NEPA/404 MERGER CONCURRENCE POINT 4A

TIP PROJECT R-2566B
WBS 37512.1.5
FEDERAL AID NUMBER NHP-0150(004)

NC 105 IMPROVEMENTS FROM CLARKS CREEK ROAD (SR 1136) TO NC 105 BYPASS (SR 1107) IN BOONE WATAUGA COUNTY

SUMMARY INFORMATION

Meeting Purpose

The purpose of this meeting is **CP 4A – To identify avoidance and minimization efforts**. Concurrence was previously reached on CP 4A at a Merger meeting in July 2017. Since that time, a new concept has been developed between Station 176+00 (near Old Shull's Mill Road) and Station 265+00 (near Broadstone Road) to minimize impacts to the animal passageway and floodplain area parallel to the Watauga River.

The original alignment and the new ("Western") alignment will be presented to the Merger Team for concurrence on how to proceed. Maps showing the slope stakes + 25' buffer are attached, and anticipated impacts are included in this packet.

Project Description

The North Carolina Department of Transportation (NCDOT) proposes to improve a 5.5-mile section of NC 105 from Clarks Creek Road (SR 1136) to the NC 105 Bypass (SR 1107) in Boone, Watauga County. Project R-2566B is included in the 2018-2028 State Transportation Improvement Program (STIP).

- Project R-2566B: Right of Way acquisition is currently scheduled to begin in Fiscal Year (FY) 2021, and construction is scheduled to begin in FY 2023.
- Project R-2566BA: Right of Way acquisition is scheduled for FY 2018, and construction is scheduled to begin in FY 2019.

Merger History of Project

<u>Concurrence Point 1</u>

At a meeting in August 2014, the Merger team agreed on the logical termini and purpose and need for Project R-2566B:

- *Congestion:* A primary purpose of the project is to reduce congestion on NC 105 in order to achieve level of service (LOS) D or better in the design year (2040) during the average highest week day, and to achieve LOS E or better in the design year during the average highest weekend day.

  NC 105 is used heavily by commuters during the week, but also is used by tourists and locals visiting recreational sites on the weekends. The congestion goals for this project were chosen to address the needs of commuters (LOS D during the week), but also to try to ensure that the road didn't experience failure during the busy tourist times (LOS E on the weekends).

- *Safety:* Another primary purpose is to reduce rear-end and run-off-road crashes on NC 105. Alternatives were analyzed using Highway Safety Manual methodologies.
- *Bicycle Facilities:* A secondary purpose is to improve bicycle facilities on NC 105 in areas where capacity or safety improvements are proposed.

Concurrence Point 2

At a meeting in August 2014, the Merger team agreed to carry forward a "Best-Fit Build Alternative" for Project R-2566B, in addition to carrying forward the No Build Alternative.

Concurrence Point 2A

At a meeting in October 2015 (with final signatures in November 2015), the Merger team agreed to on the following major drainage structures:

- Site 1 – Remove and replace existing bridge over the Watauga River to 260' L X 90' W
- Site 2 – Remove and replace existing culvert carrying a UT to Laurel Fork to 1 @ 8'x6' RCBC
- Site 4 – Remove and replace existing culvert carrying a UT to Laurel Fork to 1 @ 8'x6' RCBC
- Site 6 – Remove and replace existing culvert carrying a UT to Laurel Fork to 2 @ 12'x7' RCBC
- Site 7a – On private property; more study recommended
- Site 7b – On private property; more study recommended

Concurrence Point 3

At a meeting in March 2017, the Merger team agreed to select the Best-Fit Build Alternative as the LEDPA for Project R-2566B.

Concurrence Point 4A

At a meeting in July 2017, the Merger team agreed to the following avoidance and minimization measures, included in the design of the 1.7 miles of 3-lane road, 2.8 miles of 4-lane divided road, and 1 mile with no improvements:

- Selected a best-fit alignment that minimizes impacts to Watauga River, Laurel Fork, and Big Branch, including widening asymmetrically in several locations.
- Added several retaining walls and concrete barriers to further reduce impacts to streams.
- Used steeper slopes to minimize or avoid impacts in several locations.

The following commitments were made, and will be discussed again at the CP 4B and 4C meetings:

- The feasibility of holding the existing utility line between old Shull's Mill Road (north) and Broadstone Road will be investigated.
- Temporary construction easements will be kept outside of the floodplain, floodway, and Watauga River where feasible.
- Permanent construction and slope stakes will stay out of 100-year floodplain, floodway, and Watauga River. If not feasible, the Merger team will revisit CP 4A.
- Section BA will not be constructed until sufficient information is available to apply for a phased permit.

Typical Section

The design presented at the public hearing and shown on the attached figures includes the following elements:

- No improvements are recommended for 1 mile along the project corridor from Clark's Creek Road to Old Shull's Mill Road because traffic is anticipated to operate at acceptable levels of service in the future design year (2040) on that section.
- Improvements are recommended for approximately 4.5 miles from Old Shull's Mill Road to NC 105 Bypass, based on future traffic operations and safety concerns.
    - The approximately 1.7-mile section between Old Shull's Mill Road and Broadstone Road will consist of three 12-foot lanes (two southbound, one northbound) with 6-foot wide paved shoulders on both sides.
    - The approximately 2.8-mile section between Broadstone Road and NC 105 Bypass will consist of four 12-foot lanes, a 23-foot wide raised median, and 6-foot wide paved shoulders on both sides.
    - The two intersections where Old Shull's Mill Road tees into NC 105 have safety concerns due to the horizontal skew and limited sight distance at the intersection. To address these issues, the southern intersection of Old Shull's Mill Road at NC 105 will be realigned, and the northern intersection of Old Shull's Mill Road at NC 105 will be closed.

Project Status/Schedule

Environmental Assessment	Signed September 2016
Public Hearing	November 7, 2016
Finding of No Significant Impact	Spring 2018

Concurrence Point 4A – Avoidance and Minimization

General Avoidance and Minimization Efforts

To minimize or avoid impacts, the following issues were evaluated:

- Horizontal and vertical alignment shifts
- Slopes and right of way
- Construction techniques
- Bridge design

The typical section varies along the project corridor, and was selected so that the project would meet the purpose and need of the project with the minimal footprint feasible. Of the 5.5-mile corridor studied, this resulted in 1.7 miles of 3-lane road, 2.8 miles of 4-lane divided road, and 1 mile with no improvements.

Specific Avoidance and Minimization Efforts

In addition, the following specific avoidance and minimization measures were included in the design. The attached figures show the avoidance measures studied. See **Table 1** for an impacts and cost comparison of the two alignments within this section.

*The following were agreed to at the July 2017 CP 4 Meeting, based on the **Original Alignment**, between Station 176+00 and Station 265+00.*

- Selected a best-fit alignment that minimizes impacts to Watauga River, Laurel Fork, and Big Branch. The design widens asymmetrically into the mountain in the following locations to avoid impacts to the streams:
    - Sta 245+00 to Sta 252+80
- Added retaining walls and concrete barriers on the eastern side of the roadway to further reduce impacts to streams. The design includes retaining walls in the following locations:
    - Sta 213+80 to Sta 214+87
    - Sta 224+70 to Sta 227+90
    - Sta 230+50 to Sta 234+10
    - Sta 239+00 to Sta 243+50
    - Sta 251+70 to Sta 252+80
- Used steeper slopes to minimize or avoid impacts to streams at the following locations:
    - Sta 243+50 to Sta 251+70 – Widened into the mountain using 0.75:1 cut slope

*The following are proposed as part of the **Western Alignment**, between Station 176+00 and Station 265+00. This alignment would increase the separation between the proposed project and the Watauga River, which is anticipated to decrease impacts in the floodplain, on animal passageways, and reduce need for utility relocation.*

- The design widens asymmetrically into the mountain in the following locations to avoid impacts to the streams:
    - Sta 180+00 to Sta 253+00
- Added retaining walls and concrete barriers on the western side of the roadway (unless noted otherwise) to further reduce impacts to streams, residences and rock cuts. The design includes retaining walls in the following locations:
    - Sta 183+00 to Sta 185+00
    - Sta 196+00 to Sta 197+00
    - Sta 200+00 to Sta 208+00
    - Sta 209+25 to Sta 215+48
    - Sta 215+51 to Sta 216+50
    - Sta 226+00 to Sta 226+50
    - Sta 231+00 to Sta 235+50
    - Sta 251+70 to Sta 252+80 (eastern side)
    - Sta 261+00 to Sta 261+50
- Used slopes steeper than 2:1 to minimize or avoid impacts to streams and rock cuts at the following locations:
    - Sta 181+00 to Sta 188+70 – Widened into the mountain using 1.5:1 cut slope
    - Sta 188+70 to Sta 193+10 – Widened into the mountain using 1:1 cut slope
    - Sta 199+20 to Sta 212+00 – Widened into the mountain using 1.5:1 cut slope
    - Sta 212+00 to Sta 214+50 – Widened into the mountain using 1:1 cut slope
    - Sta 220+00 to Sta 227+00 – Widened into the mountain using 1.5:1 cut slope
    - Sta 227+00 to Sta 231+00 – Widened into the mountain using 0.5:1 cut slope
    - Sta 231+00 to Sta 232+50 – Widened into the mountain using 1:1 cut slope
    - Sta 235+90 to Sta 243+00 – Widened into the mountain using 1:1 cut slope
    - Sta 243+00 to Sta 251+00 – Widened into the mountain using 0.75:1 cut slope
    - Sta 255+00 to Sta 260+00 – Widened into the mountain using 0.5:1 cut slope

The following were agreed to at the July 2017 CP 4 Meeting, and have not changed. They are outside of the section between Station 176+00 and Station 265+00.

- Selected a best-fit alignment that minimizes impacts to Watauga River, Laurel Fork, and Big Branch. The design widens asymmetrically into the mountain in the following locations to avoid impacts to the streams:
  - Sta 265+00 to Sta 284+00
  - Sta 307+00 to Sta 311+00
- Added retaining walls and concrete barriers on the northern side of the roadway to further reduce impacts to streams. The design includes retaining walls in the following locations:
  - Sta 352+20 to Sta 358+00
  - Sta 360+00 to Sta 365+00
- Used steeper slopes to minimize or avoid impacts to streams at the following locations:
  - Sta 309+00 – 1.5:1 cut slope
  - Sta 340+50 to Sta 341+50 – 1:1 cut slope

Table 1 shows the impacts and cost difference between the two alignments. **Tables 2 and 3** show the individual stream and wetland impacts for this section of the project.

Table 1. Impacts and Cost Comparison for Alignment Shift between Sta 176+00 and Sta 265+00

		Original Alignment	Western Alignment
Impacts	**Stream Impacts (LF)**	975	985
	Wetland Impacts (Acre)	0.5	0.4
	Owners Impacts	30	34
	Relocations	4	5
	Other Impacts	Encroaches into floodplain and animal passageway	Limited encroachment east of existing edge of pavement (Sta 176+00 to Sta 250+00)
	Total Cost Difference*		**$3,210,000 (higher)**

NOTE: Impacts calculated using a 25' offset of the proposed slopestakes.
NOTE: Impacts due to original alignment only include if between Sta 176+00 and Sta 265+00.
*Only includes difference in utility and construction costs, and does not include difference in ROW cost.

Table 2. Anticipated Stream Impacts between Sta 176+00 and Sta 265+00

Stream	Original Alignment	Western Alignment	Figure
	Length (LF)	Length (LF)	
Big Branch	0	5	1A
Laurel Fork	70	105	1C
SFV	60	60	1A
SFW	50	50	1A
SGB	0	25	1A
SGD	155	170	1B
SGE	45	20	1B
SGF	0	30	1B
SGG	40	0	1B
SGH	75	70	1B
SGI	60	0	1B
SGJ	45	50	1B
SGO	110	180	1B
SGP	55	0	1B
SGS	75	90	1C
SGT	80	70	1C
SGU	55	60	1C
Total	***975.00***	***985.00***	

NOTE: Stream impacts were calculated using a 25' buffer of the proposed slope stakes and were rounded up to the nearest 5 foot interval for each individual stream.

Table 3. Anticipated Wetland Impacts between Sta 176+00 and Sta 265+00

Wetland	Original Alignment	Western Alignment	Figure
	Area (Ac)	Area (Ac)	
WBZ	0.0	0.0	1A
WCE	0.1	0.0	1B
WCF	0.1	0.1	1B
WCG	0.1	0.1	1B
WCI	0.1	0.1	1B
WCK	0.1	0.1	1B
Total	***0.5***	***0.4***	

NOTE: Wetland impacts were calculated using a 25 foot buffer of the proposed slope stakes and rounded up to the nearest 0.1 acre interval for each individual wetland. Wetland labels correspond to the NRTR map IDs.

Avoidance and Minimization Commitments

Additional geotechnical survey has been prepared. However, final designs are not yet available, and a work zone traffic control plan has not been developed. Therefore, specific avoidance and minimization measures will be addressed in CP 4B and 4C meeting. NCDOT proposes that the following commitments be included in the CP 4A agreement, which were previously agreed to in the July 2017 CP 4A meeting:

- The feasibility of holding the existing utility line between old Shull's Mill Road (north) and Broadstone Road will be investigated.
- Temporary construction easements will be kept outside of the floodplain, floodway, and Watauga River where feasible.
- Permanent construction and slope stakes will stay out of 100-year floodplain, floodway, and Watauga River. If not feasible, the Merger team will revisit CP 4A.
- Section BA will not be constructed until sufficient information is available to apply for a phased permit

Section 404/NEPA Interagency Agreement

Concurrence Point 4A
Avoidance and Minimization Measures

Project Title: NC 105 Improvement from Clarks Creek Road to NC 105 Bypass
TIP Project No.: R-2566B
WBS No.: 37512.1.1

The Project Team has concurred on this date to use the following measures to minimize or avoid impacts. The typical section varies along the project corridor, and was selected so that the project would meet the purpose and need of the project with the minimal footprint feasible. Of the 5.5-mile corridor studied, this resulted in 1.7 miles of 3-lane road, 2.8 miles of 4-lane divided road, and 1 mile with no improvements. In addition, the following avoidance and minimization measures were included in the design:

- Selected a best-fit alignment that minimizes impacts to Watauga River, Laurel Fork, and Big Branch, including widening asymmetrically in several locations.
- Shifted the alignment to the west between Sta 176+00 and 265+00 to reduce impacts on animal passageway parallel with the Watauga River and floodplains.
- Added several retaining walls and concrete barriers to further reduce impacts to streams.
- Used steeper slopes to minimize or avoid impacts in several locations.

The following commitments have been made, and will be discussed again at the CP 4B and 4C meetings:

- The feasibility of holding the existing utility line between old Shull's Mill Road (north) and Broadstone Road will be investigated.
- Temporary construction easements will be kept outside of the floodplain, floodway, and Watauga River where feasible.
- Permanent construction and slope stakes will stay out of 100-year floodplain, floodway, and Watauga River. If not feasible, the Merger team will revisit CP 4A.
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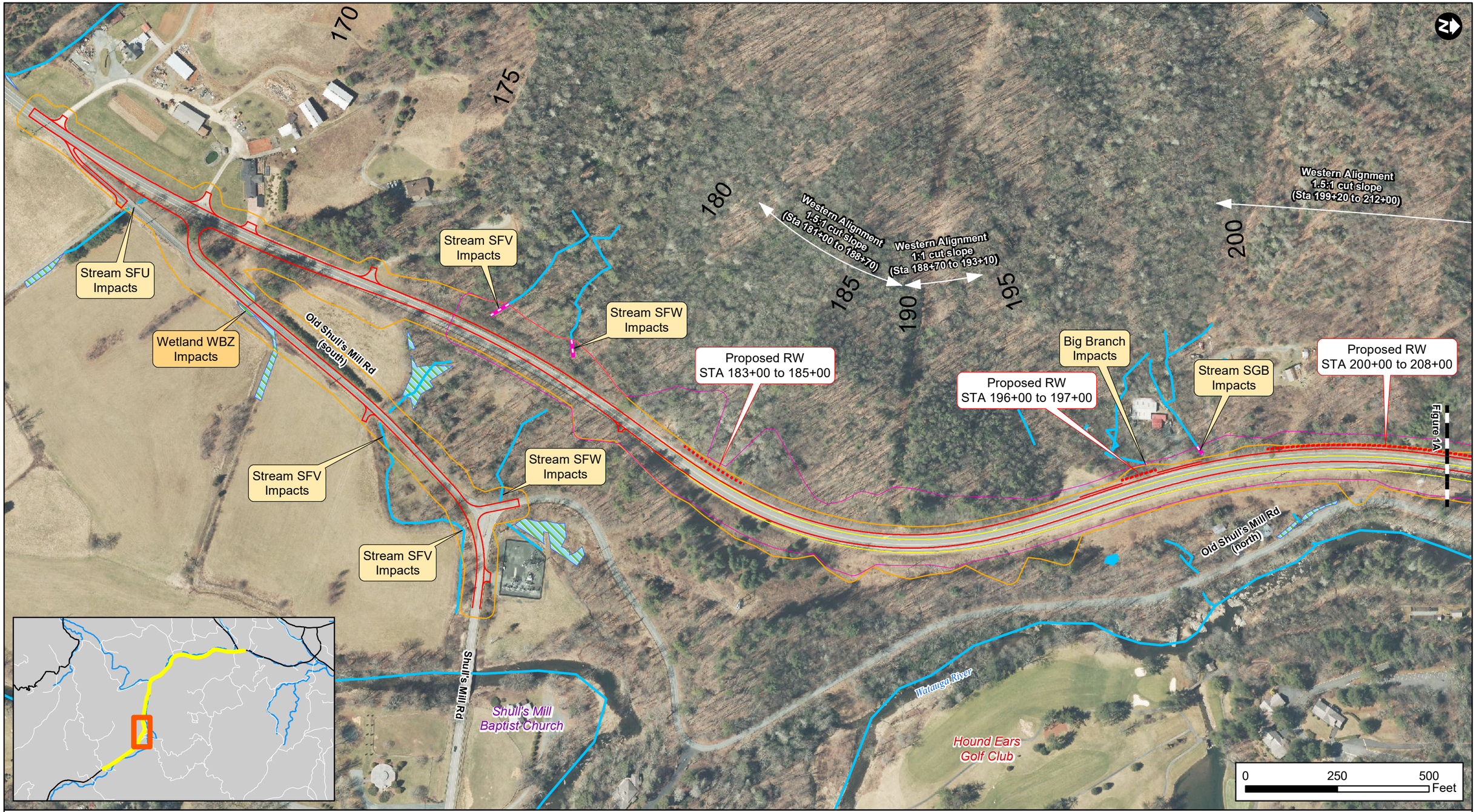
Name	Agency	Date
	FHWA	
	USEPA	
	USACE	
	USFWS	
	NCDOT	
	NCWRC	
	NCDWR	
	NCSHPO	
	RPO	

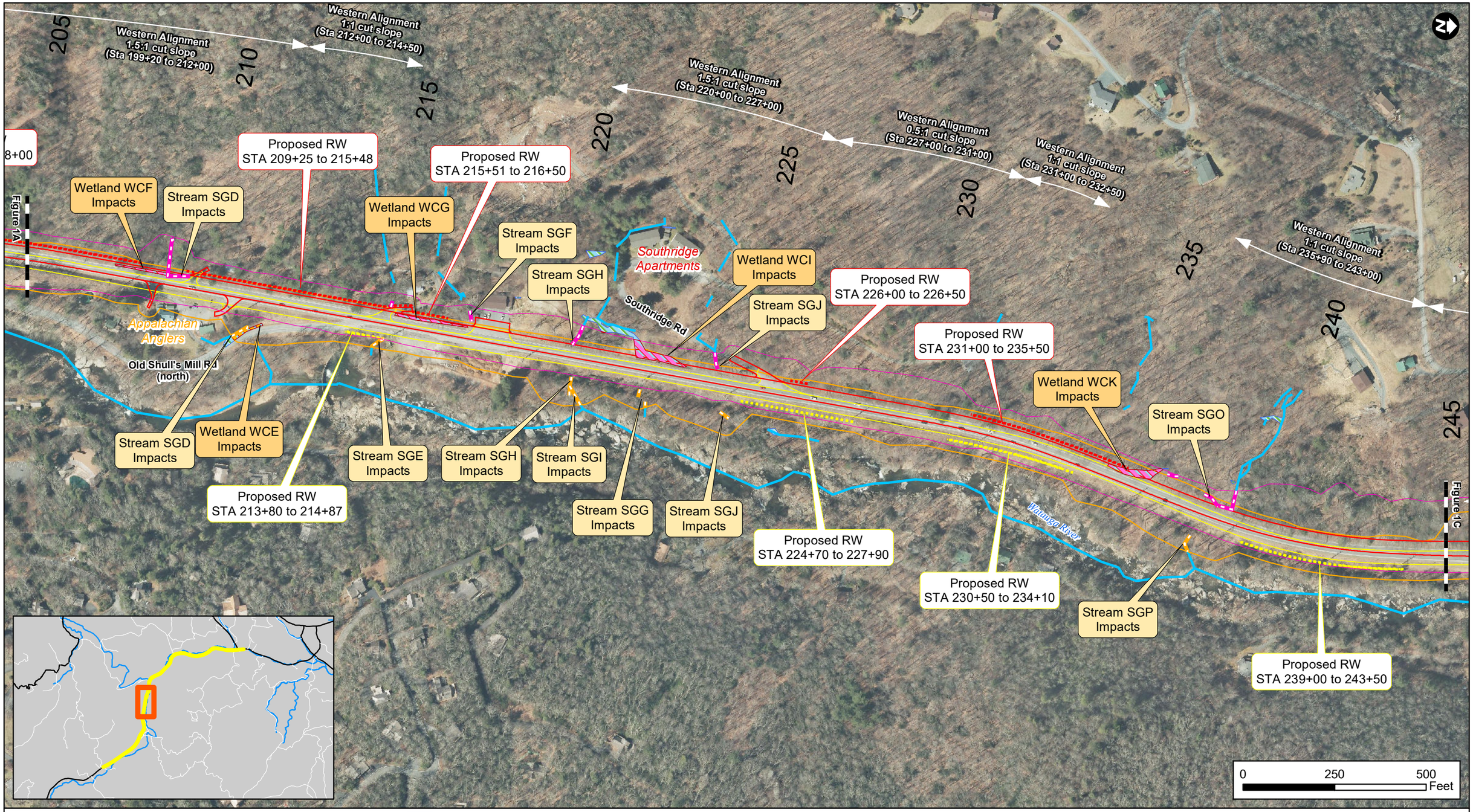


Original Alignment Notes

Western Alignment Notes

- Delineated Pond
- Delineated Wetland
- Delineated Stream
- Original Alignment 25 Ft. SS Buffer
- Original Alignment Wetland Impacts
- Original Alignment Stream Impacts
- Original Alignment Proposed Retaining Wall
- Original Alignment Proposed Edge of Travel
- Western Alignment 25 Ft. SS Buffer
- Western Alignment Wetland Impacts
- Western Alignment Stream Impacts
- Western Alignment Retaining Wall
- Western Alignment Proposed Edge of Travel

Figure 1A
Stream and Wetland Impacts
TIP Project No. R-2566B
NC 105 Improvements
Watauga County

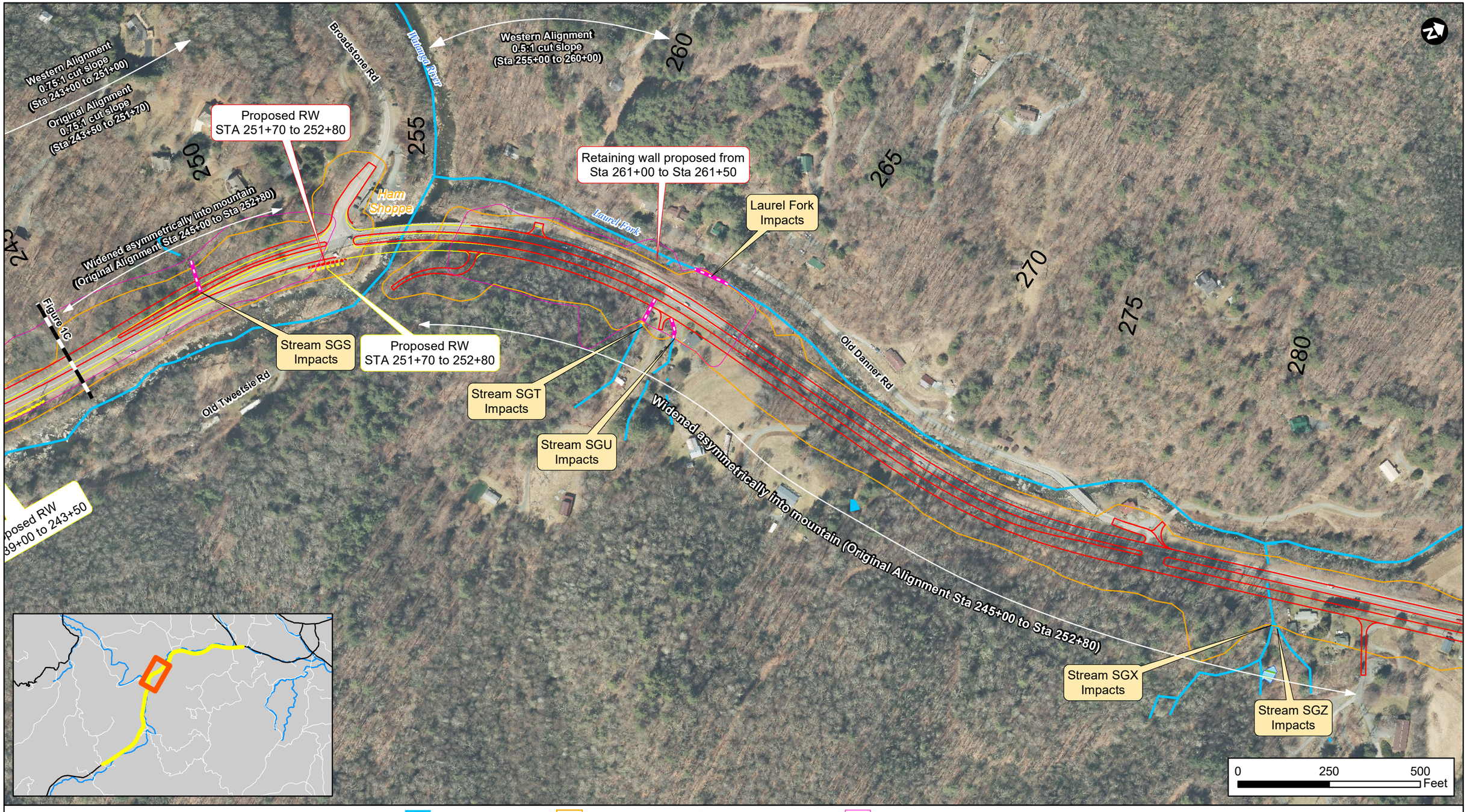


Original Alignment Notes

Western Alignment Notes

- Delineated Pond
- Delineated Wetland
- Delineated Stream
- Original Alignment 25 Ft. SS Buffer
- Original Alignment Wetland Impacts
- Original Alignment Stream Impacts
- Original Alignment Proposed Retaining Wall
- Original Alignment Proposed Edge of Travel
- Western Alignment 25 Ft. SS Buffer
- Western Alignment Wetland Impacts
- Western Alignment Stream Impacts
- Western Alignment Retaining Wall
- Western Alignment Proposed Edge of Travel

Figure 1B
Stream and Wetland Impacts
TIP Project No. R-2566B
NC 105 Improvements
Watauga County



Original Alignment Notes

Western Alignment Notes

- Delineated Pond
- Delineated Wetland
- Delineated Stream
- Original Alignment 25 Ft. SS Buffer
- Original Alignment Wetland Impacts
- Original Alignment Stream Impacts
- Original Alignment Proposed Retaining Wall
- Original Alignment Proposed Edge of Travel
- Western Alignment 25 Ft. SS Buffer
- Western Alignment Wetland Impacts
- Western Alignment Stream Impacts
- Western Alignment Retaining Wall
- Western Alignment Proposed Edge of Travel

Figure 1C
Stream and Wetland Impacts
TIP Project No. R-2566B
NC 105 Improvements
Watauga County