NORTH CAROLINA
Department of Transportation









NCDOT STIP No. A-0009C

Concurrence Point 2 Meeting

May 20, 2020

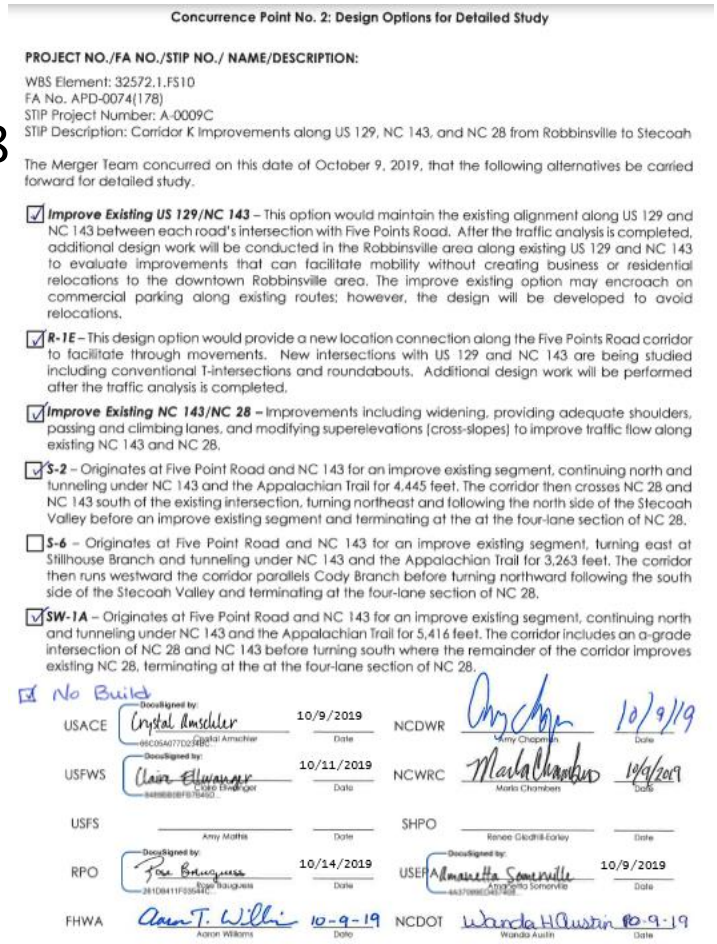
Purpose of Today's Meeting

- Revise concurrence form:
  - Detailed Study Alternatives (CP 2)
  - Remove S-2, SW-1A, R-1E, R-1E Refined

Design Options

- Improve Existing US 129/NC 143/NC 28
- SW-1A
- S-2
- R-1E
- R-1E Refined *
- No Build

* R-1E Refined added at CP 2A



Concurrence Point No. 2: Design Options for Detailed Study

PROJECT NO./FA NO./STIP NO./ NAME/DESCRIPTION:

WBS Element: 32572.1.FS10
FA No. APD-0074(178)
STIP Project Number: A-0009C
STIP Description: Corridor K improvements along US 129, NC 143, and NC 28 from Robbinsville to Stecoah

The Merger Team concurred on this date of October 9, 2019, that the following alternatives be carried forward for detailed study.

☑ ***Improve Existing US 129/NC 143*** – This option would maintain the existing alignment along US 129 and NC 143 between each road's intersection with Five Points Road. After the traffic analysis is completed, additional design work will be conducted in the Robbinsville area along existing US 129 and NC 143 to evaluate improvements that can facilitate mobility without creating business or residential relocations to the downtown Robbinsville area. The improve existing option may encroach on commercial parking along existing routes; however, the design will be developed to avoid relocations.

☑ ***R-1E*** – This design option would provide a new location connection along the Five Points Road corridor to facilitate through movements. New intersections with US 129 and NC 143 are being studied including conventional T-intersections and roundabouts. Additional design work will be performed after the traffic analysis is completed.

☑ ***Improve Existing NC 143/NC 28*** – Improvements including widening, providing adequate shoulders, passing and climbing lanes, and modifying superelevations (cross-slopes) to improve traffic flow along existing NC 143 and NC 28.

☑ **S-2** – Originates at Five Point Road and NC 143 for an improve existing segment, continuing north and tunneling under NC 143 and the Appalachian Trail for 4,445 feet. The corridor then crosses NC 28 and NC 143 south of the existing intersection, turning northeast and following the north side of the Stecoah Valley before an improve existing segment and terminating at the at the four-lane section of NC 28.

☐ **S-6** – Originates at Five Point Road and NC 143 for an improve existing segment, turning east at Stillhouse Branch and tunneling under NC 143 and the Appalachian Trail for 3,263 feet. The corridor then runs westward the corridor parallels Cody Branch before turning northward following the south side of the Stecoah Valley and terminating at the four-lane section of NC 28.

☑ **SW-1A** – Originates at Five Point Road and NC 143 for an improve existing segment, continuing north and tunneling under NC 143 and the Appalachian Trail for 5,416 feet. The corridor includes an a-grade intersection of NC 28 and NC 143 before turning south where the remainder of the corridor improves existing NC 28, terminating at the at the four-lane section of NC 28.

☑ No Build

USACE	Crystal Amschler 10/9/2019	Date	NCDWR	Amy Chapman 10/9/19	Date
USFWS	Claire Ellwanger 10/11/2019	Date	NCWRC	Marla Chambers 10/9/2019	Date
USFS	Amy Mathis	Date	SHPO	Renee Gledhill-Earley	Date
RPO	Ryan Bouguess 10/14/2019	Date	USEPA	Almarietta Somerville 10/9/2019	Date
FHWA	Aaron T. Williams 10-9-19	Date	NCDOT	Wanda H Austin 10-9-19	Date

Detail Study Alternatives

Alternative 1: Improve Existing US 129 / Improve Existing NC 143 / Improve Existing NC 28

Alternative 2: **Improve Existing US 129 / Improve Existing NC 143 / S-2**

Alternative 3: **Improve Existing US 129 / Improve Existing NC 143/SW-1A / Improve Existing NC 28**

Alternative 4: R-1E Intersection / Improve Existing NC 143 / Improve Existing NC 28

Alternative 5: **R-1E Intersection / Improve Existing NC 143 / S-2**

Alternative 6: **R-1E Intersection / Improve Existing NC 143 / SW-1A / Improve Existing NC 28**

Alternative 7: R-1E Roundabout / Improve Existing NC 143 / Improve Existing NC 28

Alternative 8: **R-1E Roundabout / Improve Existing NC 143 / S-2**

Alternative 9: **R-1E Roundabout / Improve Existing NC 143 / SW-1A / Improve Existing NC 28**

Milestone Completions

CP2
10/9/2019

Visual Impact Assessment
4/14/2020

Crash Analysis
2/20/2020

Tunnel Feasibility Report
4/30/2020

Historic Architecture Report
4/13/2020

Geotechnical Review
1/7/2020

Cost Estimates
4/28/2020

Community Impact Assessment
4/20/2020

Air Quality Analysis
2/25/2020

Indirect and Cumulative Effects Report
4/10/2020

Traffic Noise Report
4/21/2020

NRTR
10/4/2019

Archaeological Management Summary
4/20/2020

Traffic Operations Analysis Technical Memorandum
2/3/2020

Geo-Environmental Report
12/23/2020

Hydraulics Analysis Report
12/6/2019

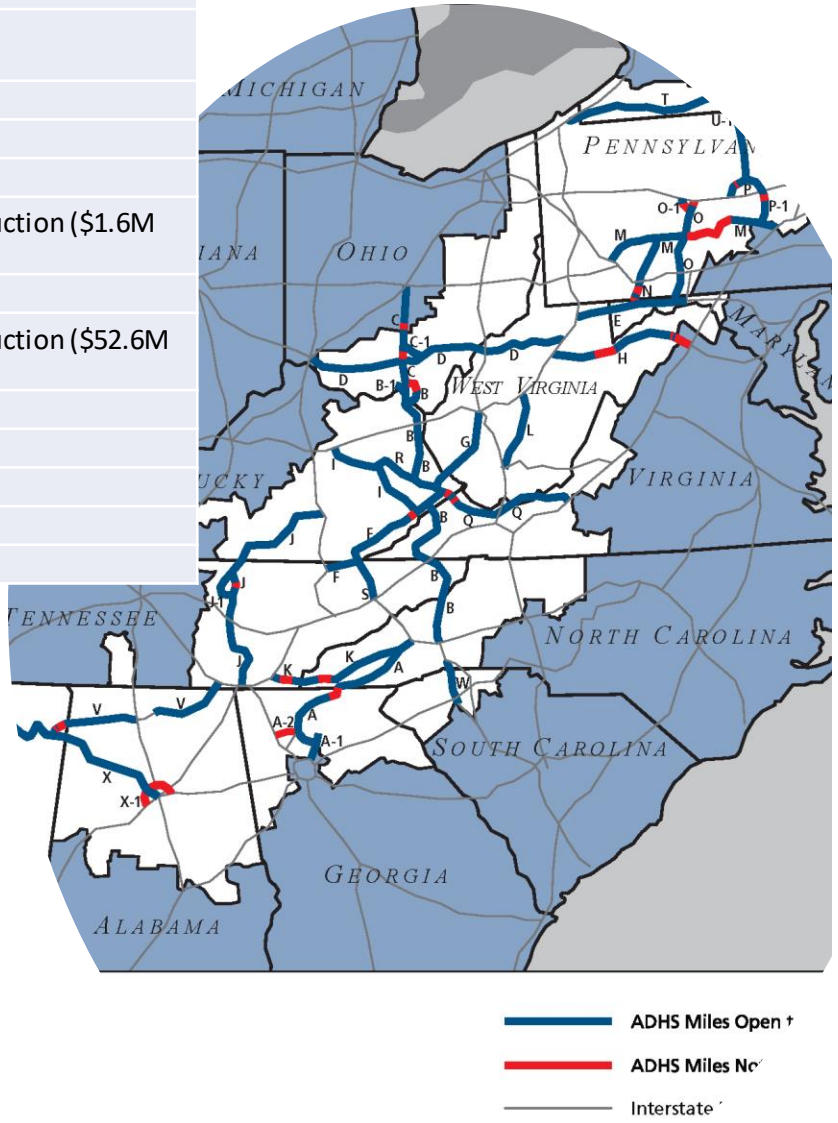
Update CP2
5/20/2020

Appalachian Regional Commission Funding Updates

Appalachian Development Highway System

Active and Future ADHS Projects					
STIP #	Right-of-Way	Utilities	Construction	CON Schedule	Comments
R-5870			$1,125,000	FY 2022	
U-6251			$2,000,000	FY 2021	
R-5967			$1,246,000	FY 2020	
R-5779					Under Construction ($1.6M authorized)
R-5964			$600,000	FY 2020	
A-0011C					Under Construction ($52.6M authorized)
A-0011D	$20,845,000	$378,000	$52,800,000	Future Year	Unfunded
A-0009A	$14,300,000	$925,000	$366,000,000	Future Year	Unfunded
A-0009C	$13,590,000	$6,371,000	$104,200,000	FY 2024	
			TOTAL:	$614,380,000	

NOTE: $206,500,000 ADHS funds currently available in North Carolina



Tunnel Operation Costs & Considerations

National Tunnel Inventory

5 tunnels, over 3,200 feet long, single bore, two-directional traffic

- Four have detour lengths over 99 miles or greater.
- The other is a tolled high ADT alternate crossing in Detroit, Michigan

Tunnel	State	Tunnel Length (feet)	ADT	Detour length (miles)
Buffalo Bill Tunnel	WY	3,202	2,229	99
Wawona	CA	4,237	2,000	199
Detroit Windsor (Toll)	MI	5,160	12,000	5
Chesapeake Channel	VA	5,424	10,956	425
Zion – Mount Carmel	UT	5,613	2,000	199

Squirrel Hill - PennDOT

- 2 bores with 2 lanes each
- 4,225 feet long
- Built in 1955
- Rehabilitated in 2016

- 17 full time staff
  - Plus additional maintenance from neighboring tunnels
- $2.6 Million – annual staff cost
- $400,000 – annual utility cost

Cumberland Gap – KY/TN

- 2 bores with 2 lanes each
- 4,860 feet long
- Built in 1996

- 35 full time staff
  - 5 administrative
  - 24 operators (4 shifts of 6)
  - 6 maintenance
- $2 Million – annual staff cost
- $320,000 – annual utility cost

I-77, Big Walker Mountain - VA

- 2 bores with 2 lanes each
- 4,228 feet long
- Built in 1972

- Staffing
  - 1 operator
  - 4 emergency response
  - 1 master electrician
  - 1 technician, preventative maintenance
- $3.7 Million staff cost, operations and maintenance
  - Supplemental O&M contractor as needed
- $500,000 – annual utility cost

I-77, East River Mountain – VA/WV

- 2 bores with 2 lanes each
- 5,661 feet long
- Built in 1974

- Staffing
  - 1 operator
  - 4 emergency response
  - 1 master electrician
  - 1 technician, preventative maintenance
- $3.7 Million staff cost, operations and maintenance
  - Supplemental O&M contractor as needed
- $500,000 – annual utility cost

A-0009C Estimated Costs

Alternative 1 (Improve Existing)

- O&M Estimate Roadway: $0.038M
- R/W Estimate: $13.6M
- Utility Estimate: $6.6M
- Construction Estimate: $104.2M
- **ESTIMATED TOTAL COST: $124.4M**

Alternative 2 (S-2)

- Tunnel Estimate: $217M
- O&M Estimate Tunnel: $3.8M
- O&M Estimate Roadway: $0.16M*
- R/W Estimate: $17.8M
- Utility Estimate: $5.4M
- Construction Estimate: $204.7M
- **ESTIMATED TOTAL COST: $448.7M**

*Snow and Ice Systems not included

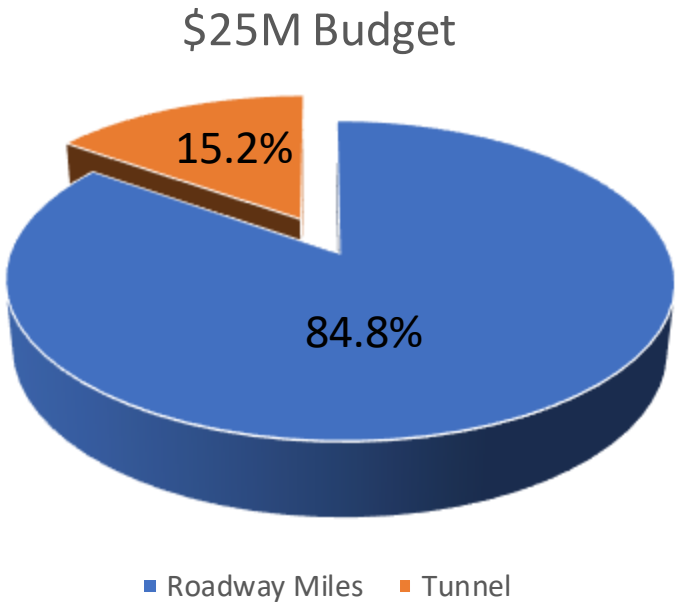
Alternative 3 (SW-1A)

- Tunnel Estimate: $262M
- O&M Estimate Tunnel: $4.2M
- O&M Estimate Roadway: $0.028M
- R/W Estimate: $14.5M
- Utility Estimate: $6.2
- Construction Estimate: $191.2M
- **ESTIMATED TOTAL COST: $478.1M**

Division 14 Maintenance

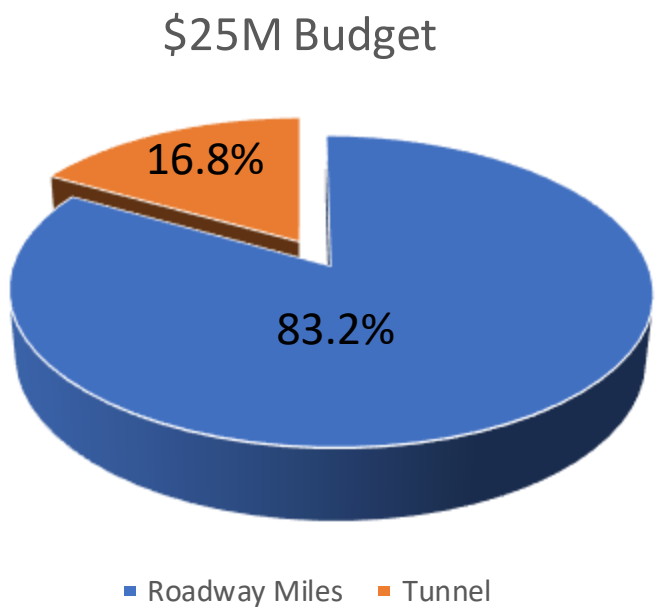
S-2

- O&M Estimate: $3.8M



SW-1A

- O&M Estimate: $4.2M



Allocation per mile based on 8,000 roadway miles in Division 14

$3,125/mile → $2,650/mile

$3,125/mile → $2,600/mile

NCDOT Funding

Strategic Transportation Investments

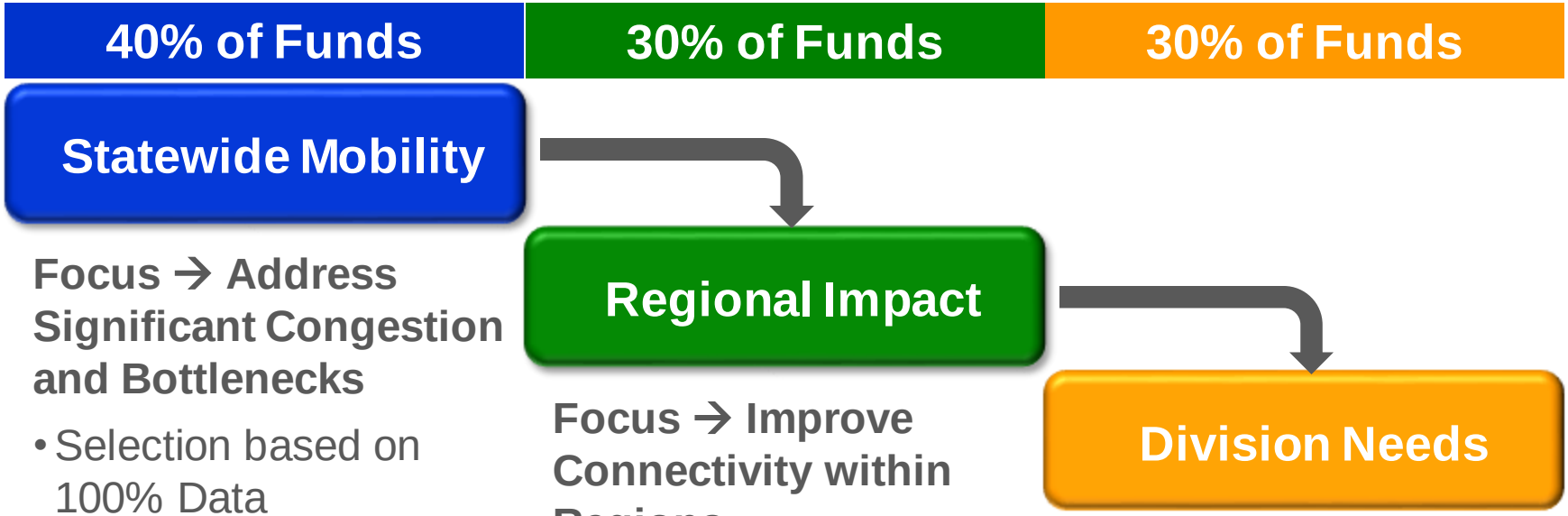
"Article 14B.

Strategic Prioritization Funding Plan for Transportation Investments.

§ 136-189.10. Definitions.

The following definitions apply in this Article:

How STI Works



Focus → Address Significant Congestion and Bottlenecks

- Selection based on 100% Data
- Projects Programmed prior to Local Input Ranking

Focus → Improve Connectivity within Regions

- Selection based on 70% Data & 30% Local Input
- Funding based on population within Region (7)

Focus → Address Local Needs

- Selection based on 50% Data & 50% Local Input
- Funding based on equal share for each Division (14)

STIP Expenditures

Programmed first in Statewide
- Interstate Maintenance
- Bridge Replacement
- Highway Safety
- Committed Projects

Divided based on % of State Population

Programmed first in each Region
- Bridge Replacement
- Highway Safety
- Committed Projects

Divided based on Equal Share

Programmed first in each Division
- Bridge Replacement
- Highway Safety
- DA Funds (STBG & TAP)
- Rail-Highway Crossing
- Economic Development
- Committed Projects

Division 14 Level Funding Needs

- STIP 2020 – 2029
  - Approximately $156 Million
- STIP 2018 – 2027
  - Approximately $223 Million
- Preliminary Score

NC 143 (Sweetwater Road), NC 28 (Fontana Road)	(SW1A Tunnel only from NC 28 to tie on NC 143) Construct roadway and Tunnel on new alignment.	5.78
NC 28 (Fontana Road), NC 143 (Sweetwater Road)	(Improve Existing) Widen existing roadway to 2+1 adding climbing lanes	16.43
NC 143 (Sweetwater Road), NC 28 (Fontana Road)	(SW-1A) Construct roadway with partial widening and partially on New Location	5.78
NC 143 (Sweetwater Road), NC 28 (Fontana Road)	(S-2) Construct roadway with partial widening and partially on New Location	5.78

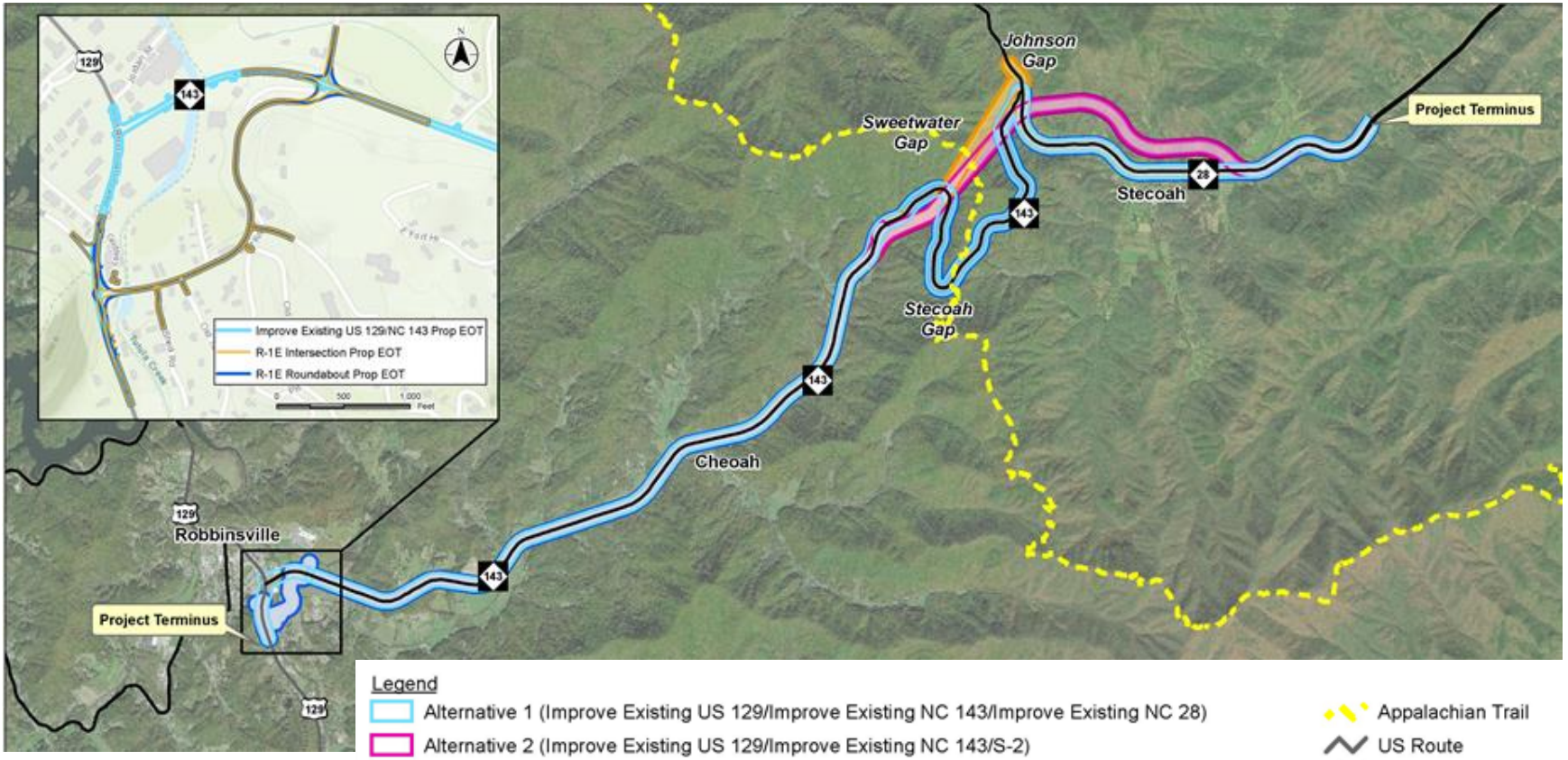
P6.0 Hwy Criteria & Weights (Modernization Default)

Funding Category	QUANTITATIVE Data		LOCAL INPUT Division	LOCAL INPUT MPO/RPO
Statewide Mobility	Congestion = 10% Safety = 25% Freight = 25% Lane Width = 10% Shoulder Width = 20% Pavement Condition = 10%	**100%**	--	--
Regional Impact	Congestion = 5% Safety = 25% Freight = 10% Lane Width = 10% Shoulder Width = 10% Pavement Condition = 10%	**70%**	**15%**	**15%**
Division Needs	Safety = 20% Freight = 5% Lane Width = 5% Shoulder Width = 10% Pavement Condition = 10%	**50%**	**25%**	**25%**

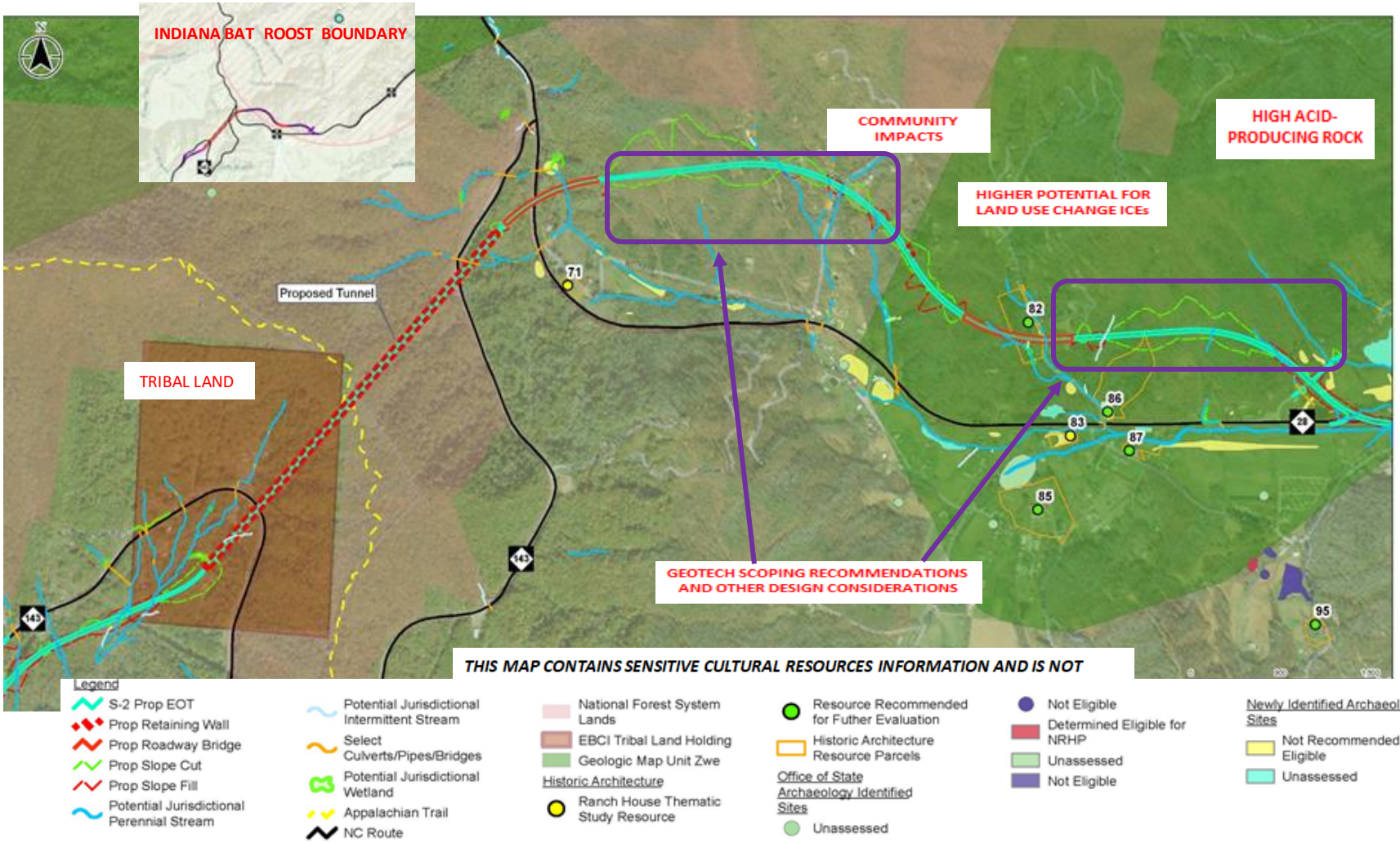
Note: Area-Specific Criteria Weights allowed

CONCURRENCE POINT 2

Design Study Alternatives



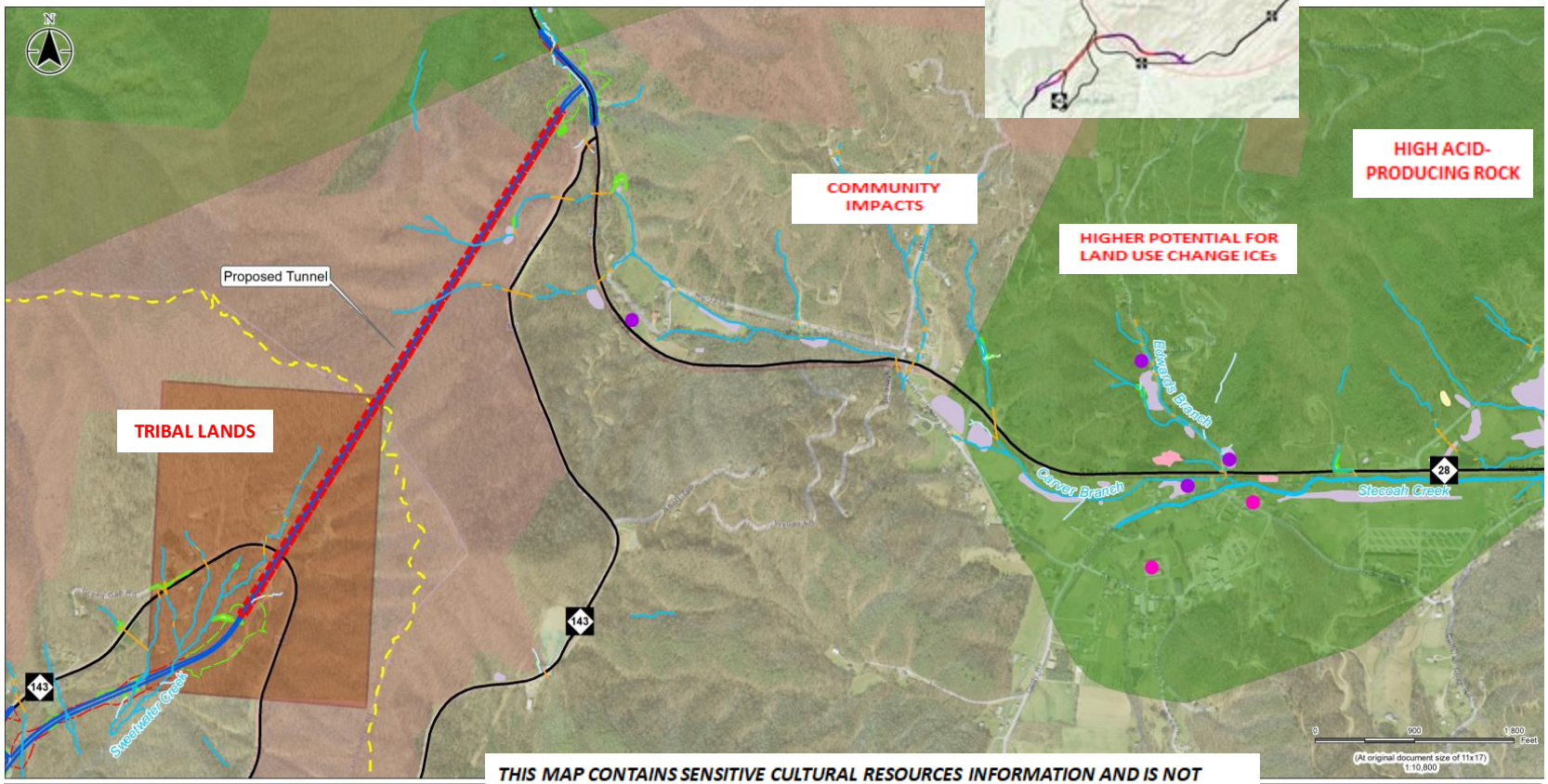
Alternative 2: S-2

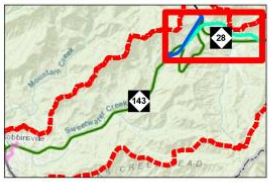


Alternative 2: S-2

- 4,470 feet long
- Constructability and maintenance issues associated with two ~ 100-ft high, ~1,000-ft long curved bridges with 6% super-elevations
- 3,740 feet of parallel terraced retaining walls with maximum height of 140 feet for a total distance of 815 feet
- Footprint increased 5.2 ac with geotechnical recommendations
- Declining 2.4% grade South to North
- 635 feet of max ground cover
- Northernmost section has limited cover; recommend redesigning to shorten
- Southern portal on tribal lands; relocates 3 homes
- Impacts 13.79 acres of tribal land
- Not supported by local officials
- High pyritic rock potential
- Adverse effect to Indiana bat roost
- Adverse community cohesion effects(Stecoah Heights)
- High number of relocations
- High visual impacts from AT

Alternative 3: SW-1A





Legend
- SW-1A Prop EOT
- Prop Retaining Wall
- Prop Slope Cut
- Prop Slope Fill
- Potential Jurisdictional Perennial Stream
- Intermittent Stream
- Select Culverts/Pipes/Bridges
- Potential Jurisdictional Wetland
- Appalachian Trail
- National Forest System Lands
- EBCI Tribal Land Holding
- Geologic Map Unit Zwe

Historic Architecture
- Recommended Eligble

Archaeology
- Historic Cemetery
- Recommended Eligible
- Recommended Not Eligible

THIS MAP CONTAINS SENSITIVE CULTURAL RESOURCES INFORMATION AND IS NOT INTENDED FOR PUBLIC DISTRIBUTION. CULTURAL RESOURCES SURVEYS ARE ONGOING.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
DIVISION 14

Project Location: Graham County, NC
Prepared by ALK on 2020-05-04
Reviewed by ECL on 2020-05-04

Client/Project: NCDOT - Division 14
Corridor K Improvements
STIP Project No. A-0009C

Figure No. 1

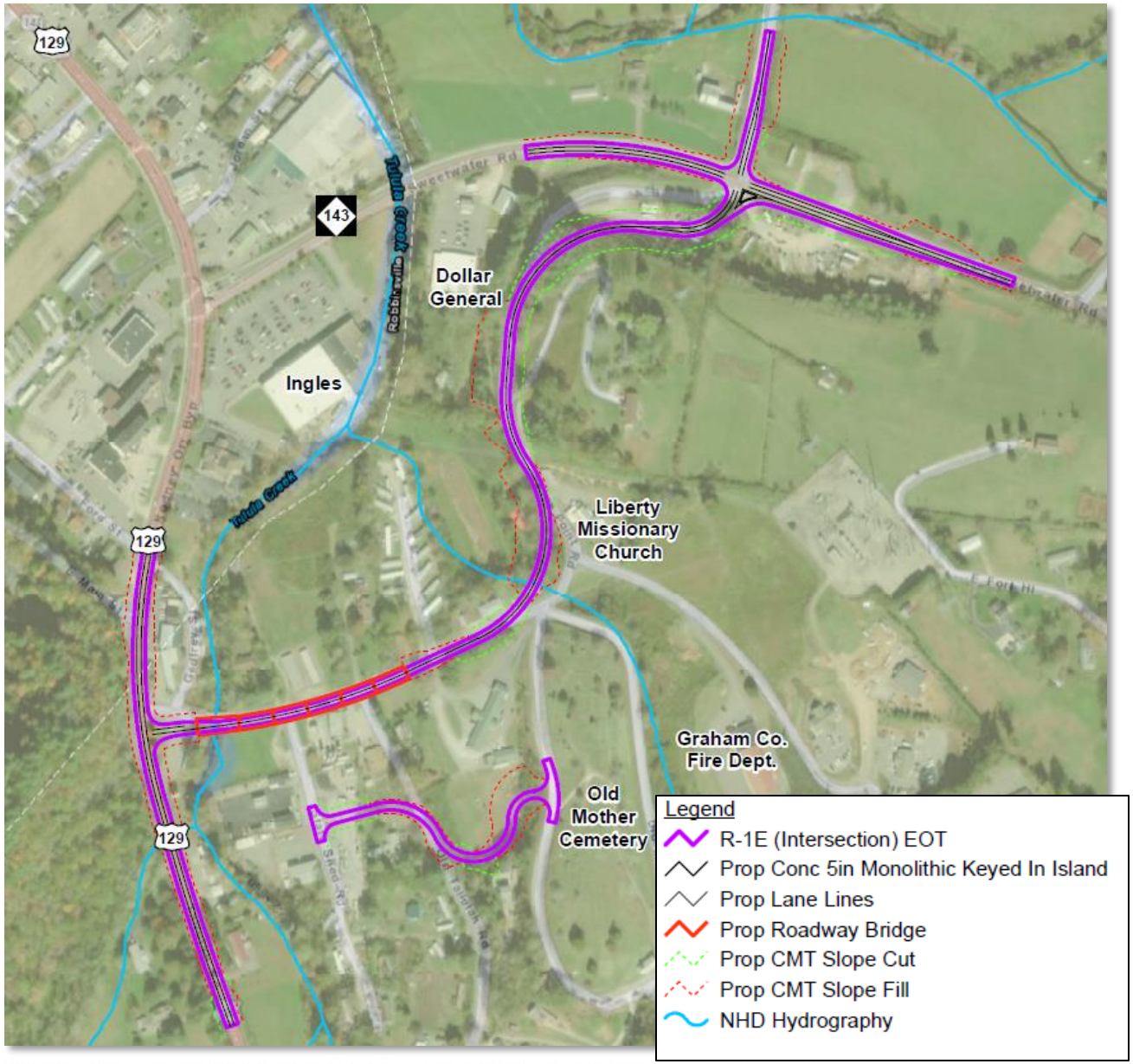
Title: **SW-1A - Environmental Features**

NOTE: THIS MAP CONTAINS SENSITIVE CULTURAL RESOURCES INFORMATION, AND IS NOT INTENDED FOR PUBLIC DISTRIBUTION.

Alternative 3: SW-1A

- 5,408 feet long
- Declining 2.9% grade South to North
- 670 feet of max ground cover
- Southern portal on tribal lands; relocates 3 homes
- Impacts 10.78 acres of tribal land
- Not supported by local officials
- High stream impacts at tunnel approach
- Terraced retaining walls required at portals

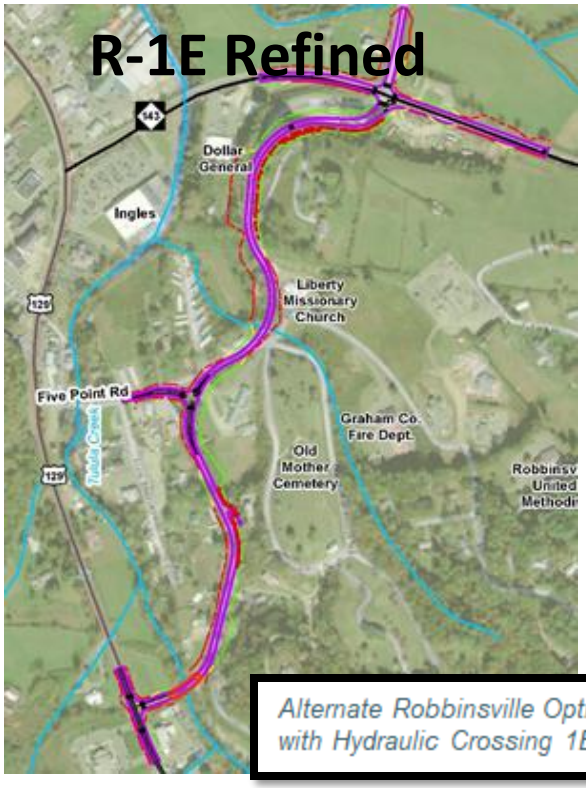
Alternatives 4-9: R-1E



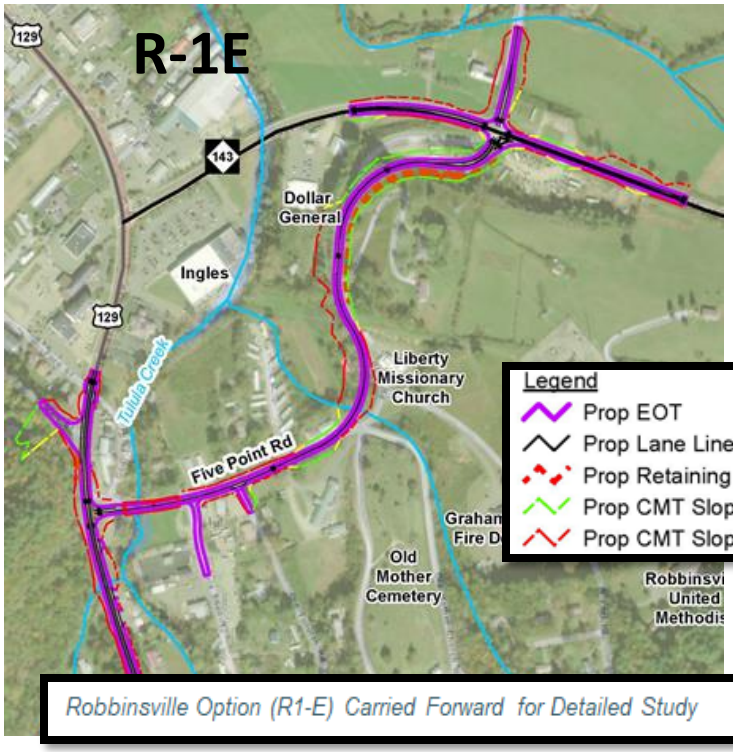
- New location connection along Five Point Rd.
- In Graham County CTP
- Would remove through traffic from existing US 129/ NC 143
- Roundabout & T-intersection being studied
- No control of access
- Requires new driveway access for ~3 businesses

Robbinsville Options

- Major drainage structure details for design option included in CP2A materials
- Developed as an option to preliminary long bridge on Five Point Road over Tulula Creek
- Subsequent hydraulic design studies reduced bridge length
- Increases EMS/Fire response times during road closure for bridge replacement
- Not supported by local officials



Alternate Robbinsville Option with Hydraulic Crossing 1B



Robbinsville Option (R1-E) Carried Forward for Detailed Study

Recommendations: Robbinsville

Design Option	Retain?	Notes
Alternative 1: Improve Existing	Yes	• Capacity Analysis indicates roadway is sufficient for future growth with addition of right turn lane on US 129 at NC 143/US 129 intersection • Lowest relocations • Supported by public comments • Supported by agencies

Recommendations

Design Option	Retain?	Notes

Alternatives 2, 5, & 8 (S-2)	No	• More new location than SW-1A
		• Habitat fragmentation
		• High number of relocations
		• Adverse community cohesion effects
		• Constructability and maintenance issues associated with:
		  • Two ~100-foot high, ~1,000-foot long curved bridges with 6% superelevations;
		  • 3,740 feet of terraced retaining walls with max height of 140-feet over a distance of 815 feet
		• Impacts high-quality mountain headwater systems
		  • Little opportunity for stream relocations due to terrain constraints
		• Among recommended options from DSR; however, SW-1A is more practicable new location option

Recommendations: Robbinsville

Design Option	Retain?	Notes
Alternatives 3, 6, 9 (SW-1A)	No	• Avoids direct impacts to AT • Minimizes impacts to NFS lands • Minimizes visual impacts from AT viewpoints • No new bridge on north face • Construction Cost = 10 years Division allocation • Operation and Maintenance Cost = 16.8% of Division 14 Annual Maintenance Budget

Recommendations: Robbinsville

Design Option	Retain?	Notes
Alternatives 4 – 9 (R-1E)	No	• Identified in CTP • Would remove through-traffic from existing NC 143/NC 28 intersection • High impacts to Historic Architecture Sites

Concurrence Point 2

NEPA/404 MERGER TEAM MEETING AGREEMENT
Concurrence Point No. 2: Design Alternatives for Detailed Study

WBS Element: 32572.1.FS10
FA No. APD-0074(178)
STIP Project Number: A-0009C
STIP Description: Corridor K Improvements along US 129, NC 143, and NC 28 from Robbinsville to Stecoah

The Merger Team concurred on this date of May 20, 2020, that the following alternatives be carried forward for detailed study.

Reminders:
S-6 dropped from further study
R-1E Refined (R-1F) added at CP2A

Adjourn