NORTH CAROLINA
Department of Transportation









NCDOT STIP No. A-0009C

Concurrence Point 2 Meeting

May 20, 2020

~ Please sign-in using the chat box ~

~ Meeting to begin promptly at 1:00 PM ~

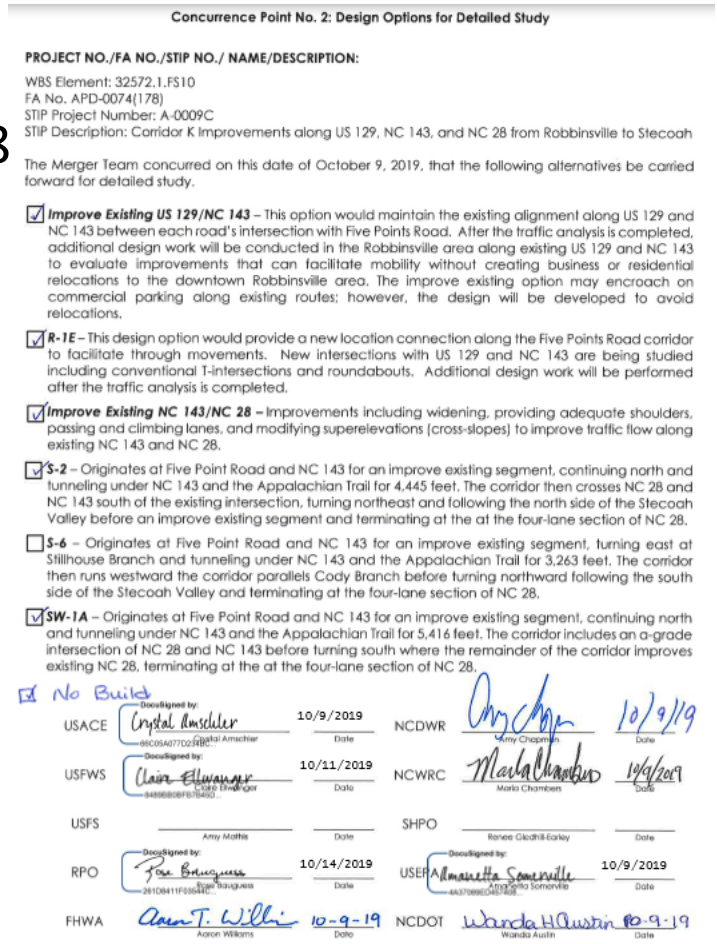
Purpose of Today's Meeting

- Revisit CP2 concurrence form:
  - Detailed Study Alternatives (CP 2)
  - Remove S-2, SW-1A, R-1E, R-1E Refined
  - Discuss B-1

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	NCDWR	Amy Chapman	10/9/19
USFWS	Claire Ellwanger	10/11/2019	NCWRC	Marla Chambers	10/9/2019
USFS	Amy Mathis		SHPO	Renee Gledhill-Earley	
RPO	Ryan Bouguess	10/14/2019	USEPA	Amanetta Somerville	10/9/2019
FHWA	Aaron Williams	10-9-19	NCDOT	Wanda Austin	10-9-19

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

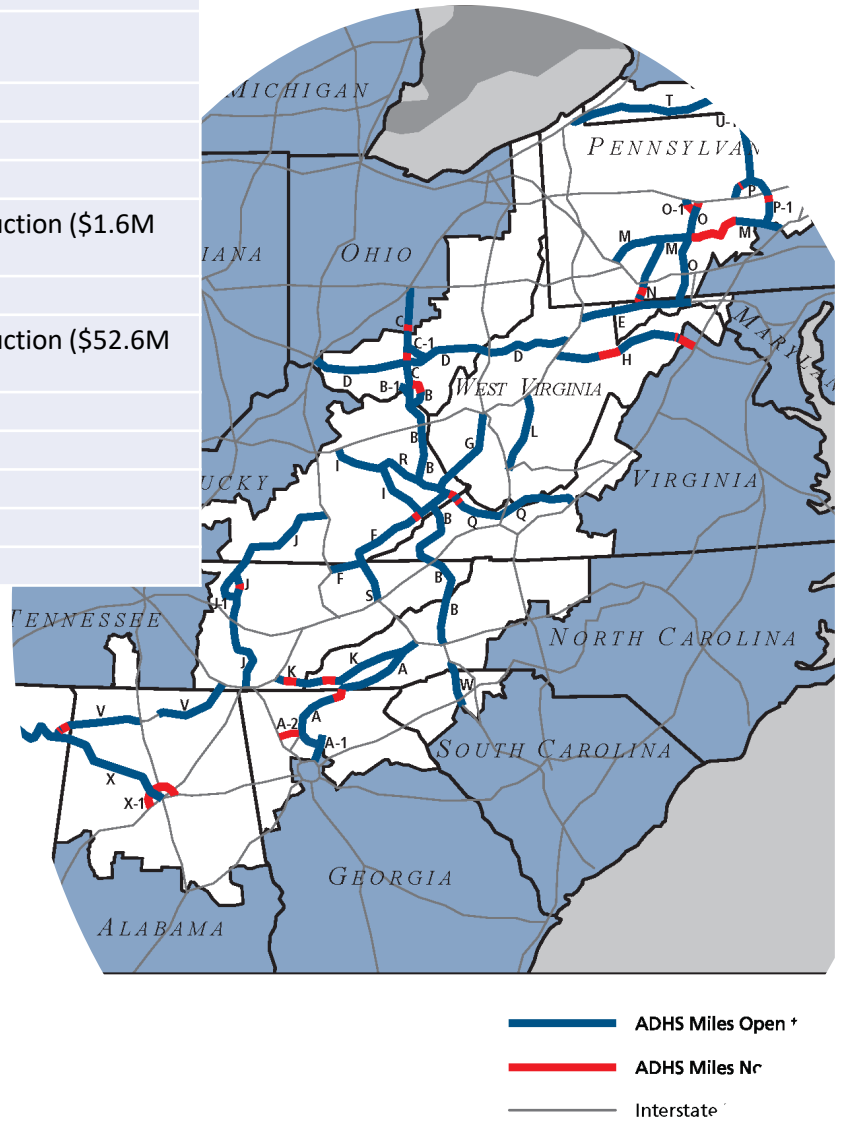
Update CP2
5/20/2020

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)

- 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
- R/W Estimate: $17.8M
- Utility Estimate: $5.4M
- Construction Estimate: $204.7M
- **ESTIMATED TOTAL COST: $444.9M**

Alternative 3 (SW-1A)

- Tunnel Estimate: $262M
- R/W Estimate: $14.5M
- Utility Estimate: $6.2
- Construction Estimate: $191.2M
- **ESTIMATED TOTAL COST: $473.9M**

A-0009C Estimated Annual O&M Costs

Alternative 1 (Improve Existing)

- O&M Estimate Roadway: $0.038M
- **ESTIMATED TOTAL O&M: $0.038M**

Alternative 2 (S-2)

- O&M Estimate Tunnel: $4.0M
- O&M Estimate Structures: $0.13M
- O&M Estimate Roadway: $0.038M *
- **ESTIMATED TOTAL O&M: $4.168M**

*Snow and Ice Systems not included

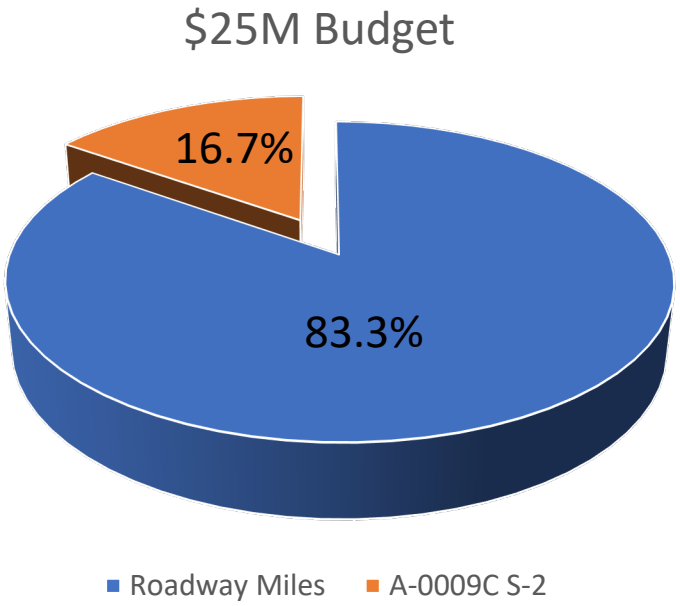
Alternative 3 (SW-1A)

- O&M Estimate Tunnel: $4.0M
- O&M Estimate Roadway: $0.038M
- **ESTIMATED TOTAL COST: $4.038M**

Division 14 Maintenance

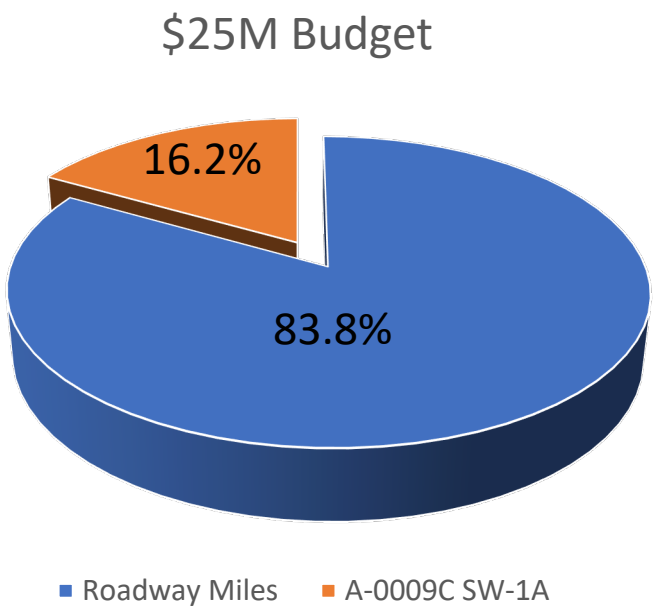
S-2

- O&M Estimate: $4.168M



SW-1A

- O&M Estimate: $4.038M



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

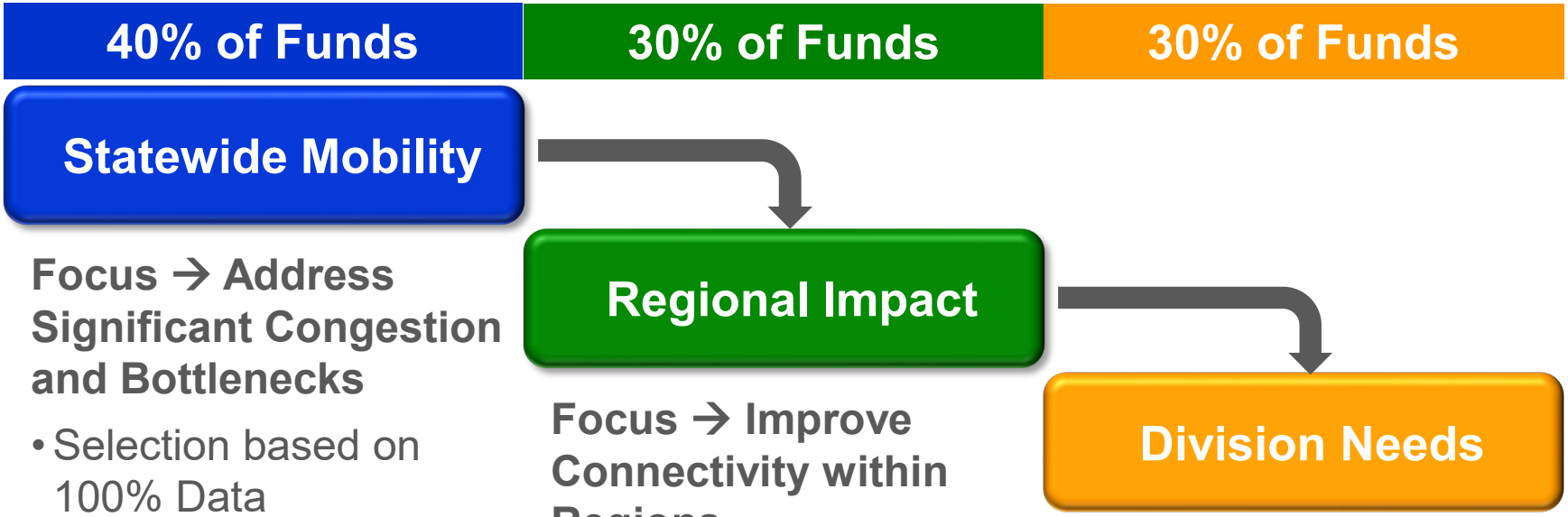
"Article 14B.

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

Divided based on % of State Population

Divided based on Equal Share

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

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

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

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

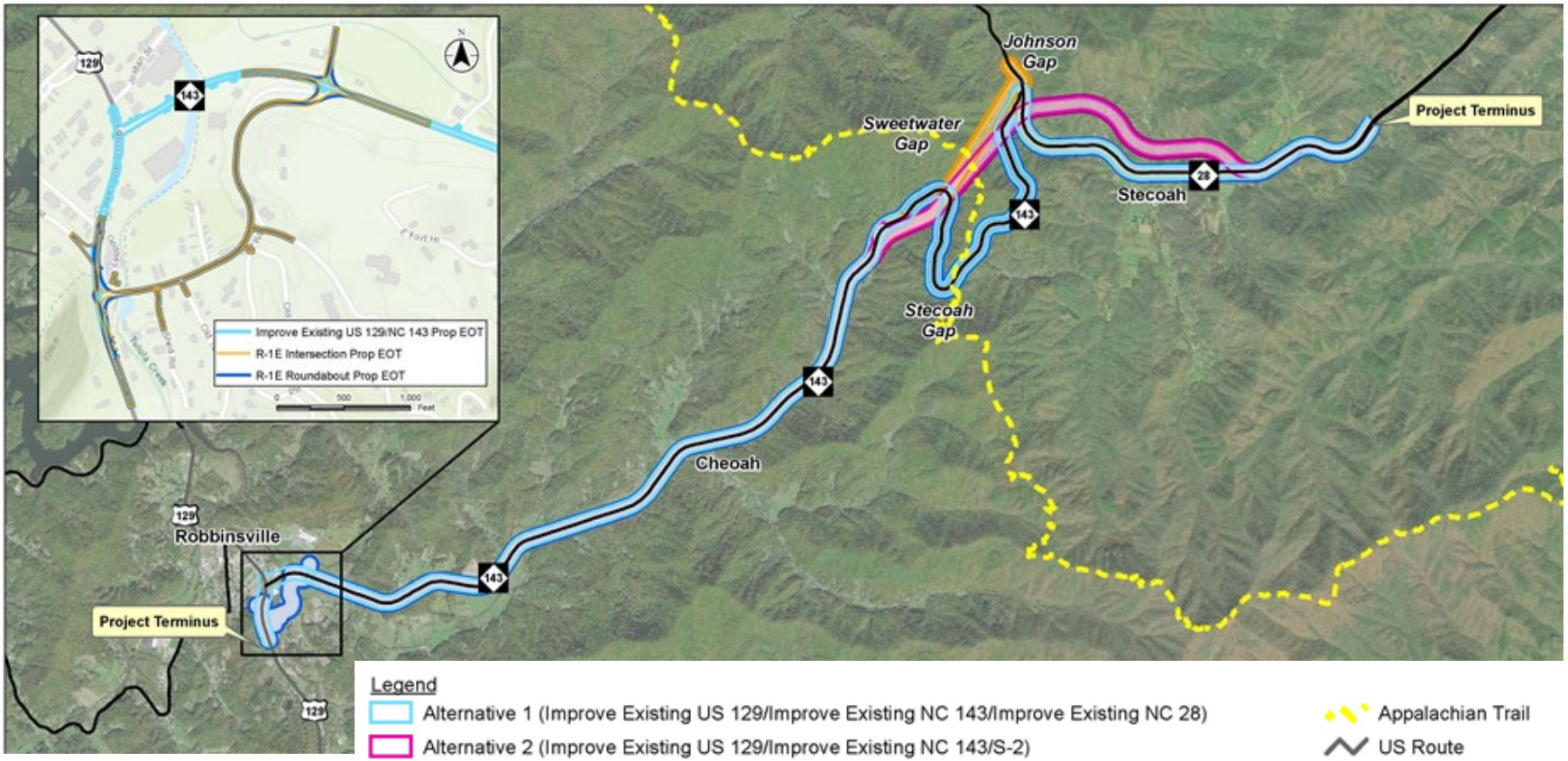
Project Scores and Division 14 Level Funding

Alternate	Description	Preliminary Quantitative Score
1	Improve Existing existing roadway to 2+1 adding climbing lanes from 4 lane section of NC 28 to US 129	16.43
SW-1A (Tunnel Only)	Tunnel only from NC 28 to tie on NC 143. New alignment.	5.78
SW-1A	Construct roadway with partial widening and partially on New Location from 4 lane section of NC 28 to US 129	5.78
S-2	Construct roadway with partial widening and partially on new location from 4 lane section of NC 28 to US 129	5.78

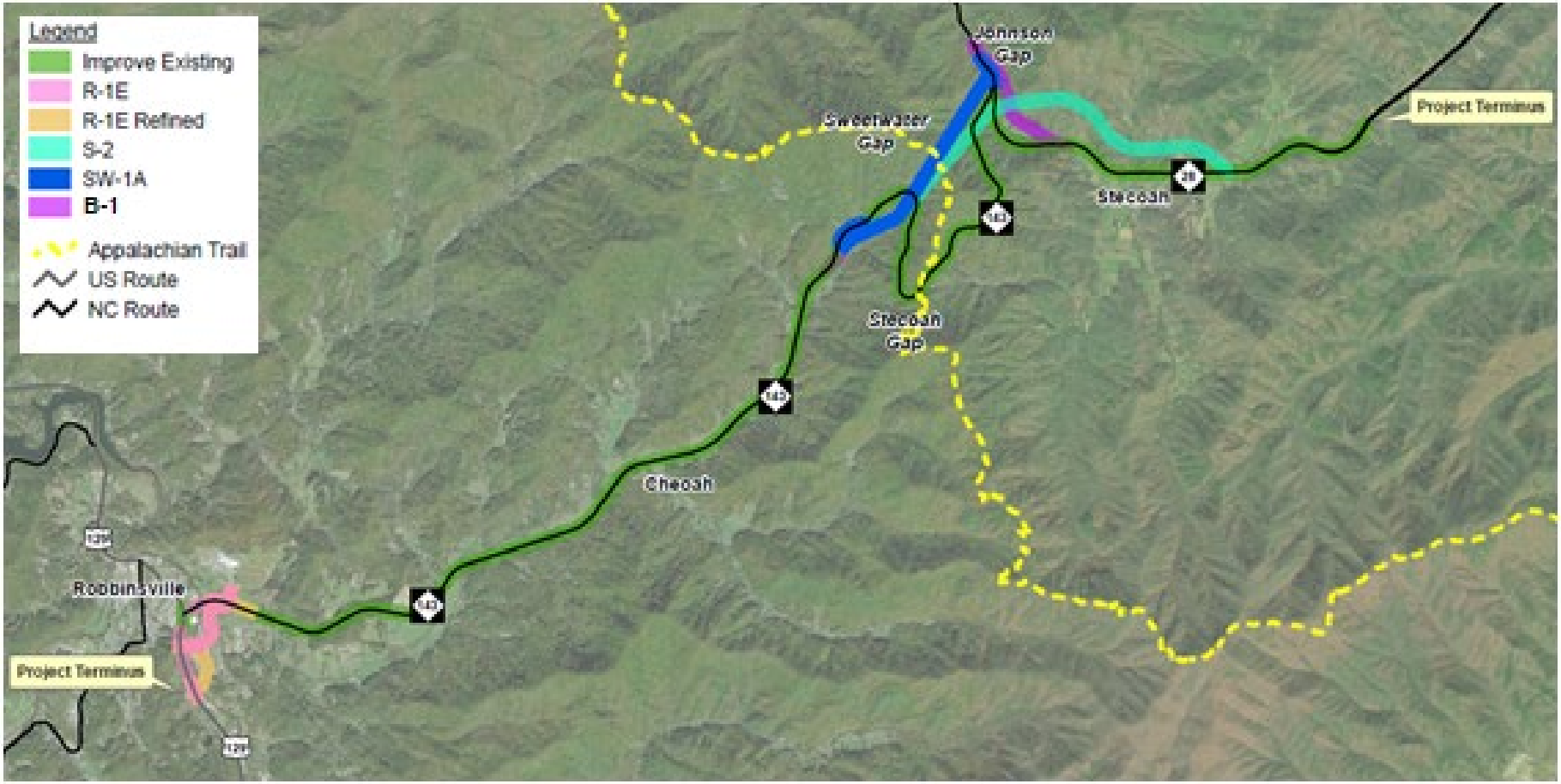
- STIP 2018 – 2027
  - Approximately $223 Million
- STIP 2020 – 2029
  - Approximately $156 Million

CONCURRENCE POINT 2

Design Study Alternatives



Overview of Design Options

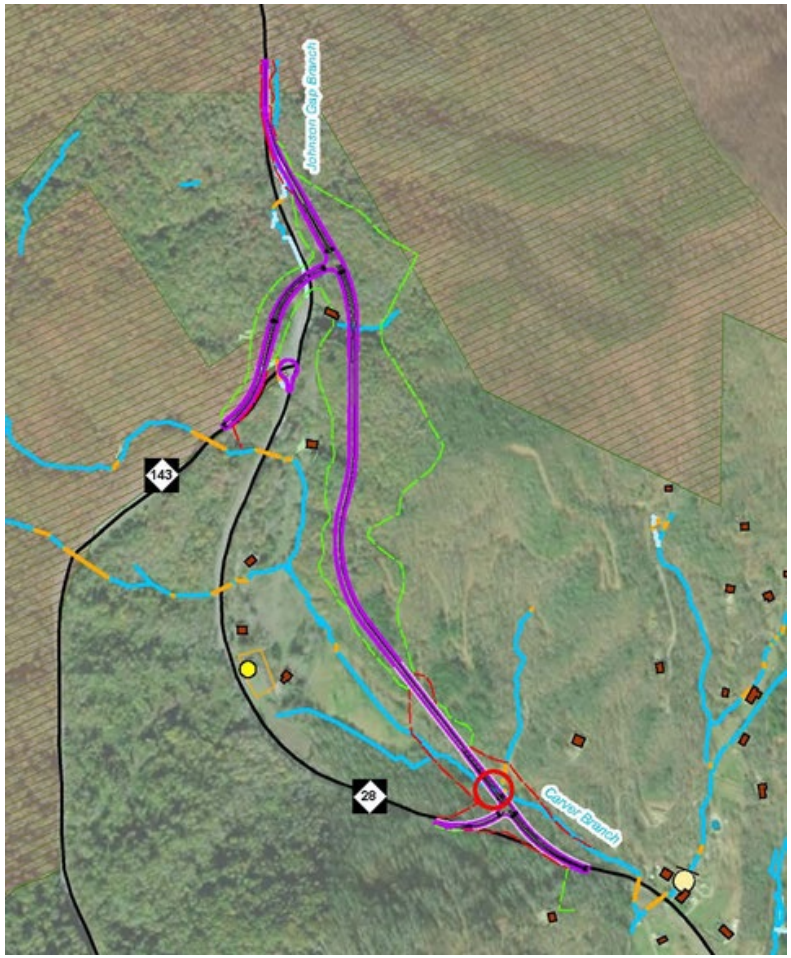


(Robbinsville Options to be discussed at January 29, 2020 project team meeting)

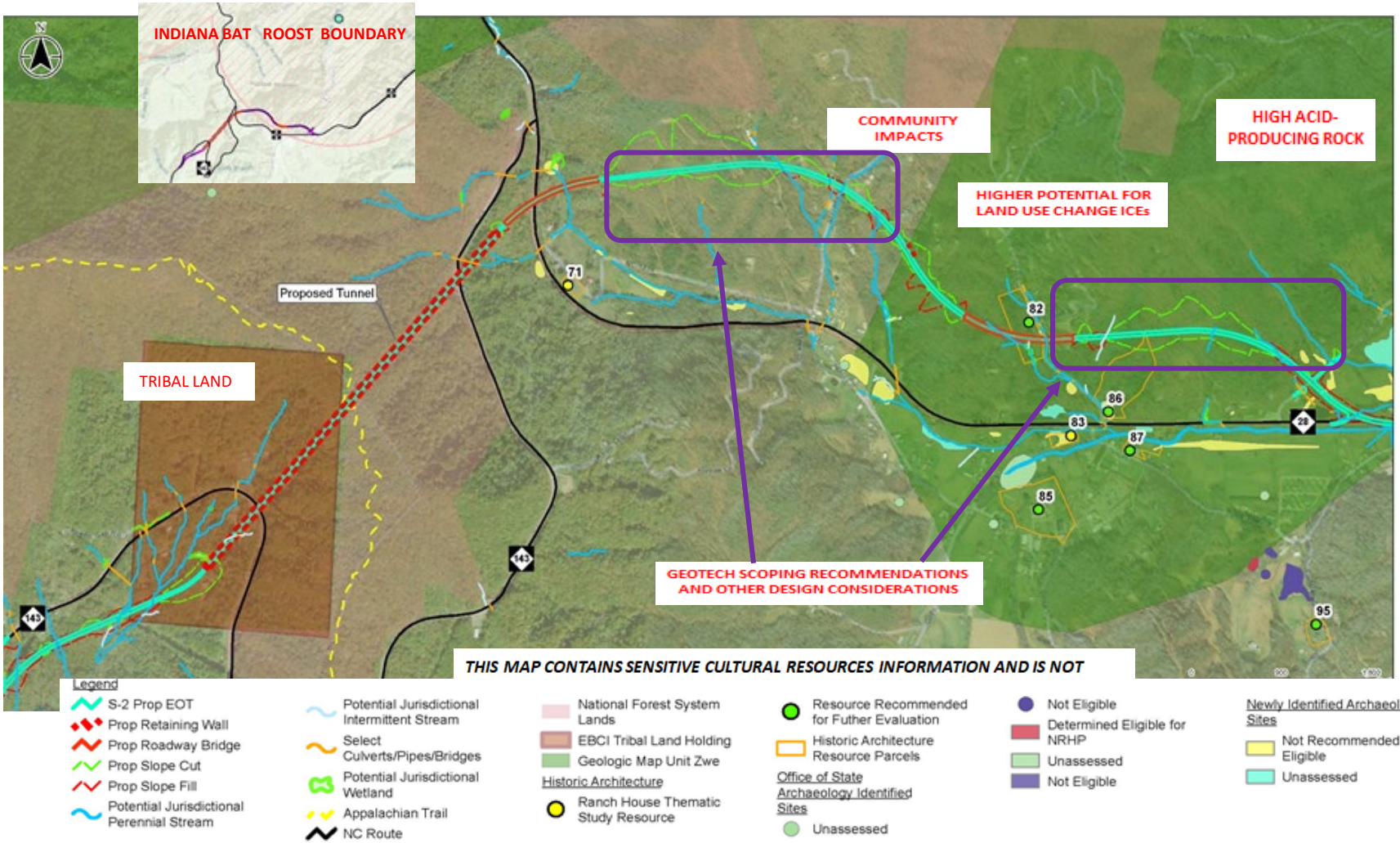
Barbershop Hill Options (NC 28 Relocation)

- Noted as work in progress at 11/20/10 CP2A Meeting
- Originated from coordination with local officials, residents and environmental stakeholders to daylight NC 28

- Eliminated from further study on 01/28/20
  - Diverted watershed to unnatural flow.
  - Unable to connect large tracts of land. Tracts between B-1 and NC 28 may be total takes
  - No improvement to existing 8% grade
  - Failed to meet the purpose of daylighting NC 28



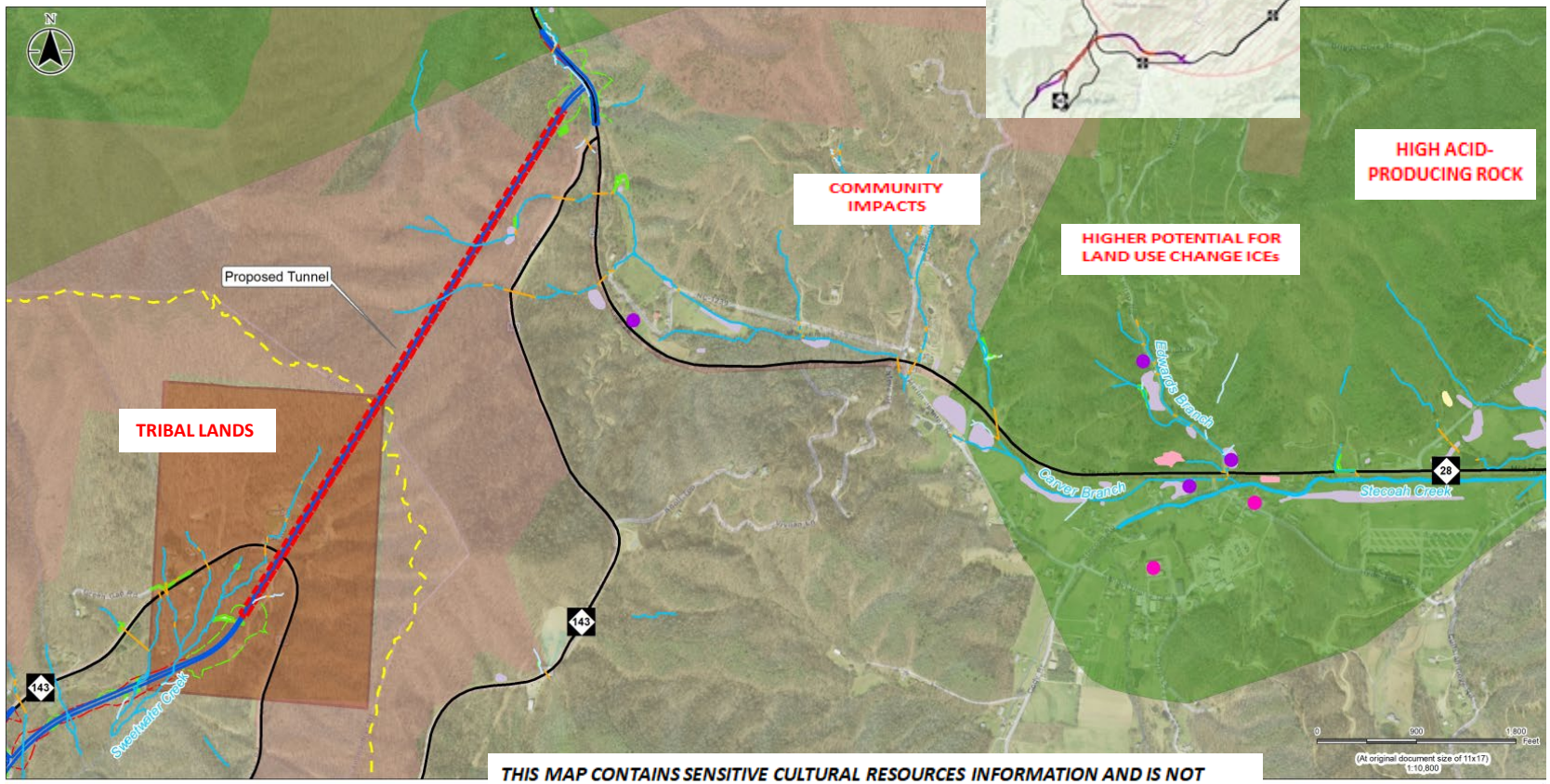
Alternative 2: S-2



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

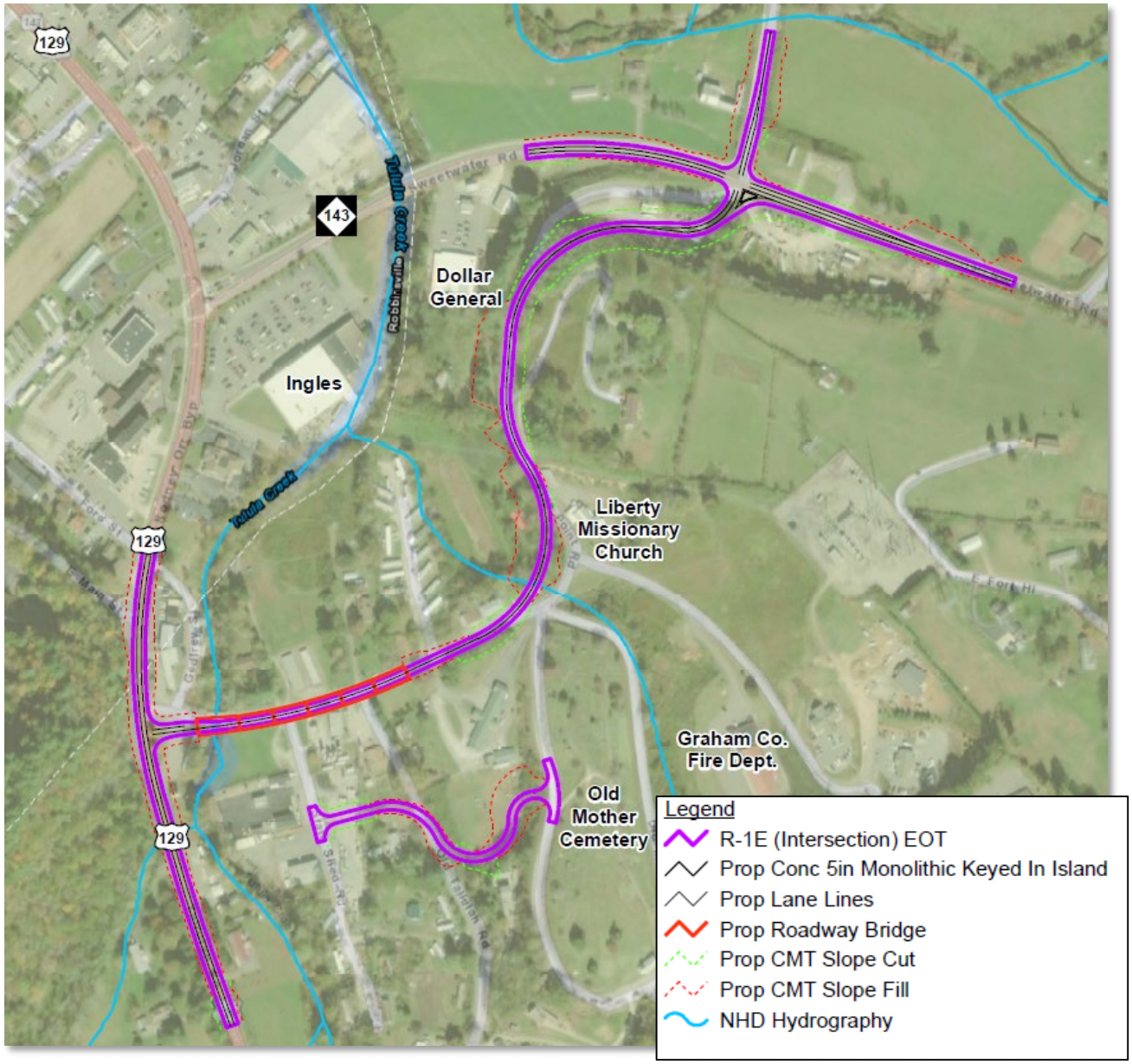
Alternative 3: SW-1A



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

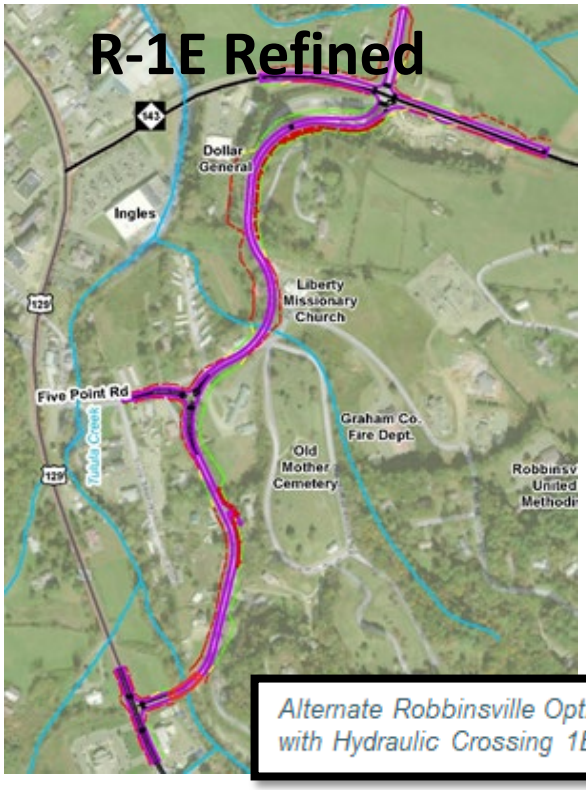
Alternatives 4-9: R-1E

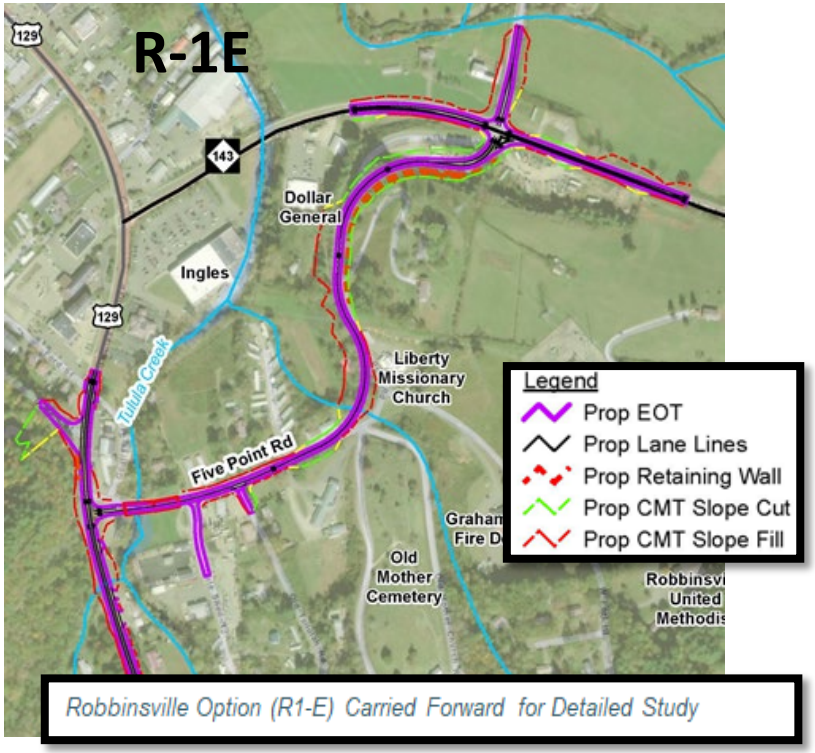


- New location connection along Five Point Rd.
- In Graham County CTP
- Would remove through traffic from existing US 129/ NC 143
- Roundabout & T-intersection being studied
- No control of access
- Requires new driveway access for ~3 businesses

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





Alternative Impact Summary

EVALUATION FACTORS	ALTERNATIVES								
	1	2	3	4	5	6	7	8	9
CONSTRUCTION FACTORS									
Length (miles)	12.2	10.1	10.7	12.5	10.4	11.0	12.5	10.4	11.0
Tunnels (feet)	NA	4,445	5,416	NA	4,445	5,416	NA	4,445	5,416
Railroad Crossings	0	0	0	0	0	0	0	0	0
Major Utility Conflicts	No	No	No	No	No	No	No	No	No
Constructability Issues (low/mod/high) [1]	Low	High	Mod	Mod	High	Mod	Mod	High	Mod
Roadway Construction Cost	$104.2 M	$204.7 M	$191.2 M	$116.9 M	$217.3 M	$203.8 M	$113 M	$213.4 M	$199.9 M
Tunnel Construction Cost	N/A	$217 M	$262 M	N/A	$217 M	$262 M	N/A	$217 M	$262 M
Right-of-Way Cost	$13.6 M	$17.8 M	$14.5 M	$15.5 M	$19.8 M	$16.4 M	$15.5 M	$19.7 M	$16.4 M
Utility Relocation Cost	$6.6 M	$5.4 M	$6.2 M	$9 M	$7.8 M	$8.6 M	$6.8 M	$5.6 M	$6.4 M
Total Cost	$124 M	$445 M	$474 M	$141 M	$462 M	$491 M	$135 M	$456 M	$485 M
SOCIOECONOMIC FACTORS									
Residential Relocations (#)	7	15	8	7	15	8	7	15	8
Business Relocations (#)	5	5	5	10	10	10	10	10	10
Churches/Cemeteries Displaced (#)	0	0	0	0	0	0	0	0	0
CULTURAL RESOURCE FACTORS [2]									
Potential/Recorded Archaeological Sites (#) [5]	TBD/1	TBD/0	TBD/1	TBD/1	TBD/0	TBD/1	TBD/1	TBD/0	TBD/1
Historic Properties Affected (#) [5]	7	7	7	7	7	7	7	7	7
Tribal Resources (yes/no) [6]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NATURAL RESOURCE FACTORS [2]									
Section 4(f) (yes/no) [5]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Protected Species Impacted (yes/no) [7]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Major Stream Crossings (#)	14	15	16	14	15	16	14	15	16
Stream Impacts (linear feet)	16,030	13,786	16,212	16,392	14,148	16,574	16,325	14,081	16,507
Wetland/Aquatic Systems (acres)	1.21	1.17	1.30	1.21	1.17	1.30	1.21	1.17	1.30
NFS land (acres)	8.29	0.00	0.00	8.29	0.00	0.00	8.29	0.00	0.00
Consistency with current Forest Plan (yes/no)	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
AT impacts/visual (low/mod/high)	Low/Mod	High	Low	Low/Mod	High	Low	Low/Mod	High	Low
Habitat fragmentation (low/mod/high)	Low	High	Mod	Low	High	Mod	Low	High	Mod
PHYSICAL FACTORS [2]									
Floodplains (acres)	12.78	9.17	12.78	15.73	12.12	15.73	15.85	12.24	15.85
Farmland (acres)	24.5	25.49	23.81	28.26	29.25	27.57	28.2	29.19	27.51
Hazardous Materials Sites (#)	0	0	0	0	0	0	0	0	0

SOURCES: ATLAS Project Development Screening Report (9/12/2019), EJSCREEN (9/8/2019), Historic Architecture Surveys Completed by RGA 7/26/19, Archaeology Surveys by TRC as of 8/16/19, Office of State Archaeology Sites as of 2017, Jurisdictional surveys by Stantec as of July 2019.

Recommendations

Design Option	Retain?	Notes
Alternative 1: Improve Existing	Yes	• Capacity Analysis: 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 • February 2019 Public Meetings • Supported by agencies • Lower Operation and Maintenance Costs • Addresses two locally identified “hot spots” • Provides improved pedestrian safety elements in Robbinsville and NC 143 at the Appalachian Trail crossing • Provides increased mobility through passing/climbing lanes • **Cost within available funding through ADHS**

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:
		  • 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
		• Terrain restraints limits opportunity for stream relocations
		• Operation and Maintenance Cost = 16.7% of Division 14 Annual Maintenance Budget
		• Costs exceeds STI bi-annual allocation for Division 14
		• **Cost exceeds available funding through ADHS by 127%**

Recommendations

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 • Higher Tribal Land impacts than Improve Existing • No new bridge on north face • Operation and Maintenance Cost = 16.2% of Division 14 Annual Maintenance Budget • Costs exceeds STI bi-annual allocation for Division 14 • **Costs exceeds available funding through ADHS by 130%**

Recommendations

Design Option	Retain?	Notes
Alternatives 4 & 7 (R-1E)	No	• Identified in CTP • Would remove through-traffic from existing NC 143/NC 28 intersection • Direct impacts to Historic Architecture/Archaeology Sites • High community impacts • Improves geometric design • Cost benefit of replacing structure #20 • Provides pedestrian safety elements in Robbinsville and on NC 143 at the Appalachian Trail crossing

Concurrence Point 2

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

A 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

Due to new information since the October 9, 2019 CP1 and CP2 Meeting, 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 - 10/09/2019
R-1E Refined added at CP2A - 11/20/2019

Adjourn