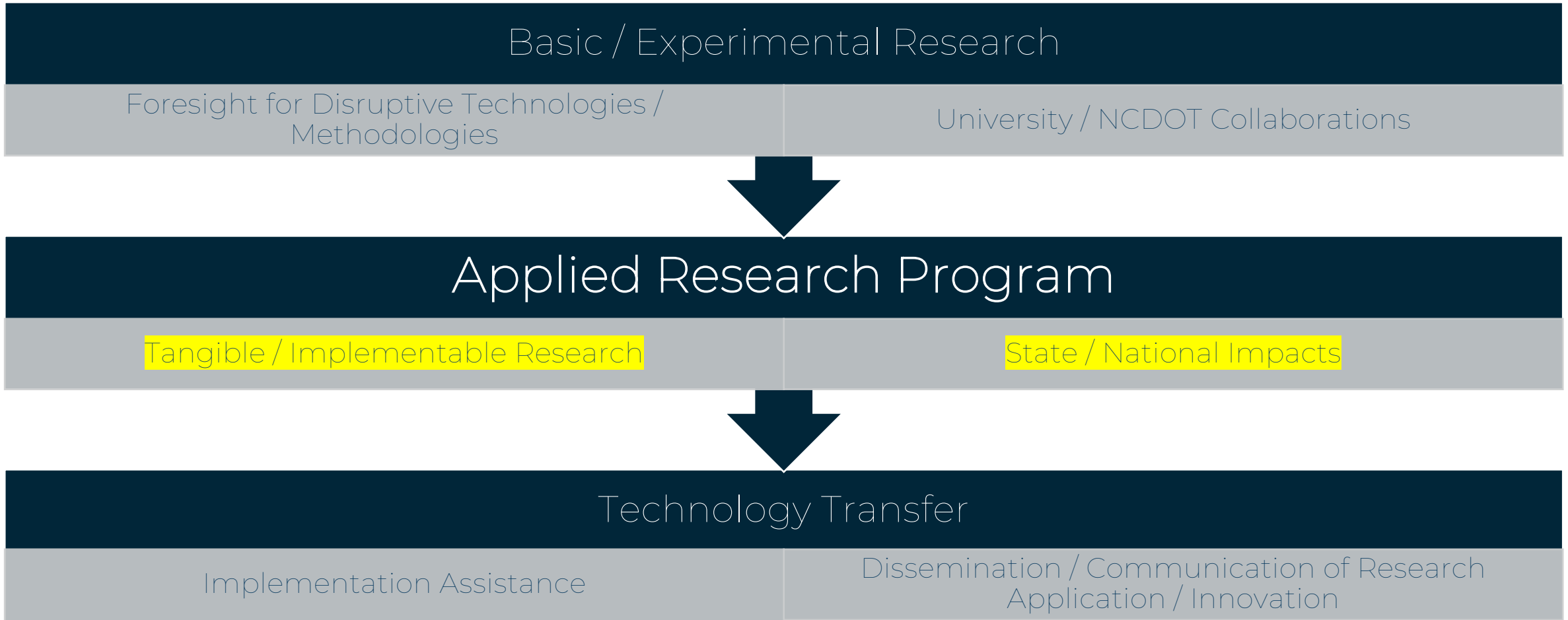
*Primary Source of Funding

Universities Engaged In Research

-  Appalachian State
-  East Carolina
-  Elizabeth City State
-  Fayetteville State
-  NC A&T
-  NC Central

-  UNC-Charlotte
-  UNC-Greensboro
-  UNC-Wilmington
-  UNC – Chapel Hill
-  NC State
-  UNC-Asheville
-  Out of State Partners

Research & Development – Strategic Approach



What Makes a Good Research Project?



Collaborate with NCDOT Subject Matter Experts (SME) to clearly articulate ideas and understand needs



Lines up with ongoing initiatives and supports DOTs current mission and goals



Clearly articulated methodology: Needs to be useable for NCDOT



Tangible / Useable deliverables (Implementation)



Project Management

Overview of Project Roles

Principal Investigator (PI)

- Research Professional (Expert) conducting the work.
- Oversight of the execution of the research project methodology and deliverables.
- Responsible for reporting updates, challenges, needs, etc.

StIC

- NCDOT Subject Matter Expert
- Steward of NCDOT needs and priorities.
- Responsible for the review of the work product.
- Responsible for the Implementation of the work product.

Project Manager (PM)

- Coordinates the Project Authorization Process.
- Executes the invoicing for the research project.
- Coordinates any changes / adjustments to the research project.

Project Manager Authorization



Scope Change

Task / Assignment
Approach
Additional Work



Budget Reallocation

Line-item changes
Increased budget



Time Extension

Outside circumstances
Miscalculation of level of effort.

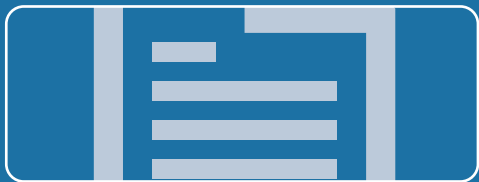
Research Program

Research Programs



Annual Research Program

- Typically, 18 – 20 Research Projects Annually



Technical Assistance Program

- Short Term Research



Technology Transfer

- Implementation, Training, Workshops, Pilots

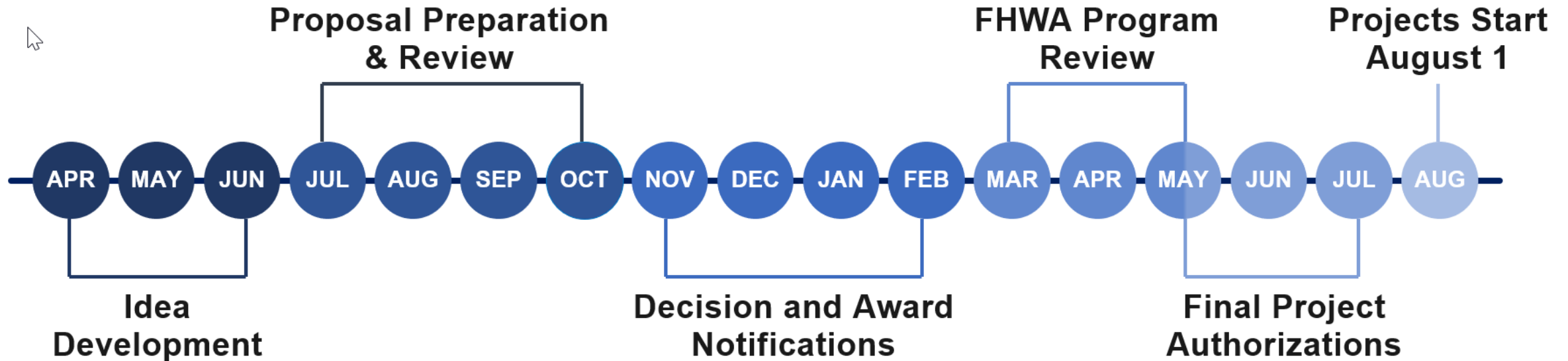


Pooled Fund / National Programs

- Coordinated National Research (partnerships with other states)

Annual Research Program

Annual Research Timeline



Project Selection & Oversight

Research & Development Unit

- Manages overall program
- Solicits ideas & proposals
- Coordinates NCDOT research activities

Research Subcommittees

- Review ideas and recommend for proposal development
- Review proposals and recommend to REC for funding

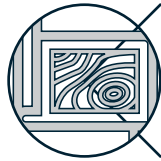
Research Executive Committee

- Reviews and approves recommended annual R&D Work Program

FHWA NC Division

- Reviews and approves annual R&D Work Program for SPR Part B funding

Research Subcommittees



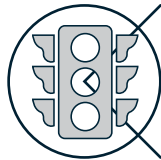
Environmental & Hydraulics



Pavement, Operations & Maintenance, Materials



Structures, Construction, & Geotechnical

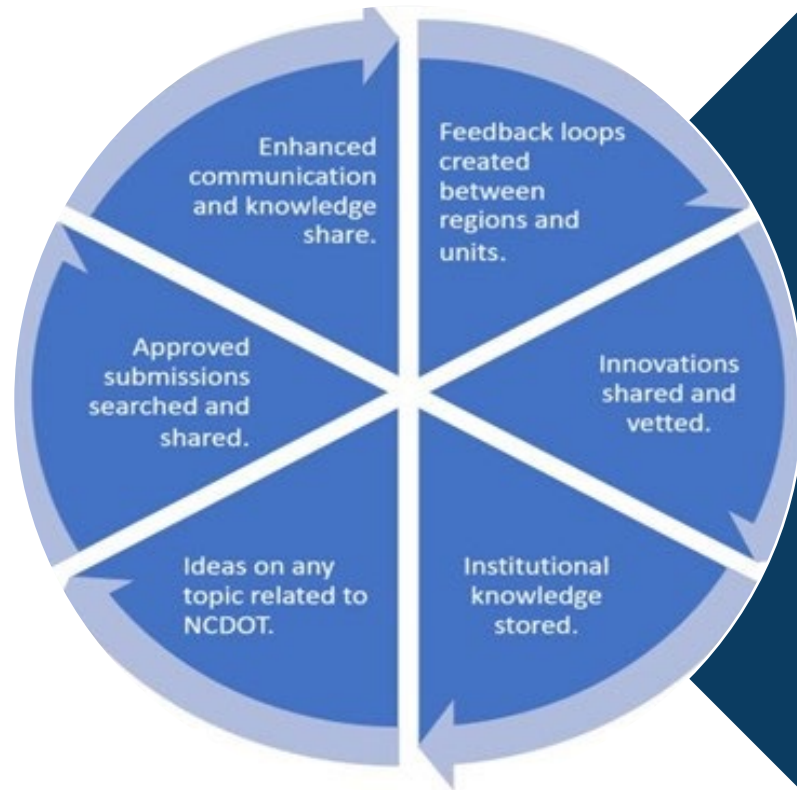


Traffic, Roadway Design, & Safety



Planning, Programming, Policy & Multimodal

Annual Research Project - Example



RP 2019-15:
“Communicate Lessons, Exchange Advice, Record (CLEAR) – Database Development” – NCSU

Technical Assistance Program

Technical Assistance Program

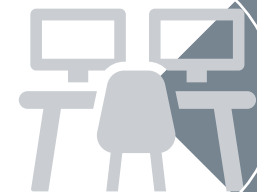
- Short Term Research Projects / Quick Response to Problems
- Up to 120 Hours of Researcher Time
- Facilitated through NCSU / ITRE
- Capable of working with any researcher in North Carolina



Synthesis



Surveys



Misc. Studies

Technical Assistance Program



Scooter
Share
Data



Rail Noise



Roller
Compacted
Concrete

Technology Transfer Program

Technology Transfer (Implementation) Program



NCDOT Research & Innovation Summit

North Carolina A&T University

- In-Person (2019)
- 187 Attendees

UNC – Chapel Hill

- Virtual (2020 – 2021)
- 356 & 347 Attendees

NC State University

- Hybrid (2023)
- 305 Attendees (254 In-Person / 51 Virtual)



Technology Transfer Projects



RP 2020-56: “CLEAR Technology Transfer and Metric Building” – NCSU



RP 2022-29: “Transferring Artificial Intelligence Model to CLEAR Program for enhanced Lessons Learned / Best Practice Selection” - NCSU

Pooled Fund and Other National Programs

Pooled Fund and Other National Programs



National Cooperative Highway Research Program (NCHRP)

· <https://www.trb.org/NCHRP/NCHRPOverview.aspx>



American Association of State Highway Transportation Officials – Technical Services Program

· <https://www.transportation.org/technical-service-programs/>



Transportation Research Board

Transportation Research Board

· <https://www.nationalacademies.org/trb/transportation-research-board>



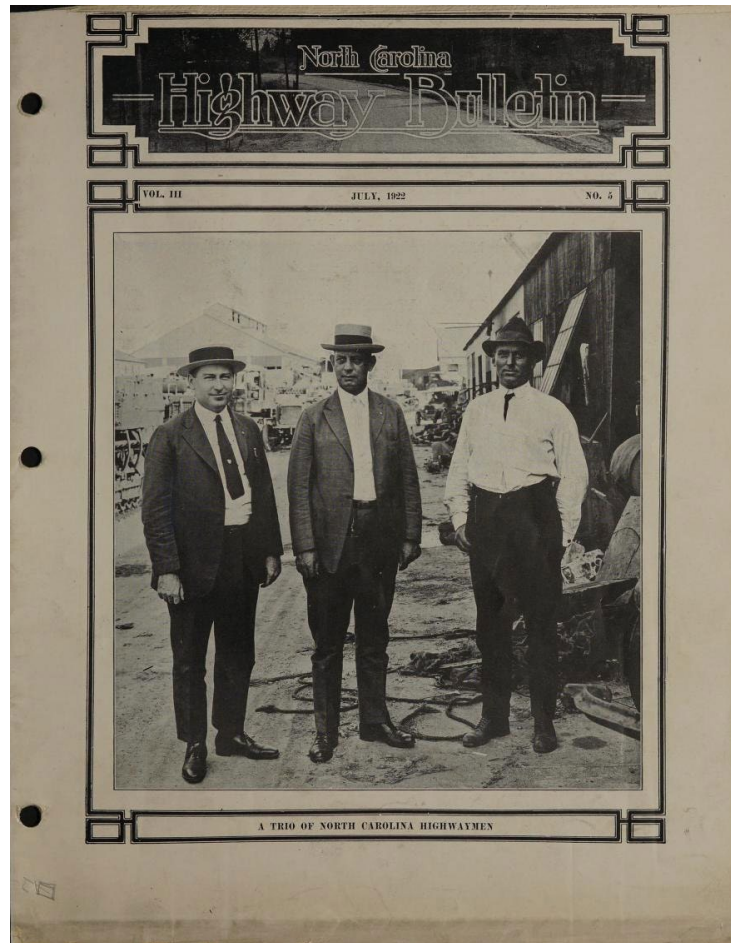
Pooled Fund Studies

· <https://www.pooledfund.org/>

· TPF – 5(493) – “Investigation of Dual Grade / Hybrid Steel Plate Girders Utilizing Stainless Steel”

Library

NC DOT Research Library



Located in Century Center, Building B



On-Staff Librarian, Lamara Williams-Jones provides Reference and Research Services.



Many engineering and transportation related books, journals, specs and other [documents](#).



Historical information dating back to the 1920s, Our trio of NC Highway Men to the left is from a recent initiative of digitizing [historic newsletters](#) from the 1920s.



Board of Transportation Minutes dating back to the 1950s.

Example of Research Project Lifecycle

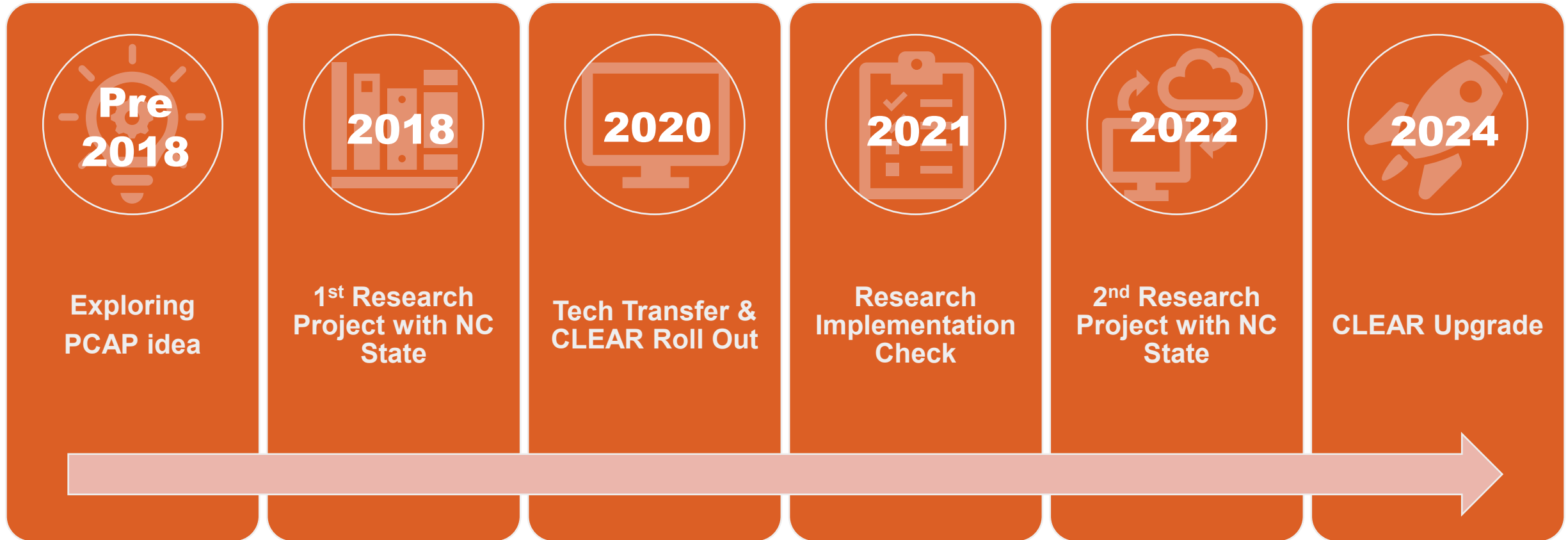
Development and Evolution of the CLEAR Portal

CLEAR Program Overview

- CLEAR stands for: Communicate Lessons, Exchange Advice, Record
- The goal is to promote cross-unit communication, sharing of best practices, and organization enhancements.



History of CLEAR



Why Research?

- New Idea for the NCDOT
- Flexible approach
- Contract support from Research Office
- Idea generators outside engineering and transportation professionals
- Mix of experience and expertise with a balance of professors and students
- Committee is made up of practitioners, experts, and end-users



Step 1: Define the Idea/Need

Questions

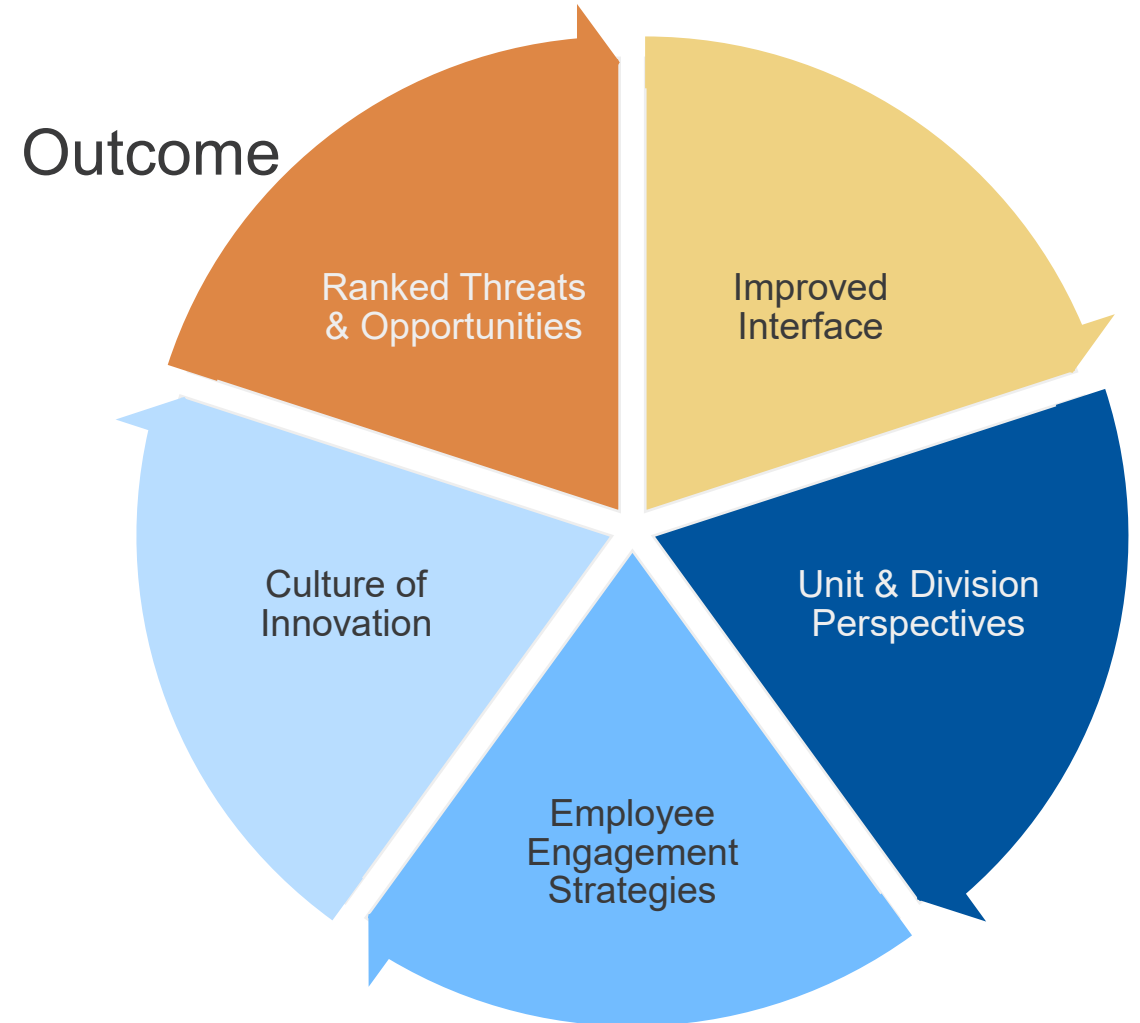
- What problem were we trying to solve?
- Why is it a problem?
- What do I hope to gain with a solution?
- On a broad level – what are the inputs and outputs – what is the start and finish?
- Who is involved?

Preliminary Scope

- Hold onto institutional knowledge.
- Close feedback loops.
- Create a space for innovative ideas to be implemented.
- Departmentwide solution.



Step 2: Identify Risks (Threats & Opportunities)



Step 3: Implementation

The screenshot shows a web browser displaying the CLEAR application. The browser address bar shows the URL: <https://connect.ncdot.gov/vhc/clear/Pages/default.aspx>. The page header includes the "Connect NCDOT BUSINESS PARTNER RESOURCES" logo and navigation links for "Home", "Help", "Team Sites", and "Site Map". A search bar is located in the top right corner. The main content area is titled "Communicate Lessons, Exchange Advice, Record" and includes a "Welcome to CLEAR" message. A prominent button labeled "Submit Lesson Learned" is visible, with a link below it: "Click here to open CLEAR Lessons Learned Form". On the right side, there is a section titled "Questions about CLEAR?" with contact information for Clare Fullerton, PE. Below this is a "CLEAR LESSONS LEARNED PROGRESS" section with a red background, showing a progress bar for "Lessons Learned Submitted" (0), "Lessons Learned Currently Approved", "Lessons Learned", and "Under Review". The footer of the page includes the text "© North Carolina Dept. of Transportation | Privacy Statement | Accessibility" and a footer menu with links for "Connect Us", "View My Profile", "Manage My Alerts", "Employee Directory", and "ncdot.gov".

- Leveraged Technology
- Transfer support from Research
- A strong communication plan is vital
- Monitor use and feedback
- Always share the value statement



CLEAR
Communicate Lessons, Exchange Advice, Record

Step 4: Adjust to Feedback

Welcome To CLEAR

This is the online submission portal for the CLEAR Program, the Department's Internal Knowledge Management Program. This portal is open to all NCDOT employees with an NCDOT email. If this is your first time here or would like a refresher on how the portal and overall program works, please visit the CLEAR Program Connect Page for overview videos and additional background material: [CLEAR Program \(ncdot.gov\)](#). We aim to have all submission vetted within 30 days. Please contact the CLEAR team at CLEAR@NCDOT.GOV with any questions. *The practices and ideas shared here represent accepted submissions from NCDOT employees, and do not in any case supersede official procedures, best practices or otherwise approved guidance.*

Search Accepted Lessons Learned and Best Practices Here:

Share Lessons Learned Share Best Practice/Idea Request Assistance with an Obstacle

Do you have a Lesson Learned to share? Have you met an obstacle and solved the issue?

Do you have a best practice to share with the Department? Do you have an idea of something that could be used in the Department?

This review will be completed within 2 weeks. Do you have an issue, problem, or obstacle that you need assistance in solving?

CLEAR PROGRESS

Lessons Learned 25 Under Review	Lessons Learned 183 Accepted	Ideas/Best Practices 21 Under Review	Ideas/Best Practices 167 Accepted
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- Continually listen to feedback and needs of the Department for Knowledge Management
- Experts
 - TAGs
 - Innovation Coordinators
 - Innovation Challenge
 - PCAs
 - Lunch and Learns



CLEAR Portal

The screenshot shows the CLEAR Portal website. At the top, it says "Connect NCDOT BUSINESS PARTNER RESOURCES" with navigation links for Home, Help, and Site Map. Below this is a menu with categories like "Doing Business", "Bidding & Letting", "Projects", "Resources", and "Local Governments". A search bar is also present. The main header features the CLEAR logo with the tagline "Communicate Lessons, Exchange Advice, Record" and a "SUBMIT YOUR IDEA!" button. The main content area is divided into two columns. The left column contains sections for "CLEAR Program Overview", "CLEAR Database", "Post-Construction Assessments (PCAs)", "Lunch & Learns", and "Innovation Challenge". The right column contains sections for "Upcoming Events", "Resources", "Videos", and "Sign Up for Notifications".

CLEAR Program Overview
CLEAR is an internally-developed team within the Value Management Office designed to help you use project successes, setbacks and challenges for the good of the whole Department.

CLEAR Database
The CLEAR SharePoint Portal is used to submit a lesson, idea, or request for a solution. Following a vetting process, these submissions are added to the CLEAR Database so that we can keep a record of the knowledge shared. These submissions can be searched by personnel to implement onto projects or programs; they can become a part of our collective Departmental historical knowledge; and using data analysis tools they can be used to look for trends and predict future issues.

Post-Construction Assessments (PCAs)
PCAs are voluntary knowledge sharing meetings hosted between construction and design teams, contractors, and consultants at the end of a project. Learn more.

Lunch & Learns
View previously recorded Lunch and Learn webinars and get a sneak peek into the upcoming webinars.

Innovation Challenge

Upcoming Events
Lunch & Learn: [Topic]
January 25, 2023
11:45 a.m. – 1:00 p.m.
[Register Link](#)

Resources
[CLEAR Portal – Internal Only](#)
[NCTIC – Internal Only](#)
[Idea Submission Form](#)
[Lessons Learned Submission Form](#)
[Request Access](#)

Videos
[CLEAR Program Overview](#)
[Post-Construction Assessments](#)
[2023 Innovation Challenge Winners](#)

Sign Up for Notifications:
[Upcoming PCAs](#)
[Upcoming Lunch & Learns](#)

- Use the CLEAR Portal today!
- Let us know your ideas for improvement!
- Look out for the updated tool to launch in 2024!



Scan to learn more
about CLEAR



CLEAR
Communicate Lessons, Exchange Advice, Record

Points of Contact for Programs



Technical Assistance – John W. Kirby -
jwkirby@ncdot.gov



Technology Transfer – Catherine Bryant P.E., -
cbryant6@ncdot.gov



Pooled Fund Engagement – Mustansir A.
Kadibhai, PE, CPM – makadibhai@ncdot.gov



Library Assistance – Lamara C. Williams –
lcwilliams2@ncdot.gov

Thank you!

<https://connect.ncdot.gov/projects/research/Pages/default.aspx>
research@ncdot.gov