



NORTH CAROLINA
Department of Transportation

P8 Highway Modernization Subcommittee Meeting #2

NCDOT SPOT Office

December 19, 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

Agenda

- Workgroup Update
- Highway Testing Scoring Spreadsheet
- Project Scoring Process
- Modernization Scores/Zero Scores
- Modernization Specific Improvement Types
- Next Steps
- Adjourn

Housekeeping

- Virtual etiquette:
 - When you are not speaking, please mute yourself. This limits disruption from background noise.
 - Feel free to use the “Raise Hand” feature if you have a question. You can also type “Q” in the chat.

Workgroup Updates

- Workgroup agreed to use this Subcommittee to discuss both Modernization projects and Road Diet projects.
 - Ideally, would like this subcommittee to have a solution that benefits both project types.
 - If not, let WG know so they can identify a Plan B for Road Diet projects

Highway Scoring Testing Spreadsheet

- A Highway scoring testing spreadsheet is available on our [website](#)
 - Spreadsheet is based on previous cycle's set of projects and scales
 - The SIT determines which criteria weights (Mobility or Modernization) are used to calculate the quantitative score
 - The project needs to be entered using different SITs in SPOT Online to test for Modernization vs Mobility
 - Project submitters can do this testing and the CDE can help if needed
 - You can use SPOT Online and testing spreadsheet to compare projects to each other
 - B/C and TREDIS analyses are not part of SPOT Online, therefore, a complete test score is not produced

Project Scoring Process

- Submittal Window
 - Submitters submit projects per submittal guidance: [P7 Submittal Guidance 8-9-23.pdf](#)
 - SPOT assists submitters (if needed) in finding the best way to submit their projects
 - Project scoring testing spreadsheet is available on our website for submitters use
- Scoring Window
 - Vetting Process by SPOT Office
 - Ensure projects are categorized correctly (Statewide Mobility, Regional Impact, Division Needs)
 - Confirm SITs make sense with descriptions/attribute data
 - For Modernization, we would also check to make sure the existing number and proposed number of lanes are the same
 - Review project mapping in SPOT Online to ensure it matches up with submitted limits
 - Send out proposed changes to submitters to have them review and approve/reject changes
 - Measures and formulas used for scoring are the same for all types of projects
 - Criteria weights are difference for Modernization projects vs Mobility projects
 - Lane and Shoulder Widths have non-zero criteria weights for Modernization and zero weights for Mobility
 - All projects have the same measures within each criteria
- A Modernization project is scored using the Modernization criteria weights (next slide)



Highway - Modernization

Criteria	Measure Description	Statewide Mobility (100%)	Regional Impact (70%)	Division Needs (50%)
Congestion	[Volume] and [Volume/Capacity]	10%	5%	-
Safety	SEG: Crash Density, Crash Severity, Crash Rate, Safety Benefits INT: Crash Frequency, Crash Severity, Safety Benefits	25%	25%	20%
Freight	[Truck Volumes] and [Truck Percentage]	25%	10%	5%
Lane Width	Existing lane width vs. DOT design standard	10%	10%	5%
[Paved] Shoulder Width	Existing paved shoulder width vs. DOT design standard	20%	10%	10%
Pavement Condition	Existing Pavement Condition Rating (PCR) along the project	10%	10%	10%

Project Types: Modernize Roadway (SIT-16) and Upgrade Freeway to Interstate Standards (SIT-17)

Highway – Lane Width

Funding Category	Mobility Default Weights	Modernization Defaults
Statewide Mobility	-	10%
Regional Impact	-	10%
Division Needs	-	5%

Purpose – measure the existing lane width vs. DOT design standard

Existing Lane Width – DOT design standard Lane Width

- Greater the difference (deficiency), the higher the criteria score

Highway – Lane Width

NCDOT Roadway Design Manual

4.3 Lane Widths

Lane width influences operational characteristics, level of service, driver comfort, and likelihood of crashes of a roadway.

- On local roads, use lane widths of 10 to 11 feet in residential areas and 12 feet in industrial areas. When right of way is limited, 9-foot lanes in residential areas and 11-foot lanes in industrial areas can be considered.
- For collectors, lane widths can range from 10 feet to 12 feet. In industrial areas, use 12-foot lanes unless right of way restrictions exist; in these cases, 11-foot lanes can be used. Turn lanes at intersections can vary from 10 to 12 feet depending on truck volumes.
- Lane widths for arterials range from 10 to 12 feet. On high speed, free flowing urban arterials, 12-foot lanes are preferred. When truck and bus traffic is low and speed is less than 35 mph, 10-foot lane widths may be used. Lane widths for divided arterials in a rural area should be 12 feet due to high speed and traffic volumes. On reconstructed arterials, 11-foot lanes are acceptable if the alignment is acceptable and has no crash history that would indicate widening is necessary.
- Provide 12-foot lanes on freeways and other high speed, high volume roadways.

A project may require lanes of unequal widths to be used. Locate the wider lane on the outside (right) to provide more space for larger vehicles that typically use the outside lane as well as provide space to share with bicycles. Locate the wider lane adjacent to the curb and gutter where curb and gutter is used.

Highway – [Paved] Shoulder Width

Funding Category	Mobility Default Weights	Modernization Defaults
Statewide Mobility	-	20%
Regional Impact	-	10%
Division Needs	-	10%

Purpose – measure the existing paved shoulder width vs. DOT design standard

Existing Paved Shoulder Width – DOT design standard Paved Shoulder Width

- Greater the difference (deficiency), the higher the criteria score

Table 4-4 NCDOT Paved Shoulder Guidance

Classification	Inside/Median	Outside
Interstate and Freeways 6 or more lanes	10'	10'
Interstate and Freeways 4 lanes	4'	10'
Freeways 4 lanes ADT < 15,000	4'	4'
Median Divided Arterials and Collectors 6 or more lanes	4'	10'
Median Divided Arterials and Collectors 4 lanes ADT ≥ 40,000	4'	10'
Median Divided Arterials and Collectors 4 lanes ADT < 40,000	2'	4'
Multilane Undivided 4 or more lanes ADT ≥ 40,000	N/A	10'
Multilane Undivided 4 or more lanes ADT < 40,000	N/A	4'
Multilane Undivided 4 or more lanes ADT ≥ 40,000	N/A	4'
Two Lane - Two Way ADT ≥ 4,000	N/A	2'
Two Lane - Two Way ADT < 4,000	N/A	N/A
Ramps	4'	4'
Flyovers	4'	10'
Loops	N/A	4'

Highway – Pavement Condition

Funding Category	Mobility Default Weights	Modernization Defaults
Statewide Mobility	-	10%
Regional Impact	-	10%
Division Needs	-	10%

Purpose – measure the existing pavement condition along the project

100 – Pavement Condition Rating

- Pavement Condition Rating is on a 0-100 point scale
 - 100 points reflects brand new pavement
 - 0 points reflects highly degraded pavement
- Greater the difference (deficiency), the higher the criteria score

Scaling

Ranking of an individual raw measure score in comparison to the total project population of that measure

Incorporated in P4 to address P3 statistical issues

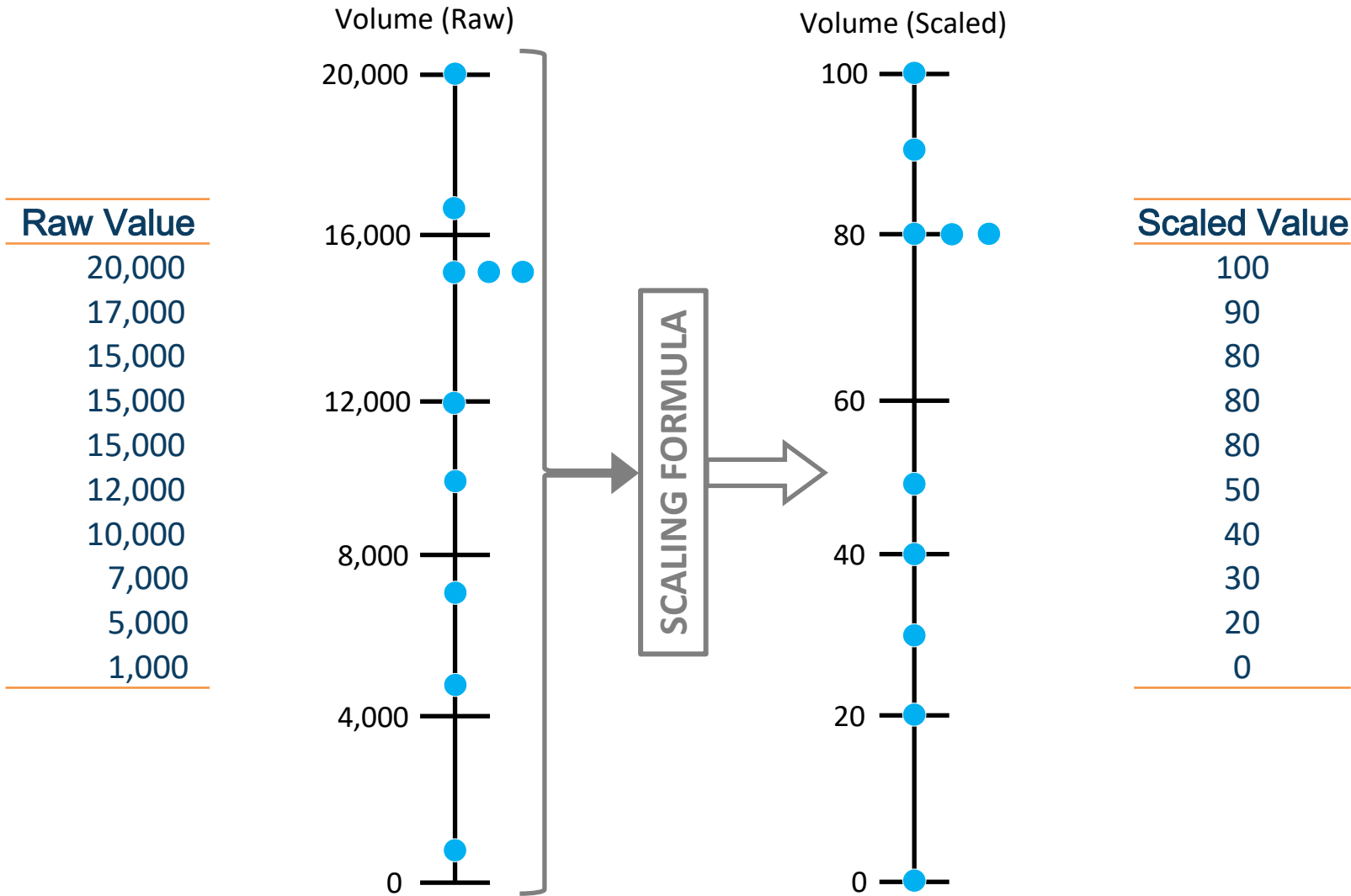
Uses standardized methodology to produces a more uniform distribution of results within each measure

Highest raw measure value = 100 scaled value

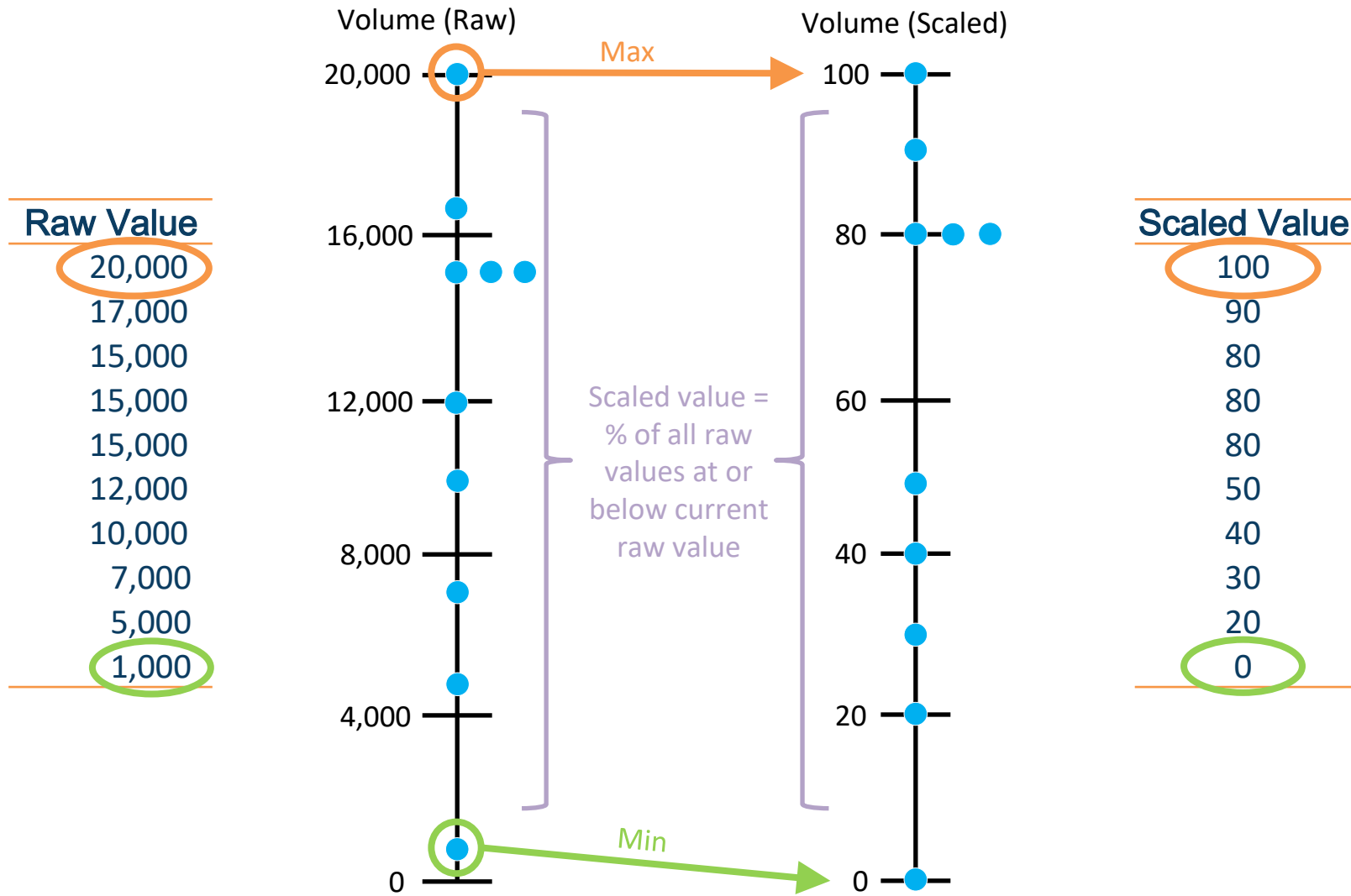
Lowest raw measure value = 0 scaled value

All other values based on percentage of projects less than or equal to that value

Scaling - Example



Scaling - Example



P7 Modernization Scores

- Total Modernization Projects
 - 197
- Projects with Lane Width scaled value of “0”
 - 159
 - Reason: Existing Lane Width is equal or greater than the Minimum DOT Design Standard
- Projects with Paved Shoulder Width scaled value of “0”
 - 167
 - Reason: Existing Paved Shoulder Width is equal or greater than the Minimum DOT Design Standard
- Projects with Pavement Condition Rating scaled value of “0”
 - 12
 - Reason: Pavement Condition Rating at 100 or N/A

Zero Scores

- Zero scores are not limited to Lane Width, Paved Shoulder Width, or Pavement Condition Rating
 - The majority are in these criteria
- Zero criteria/measure scores are not limited to Modernization projects
 - Projects with zero benefit results in a zero criteria score
- Example P7 Projects with Zero Scores
 - Safety Criteria: 6 Mobility projects and 1 Modernization project
 - B/C Statewide & Regional: 24 Mobility projects and 4 Modernization projects
 - B/C Division: 68 Mobility projects and 18 Modernization projects
 - EC Statewide only: 77 Mobility projects and 16 Modernization projects
 - A/C Regional & Division: 3 Mobility projects and 1 Modernization project

Discussion/Questions

- What is the source of the existing Lane Width? The existing Lane Width is not user entered information and comes from the Road Characteristic database or a similar file
- Is the DOT Lane Width design standard a blanket 12 foot? No - the design standard is based on the type of road and may have caveats that may further allow for a different standard.
- The Paved Shoulder Width calculation looks at a roadway with only curb and gutter as having a deficiency for Paved Shoulder. The function of a Paved Shoulder and a Curb and Gutter are technically different.
- The zero criteria scores for Lane Width, Paved Shoulder Width, and Pavement Condition Rating were a result of the existing value being equal or greater than the current DOT Design standard
- Every submitted project regardless of the SIT number is scored under each criterion.
- Only Modernization criteria have weights for Lane Width, Paved Shoulder Width, and Pavement Rating Condition.

Discussion/Questions

- One of the difficulties faced with Modernization is that a lot of times what we are trying to get at with Modernization are things like horizontal and vertical curvature which are beyond Lane and Shoulder Widths. Horizontal and vertical curvatures are not part of the 10 criteria in the STI law and there is no good way to incorporate them into any criterion
- It may be possible to make use of other criteria in the STI law. A Modernization project may not be a major capacity issue requiring something like widening but may have traffic flow/operational improvements
- It may also be possible to retool in some way a criteria such as Multimodal or Accessibility and Connectivity to serve in the Modernization category
- It appears there is a range of possible Modernization project types and one of the challenge is the original definition in the SITs. It seems we have a narrower definition of the problem than we really would want to have

Discussion/Questions

- Is there any concerns or issues with so many projects receiving a 0 score for two of the criteria? The zero scores for the Lane and Shoulder Widths criteria reflects that many projects submitted are meeting the current design standards for the metrics that we can measure them on for scoring
- The main reason why a Modernization project is submitted is to address deficiencies in Lane and Shoulder Widths. If most of these projects come back with a zero score which mostly mean that they already meet the standard, is there a reason for such projects to be submitted as Modernization in the first place?
- The rationale used by submitters is not shared with the SPOT office, but the submitters do have the ability to utilize the testing spreadsheet to check their expectations during the submittal window
- Also, there is a data review phase where information is sent out for everybody to check and verify the data that will be utilized for scoring

Discussion/Questions

- Of the current criteria used for Modernization, Pavement Condition Rating is the least satisfactory as it is not a very meaningful way to score these projects
 - All our roads are on a resurfacing cycle and the condition is fixed when a road is repaved
 - The criterion could be reworked/replaced. It could also be dropped. A minimum of 4 criteria is required. Currently there are 6 criteria for Modernization.
- Like Road Diet projects that can be scored as Mobility or Modernization, consider having a couple of different SITs that have somewhat different scoring criteria and use
 - There are some projects where Lane and Shoulder Widths are great and there are some projects where there are other criteria that could do a better job representing their value and need
- We need to think of a better way to score these projects given the zero score of the majority and make them more competitive

Discussion/Questions

- It might be worth considering/exploring adding roadway characteristic factors like vertical/horizontal alignments as a component of the Safety criterion
 - The Workgroup has discussed the idea of safety risk that could potentially measure such things
 - Some type of analysis can be done after a curve inventory on the state system is completed perhaps during the next round of Prioritization
- Do all the SITs need to use the Safety criteria in the same way? Yes – the measures used, and the calculation process is the same for every project regardless of the SIT used. This ensures the ability to effectively compare all projects equally and identify those projects that are the best use of the highly limited funds

P7 Modernization Specific Improvement Types

- SIT 16 – Modernize Roadway: Improve current roadways with deficient/historical design standards to modern roadway design standards
 - Improving a roadway to current design standards primarily by increasing the lane and/or shoulder width. Could also include improving the horizontal or vertical geometry. Could also include adding turn lanes at intersections to help improve mobility on the through route.
- SIT 17 - Upgrade Freeway to Interstate Standards: Improve an existing freeway to Interstate design standards
 - Improving an existing freeway to interstate design standards primarily by increasing shoulder width and/or bridge clearances.

Discussion

Based on feedback from Subcommittee Meeting #1:

- Are there changes/improvements needed to the current modernization definition?
- Should there be a new standard for modernization?
- Should there be other improvement types to qualify for modernization?

Next Steps

- Data collection process for Lane Width and Shoulder Width
- Review of high scoring Modernization projects with associated criteria scores
- Analysis of Modernization scores without Pavement Condition criterion
- Road Diets
 - Background on Road Diet Projects and Discussion
- Discussion Follow-Up
 - Continue discussion on current definition of Modernization and improvements to the current criteria
- Next Meeting: ***January 16th, 2025 @ 2:00 PM to 3:30 PM***

Meeting Summary

- SPOT office:
 - Shared the Workgroup's decision to have the Subcommittee produce a solution that would benefit both the Modernization and Road Diet projects or notify the Workgroup if not possible
 - Provided level-setting information on the scoring process
 - Highlighted the calculations involved for the lane width, paved shoulder width, and pavement condition rating criteria, and provided an example of how raw values are scaled down to between 0 and 100
 - Provided information on the use of the highway scoring testing spreadsheet and examples of other criteria with some zero scores

Meeting Summary - Cont.

- Subcommittee Discussions
 - The zero criteria scores for Lane Width, Paved Shoulder Width, and Pavement Condition Rating reflect that many projects submitted are meeting the current minimum design standards for the metrics that we are measuring them on for scoring
 - Project submitters have opportunities to verify that the correct information is being utilized for scoring during the submittal window such as the highway scoring testing spreadsheet and partner data review phase
 - Certain roadway elements considered during Modernization such as horizontal and vertical curvature are not part of the legislation 10 criteria and there is no effective method to incorporate them into any criterion
 - Pavement Condition Rating criterion is not a very meaningful way to score these projects as the condition of all roads is addressed during the resurfacing cycle
 - To ensure equal competition of all projects, the calculation process and measures used are the same for every project regardless of the SIT used

Thank you!



Meeting Attendance - Virtual

Name	Organization
Amin Hezaveh	NCDOT
Andy Bailey *	NCDOT
Benard Chola *	NCDOT
Brian Murphy *	NCDOT
Tyler Meyer *	Greensboro MPO
David Graham *	High County RPO
Deanna Trebil *	New Bern Area MPO
Drew Finley	Fountainworks
Fredrick D. Haith	NCDOT
Janet Robertson *	Lumber River RPO
Jason Myers *	NCDOT
Raunak Mishra	Greensboro MPO
Richard Brown *	NCDOT
Rose Bauguess	Southwestern RPO
Saman Jeffers *	NCDOT
Sarah Lee *	NCDOT
Brian Wert *	NCDOT
Scott Miller	NCDOT
Stephen Sparks	NCDOT
Tristan Winkler *	French Broad River MPO

*Workgroup Participant, Alternate, or Advisory