Updated 9/18/2018

NEPA/404 MERGER CONCURRENCE POINT 4A

TIP PROJECT NO. U-4700

IMPROVEMENTS TO US 321 FROM HICKORY TO LENOIR IN CATAWBA, BURKE, AND CALDWELL COUNTIES

SUMMARY INFORMATION

Meeting Purpose

The purpose of this meeting is to identify avoidance and minimization efforts for Project U-4700.

Project Description

The proposed improvements include the widening of US 321 from just north of the US 70 interchange in Hickory (Catawba County) to the Southwest Boulevard (SR 1933) interchange in Lenoir (Caldwell County). The proposed improvements involve approximately 13.5 miles of existing US 321 with a majority of the roadway located in Catawba and Caldwell Counties and 0.3 miles in Burke County. The purpose of the project is to reduce congestion on US 321 in order to achieve a level of service D or better in the design year (2040). The Environmental Assessment (EA) was approved in February 2016, and a Finding of No Significant Impact (FONSI) will be prepared for the project. The project study area map (Figure 17) is attached.

Project Activity since the Previous Merger Meeting (February 2018)

Environmental Documentation

- The Finding of No Significant Impact (FONSI) was signed in April 2018.

Roadway Design

- Final designs are underway for Sections A, CA, CB, and CC. Preliminary designs are available for Section B and the remainder of Section C.

Merger History of Project

Concurrence Point 1

The Project Team concurred with the following purpose and need and study area on February 16, 2018:

- Need: Some segments of US 321 between Hickory and Lenoir are currently experiencing congestion and operate at level of service (LOS) E and F. Also, a majority of intersections along the project area currently operate at LOS E and F. In 2035, 12 of 13 segments along the mainline and 16 of 18 intersections are projected to operate at LOS F.
- Purpose: The purpose of this project is to reduce congestion on US 321 in order to achieve a LOS of D or better in the Design Year (2040).
- Study Area: As presented in the attached Figure 1

Concurrence Point 2

The Project Team concurred with the following alternatives to be carried forward, with a commitment to treat storm water in designated places throughout the project on October 14, 2015:

- Throughout the project, if intersection spacing permits, the Typical Superstreet Intersection (directional crossover with median U-turns) is utilized.
- One best fit alternative is being analyzed along US 321 with various typical sections throughout.

Typical Section 1: Six-lane divided with 22-foot raised median with a concrete barrier with curb and gutter in outside lanes

Typical Section 2: Six-lane divided with 30-foot raised grassed median with curb and gutter in median and shoulder

Typical Section 3: Six-lane divided with 30-foot raised grassed median with curb and gutter in median and grassed shoulder

Table 1: Concurrence Point 2 – Proposed Typical Section

U-4700 Segments*	Typical Section Alternatives for Detailed Study
Segment A: North of US 70 to 800 feet north of 2nd Avenue NW in Hickory (0.95 miles)	Typical Section 1/2 (combination)
Segment B: 800 feet north of 2nd Avenue NW to 1300 feet north of Clement Boulevard (0.95 miles)	Typical Section 3
Segment C: 1300 feet north of Clement Boulevard to just south of Grace Chapel Road (1.12 miles)	Replace bridges over Catawba River and grade-separate RR crossing
Segment D: Just south of Grace Chapel Road to 400 feet south of Gunpowder Creek (8.10 miles)	Typical Section 3
Segment E: 400 feet south of Gunpowder Creek to Southwest Boulevard (2.04 miles)	Typical Section 3

*These segments are for C.P. 2 purposes – these are not the STIP sections

Concurrence Point 2A

The Project Team concurred with the following major drainage structures on February 16, 2018:

Table 2: Concurrence Point 2A - Proposed Hydraulic Structures

Site No.	Proposed Hydraulic Structure
1	Extend 2 – 10' x 10' RCBC (26' LT & 15' RT)
2	2 – New Bridges (1 @ 825' & 1 @ 944')
3	Extend 1 – 6' x 7' RCBC (73' LT & 89' RT)
4	Extend 2 – 6' x 7' RCBC (56' LT & 49' RT)
5	Extend 1 – 38' x 18' RC Arch (20' LT & 22.5' RT)
6	2 – Widen Bridges (1 @ 158' & 1 @ 173')
7	Extend 3 – 9' x 9' RCBC (31' LT & 15' RT)
8	Extend 1 – 7' x 7' RCBC (41' LT & 23' RT)
17	Extend 1 – 72" CMP (38' RT)
17A	New 135' bridge
17B	New 8' X 8' RCBC – 187'

Concurrence Point 3

The Project Team concurred with the following Least Environmentally Damaging Practicable Alternative (LEDPA) on February 16, 2018, shown on Tables 3 and 4:

Typical Section 1: Six-lane divided with 22-foot raised median with a concrete barrier with curb and gutter in outside lanes

Typical Section 2: Six-lane divided with 30-foot raised grassed median with curb and gutter in median and shoulder

Typical Section 3: Six-lane divided with 30-foot raised grassed median with curb and gutter in median and grassed shoulder

Table 3: Concurrence Point 3 - Least Environmentally Damaging Practicable Alternative (Typical Sections)

U-4700 Segments*	NCDOT Recommended Design
Segment A: North of US 70 to 800 feet north of 2nd Avenue NW in Hickory (0.95 miles)	Typical Section 1/2 (combination)
Segment B: 800 feet north of 2nd Avenue NW to 1300 feet north of Clement Boulevard (0.95 miles)	Typical Section 3
Segment C: 1300 feet north of Clement Boulevard to just south of Grace Chapel Road (1.12 miles)	Replace bridges over Catawba River and grade-separate at RR crossing
Segment D: Just south of Grace Chapel Road to 400 feet south of Gunpowder Creek (8.10 miles)	Typical Section 3
Segment E: 400 feet south of Gunpowder Creek to Southwest Boulevard (2.04 miles)	Typical Section 3

* These segments are for C.P. 2 purposes-these are not the STIP sections

Table 4: Concurrence Point 3 - Least Environmentally Damaging Practicable Alternative (Interchanges)

U-4700 Interchange Locations	NCDOT Recommended Design
2nd Avenue SW	Interchange
Clement Boulevard	Superstreet intersection
Grace Chapel Road	Flyover
Alex Lee Boulevard	Tight diamond interchange
Falls Avenue	Tight diamond interchange

Project Status/Schedule

Planning: In progress

- Section CA, CB, CC Final Design – Winter 2018/2019
- Section A Final Design – Spring 2020

Right-of-Way and Construction:

Section A: US 70 to US 321A
Right-of-way – April 2019
Construction – April 2021

Section B: US 321A to Mission Road
Unfunded

Section C: Mission Road to Southwest Boulevard
Unfunded

Section CA: US 321/Mount Herman Road intersection
Right-of-way – October 2018
Construction – April 2019

Section CB: US 321/Pine Mountain Road (SR 1809/1952) intersection
Right-of-way – October 2018
Construction – April 2019

Section CC: US 321/Mission Road (SR 1108) intersection
Right-of-way – October 2018
Construction – April 2019

Concurrence Point 4A – Avoidance and Minimization Measures

General Avoidance and Minimization Efforts

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

- Horizontal and vertical alignment shifts
- Steeper slopes and narrower right-of-way
- Construction techniques
- Bridge design

The preferred alternative typical section varies along the corridor in median width and shoulder type to minimize impacts to natural resources and property. Multiple interchange and intersection types were also evaluated at main intersections along the corridor to minimize or avoid impacts. These varying typical sections and interchange and intersection designs were concurred upon by the Project Team during previous Merger meetings.

Specific Avoidance and Minimization Efforts

In addition to the general minimization and avoidance practices undertaken described above, the following specific measures were included in the design. Table 5 summarizes impacts to streams and wetlands. Tables 6 and 7 summarize reduction in impacts since designs were presented at the C.P. 3 meeting.

- Selected a 22 and 30-foot median rather than 46-foot median typical section
- Added expressway gutter on the northbound side of US 321 from Station 49+00 to 63+00 to minimize impacts to property
- Added expressway gutter on the southbound side of US 321 from Station 60+00 to 63+00 to minimize impacts to Duke Energy Substation
- Added a bridge and increased slopes on the Grace Chapel Flyover ramp at Station 14+98 to minimize stream impacts
- Added a retaining wall on the northbound side of US 321 at Station 365+00 (northbound off-ramp at Falls Avenue) to minimize impacts to streams and a dwarf-flowered heartleaf boundary
- Added a retaining wall on the southbound side of US 321 at Station 370+00 (southbound on-ramp at Falls Avenue) to minimize stream impacts
- Added a retaining wall on the northbound side of US 321 at Station 397+00 (northbound on-ramp at Falls Avenue) to minimize stream impacts
- Re-aligned the connector road from the Alex Lee Boulevard interchange to Sage Meadow Circle to avoid stream impacts and minimize property impacts
- Steepened slopes and tightened buffer to avoid impacts to dwarf-flowered heartleaf conservation area
- Steepened slopes to minimize impacts to other dwarf-flowered heartleaf populations (see page 6)
- Steepened slopes at C.P. 2A Hydraulic sites 3, 5, 6 and 11
- Removed Dudley Shoals Road loop to avoid impacts to historical resources and minimize stream impacts

Storm Water Treatment

Storm water treatment was discussed during previous Merger Team meetings. At the February 2014 meeting, the 46-foot median typical section option was eliminated with a commitment to treat storm water in designated places through the project. At the October 2015 meeting, NCDOT committed to include storm water treatment facilities during the final design process. Final designs are underway for Sections A, CA, CB, and CC. No specific information on storm water treatment is available at this time.

Threatened and Endangered Species

There are 14 federally protected species listed in the U-4700 project study area. Details about the species are in the Natural Resource Technical Reports, EA, and FONSI documents. The biological conclusion for each is listed below:

- Dwarf-flowered heartleaf: **"May Affect, Likely to Adversely Affect."** The selected alternative is anticipated to impact approximately 1.4 acres of identified dwarf-flowered heartleaf population, estimated to represent 1,165 plants. Impacts to a dwarf-flowered heartleaf conservation easement (shown on Figure 2J) will be avoided based on minimization measures identified since the C.P. 3 meeting. The steepening of slopes near existing dwarf-flowered heartleaf populations was undertaken as a minimization measure to reduce impacts to this species. Slopes were steepened to 2:1 at the following locations:
    - Between station 336+50 and 338+50 (Site 51)
    - Between station 361+00 and 364+50 (Site 48)
    - Between station 581+50 and 583+50 (Site 36)
    - At station 596+00 (Site 32)
    - At station 635+00 (Site 26)
    - At station 638+00 (Site 24)

  These impacts will continue to be minimized, where feasible, during final design. Construction authorization will not be requested until Endangered Species Act (ESA) compliance is satisfied for the dwarf-flowered heartleaf. Table 8 summarizes impacts to dwarf-flowered heartleaf populations.
- Carolina northern flying squirrel, Virginia big-eared bat, spruce-fir moss spider, rock gnome lichen, Schweinitz's sunflower, Heller's blazing star, mountain golden heather, small whorled pogonia, white irisette, Roan Mountain bluet and spreading avens: **"No Effect."**
- Bog turtle: **"Not Required."**
- Northern long-eared bat is consistent with the 4(d) rule.

Avoidance and Minimization Commitments

- This project will not encroach into the dwarf-flowered heartleaf conservation easement area.

Impacts Summary

Table 5: Summary of Impacts for Selected Alternative

Topic	**Segment A** (US 70 to US 321A)	**Segment B** (US 321A to Mission Rd)	**Segment C** (Mission Rd to Southwest Blvd)	**Total**
Length (miles)	3.5	7.2	3.3	14.0
Railroad Crossings	2	0	0	2
100-Year Floodplain Crossings	4	0	2	6
Stream Impacts (linear feet) [a]	1,765	3,055	1,000	5,820
Wetland Impacts (acres) [a]	0.1	0.2	0.4	0.7
Dwarf-flowered heartleaf Impacts (acres)	<0.1	0.5	0.8	1.3
Dwarf-flowered heartleaf Impacts (plants)	1	380	782	1,163
Water Supply Watersheds	1	2	0	3
Federal Listed Species [b]		13		13
Historic Properties Affected	0	0	0	0
Archaeological Sites Affected	0	0	0	0
Section 4(f) Resources	0	0	0	0
Total Relocations*	73	27	5	105
Residential Relocations*	18	12	2	32
Business Relocations*	55	14	3	72
Non-Profit Relocations*	0	1	0	1
Schools Affected	0	0	0	0
Recreation Areas and Parks Affected	0	0	0	0
Churches Affected	0	0	0	0
Cemeteries Affected	0	0	0	0
Environmental Justice Impacts	None	None	None	None
Wildlife Refuges or Gamelands	0	0	0	0
Noise Impacts [c]	33	43	14	90
Potential Hazardous Material Site Impacts*	39	19	12	70
Total Cost*	$176,857,244	$82,774,280	$22,398,320	$282,029,844
Construction Cost*	$116,300,000	$61,200,000	$10,400,000	$187,900,000
Utility Relocation Cost*	$931,744	$2,781,780	$548,320	$4,261,844
Right-of-Way Cost*	$59,625,500	$18,792,500	$11,450,000	$89,868,000

Note: The total number of impacted dwarf-flowered heartleaf plants in segment C shown in red was reduced since the original C.P. 4A packet was distributed based on further minimization in the design near two dwarf-flowered heartleaf populations.

[a] Shown acreage includes 25-foot clearing limits outside slope stake lines.

[b] Biological conclusions: "**No Effect**" for Carolina northern flying squirrel, Virginia big-eared bat, spruce-fir moss spider, rock gnome lichen, Schweinitz's sunflower, Heller's blazing star, mountain golden heather, small whorles pogonia, white irisette, and spreading avens; "**Not Required**" for the bog turtle; "**May Affect, Likely to Adversely Affect**" for the dwarf-flowered heartleaf; Northern long-eared bat is consistent with 4(d) rule.

[c] Based upon preliminary traffic noise analysis

* The total relocations, potential hazardous material site impacts, and total cost estimates reflect the most recently available information that was included in the U-4700 FONSI which was approved in April 2018.

Table 6: Comparison of Itemized Stream Impacts

Section	Map ID	Stream Name	Impact Length (lf)		
			CP 3	CP 4A	Difference
A	Frye Creek	Frye Creek	125	125	0
	SB	UT to Catawba River	735	735	0
	SC	UT to Catawba River	300	300	0
	SQQ	UT to Catawba River	40	40	0
	SRR	UT to Catawba River	590	595	5
	SUU	UT to Catawba River	330*	0	-330
	SVV	UT to Catawba River	110*	0	-110
B	Billy Branch	Billy Branch	660	305	-355
	Little Gunpowder Creek	Little Gunpowder Creek	150	145	-5
	SF	UT to Gunpowder Creek	230	230	0
	SJ	UT to Gunpowder Creek	40	40	0
	SK	UT to Gunpowder Creek	120	120	0
	SM	UT to Gunpowder Creek	100	100	0
	SN	UT to Gunpowder Creek	280	280	0
	SO	UT to Gunpowder Creek	365	365	0
	SP	UT to Billy Branch	180	180	0
	SQ	UT to Little Gunpowder Creek	130	130	0
	SR	UT to Little Gunpowder Creek	170	170	0
	SS	UT to Little Gunpowder Creek	65	65	0
	ST	UT to Little Gunpowder Creek	30	30	0
	STA	UT to Little Gunpowder Creek	85	85	0
	SU	UT to Little Gunpowder Creek	65	65	0
	SV	UT to Little Gunpowder Creek	110	110	0
	SW	UT to Little Gunpowder Creek	540	540	0
	SX	UT to Little Gunpowder Creek	50	50	0
	SY	UT to Little Gunpowder Creek	45	45	0
C	Angley Creek	Angley Creek	200	200	0
	Brushy Fork	Brushy Fork	120	120	0
	Gunpowder Creek	Gunpowder Creek	55	55	0
	SAA	UT to Gunpowder Creek	115	115	0
	SBB	UT to Gunpowder Creek	70	70	0
	SDD	UT to Gunpowder Creek	20	20	0
	SEE	UT to Gunpowder Creek	150	150	0
	SLL	UT to Gunpowder Creek	185	185	0
	SZ	UT to Gunpowder Creek	85	85	0
Total			**6,645**	**5,820**	**-795**

*Stream delineation information for streams SUU and SVV was received following the C.P. 3 meeting and was not reflected in the C.P. 3 packet. The design at these locations has been revised to avoid impacts to these streams.

Table 7: Comparison of Itemized Wetland Impacts

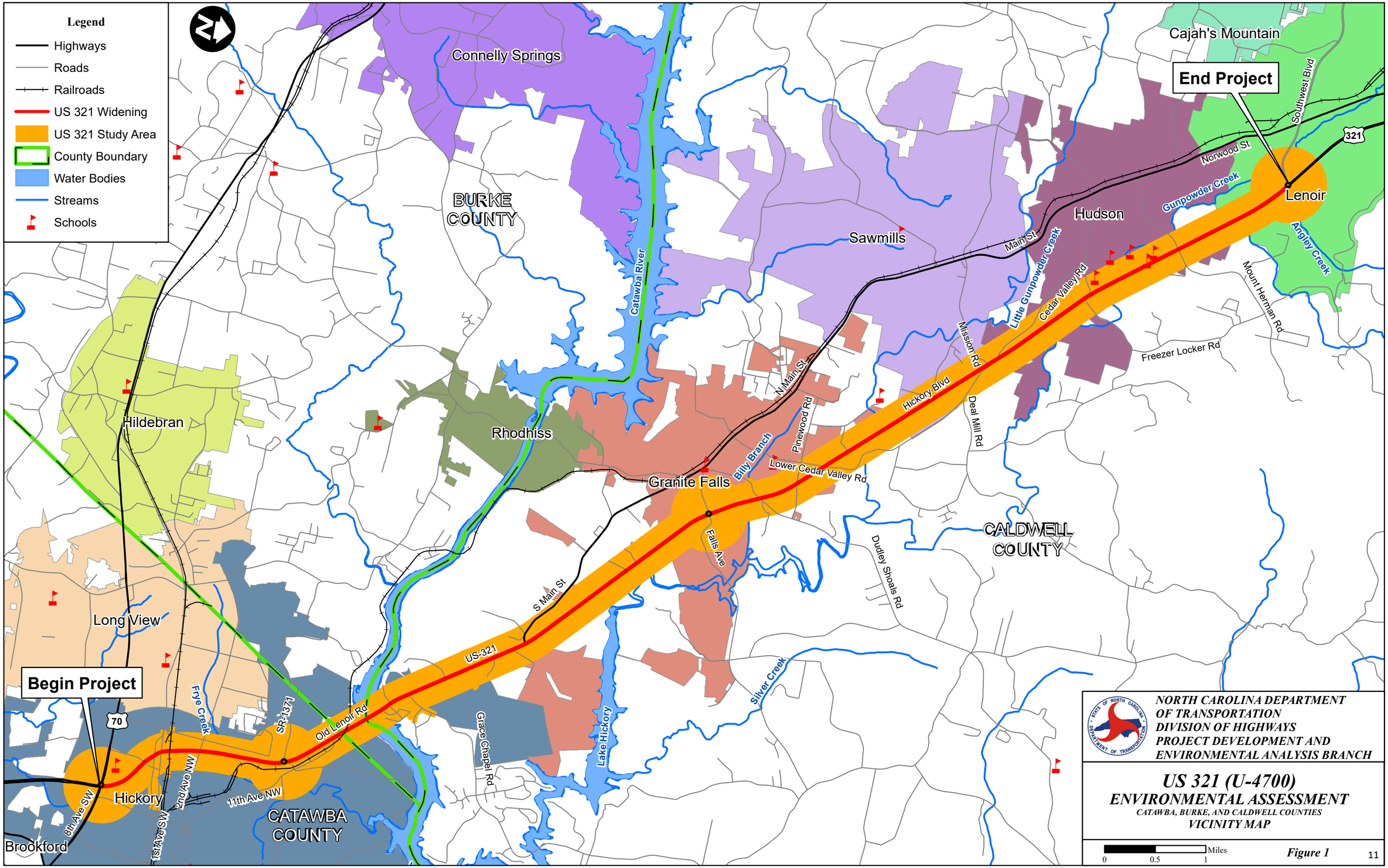
Section	Map ID	Impact Area (acres)		
		CP 3	CP 4A	Difference
A	WA	0.1	0.1	0
B	WF	<0.1	<0.1	0
	WG	<0.1	<0.1	0
	WFA	0.1	0.1	0
C	WI	0.1	0.1	0
	WKA	<0.1	<0.1	0
	WK	0.1	0.1	0
	WP	0.2	0.1	<0.1
Total		0.7	0.7	<0.1

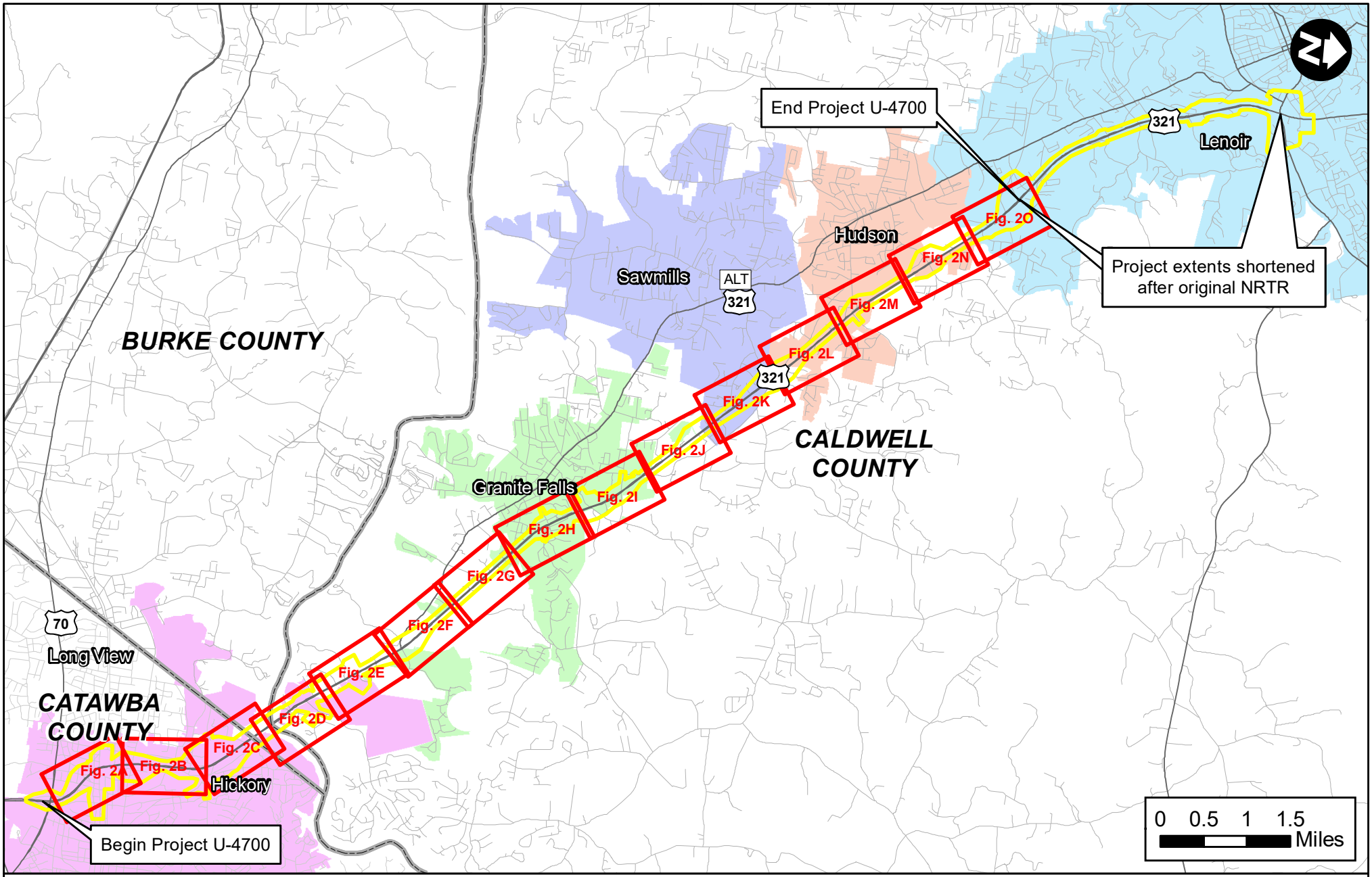
Table 8: Comparison of Itemized Dwarf-flowered Heartleaf Impacts

Section	Site	Near Station	Density (plants/acre)	CP 3		CP 4A		Difference	
				Area (acres)	Estimated Plants	Area (acres)	Estimated Plants	Area (acres)	Estimated Plants
A	F	143+50	818	0.026	22	0.00004	1	-0.026	-21
B	52a	320+00	4,762	0.020	96	0.008	41	-0.012	-55
	51	340+00	982	0.402	395	0.250	246	-0.152	-149
	48	365+00	305	0.485	148	0.240	74	-0.245	-74
	46	400+00	454	0.022	10	0.012	6	-0.010	-4
	46a	400+00	399	0.001	1	0.000	0	-0.001	-1
	43	465+00	1,000	0.023	23	0.012	13	-0.011	-10
	44	465+00	1,671	0.009	16	0.000	0	-0.009	-16
C	35	585+00	246	0.179	45	0.179	45	0.000	0
	36	585+00	1,599	0.438	701	0.093	149	-0.345	-552
	34	585+00	1,109	0.803	891	0.501	556	-0.302	-335
	32	595+00	1,265	0.009	12	0.001	2	-0.008	-10
	30	600+00	250	0.024	6	0.024	6	0.000	0
	26	635+30	889	0.027	24	0.025	23	-0.002	-1
	24	637+50	164	0.010	2	<0.001	1	-0.010	-1
Total				**2.478**	**2,392**	**1.344**	**1,163**	**-1.134**	**-1,229**

Note: Portions of the design near sites listed in red were further minimized since the original C.P. 4A packet was distributed. Additionally, estimated plant impact totals for Sites F, 52a, 48, 44, 35 and 36 were slightly modified by using an alternate rounding methodology following coordination with NCDOT Biological Surveys Group.

Figures

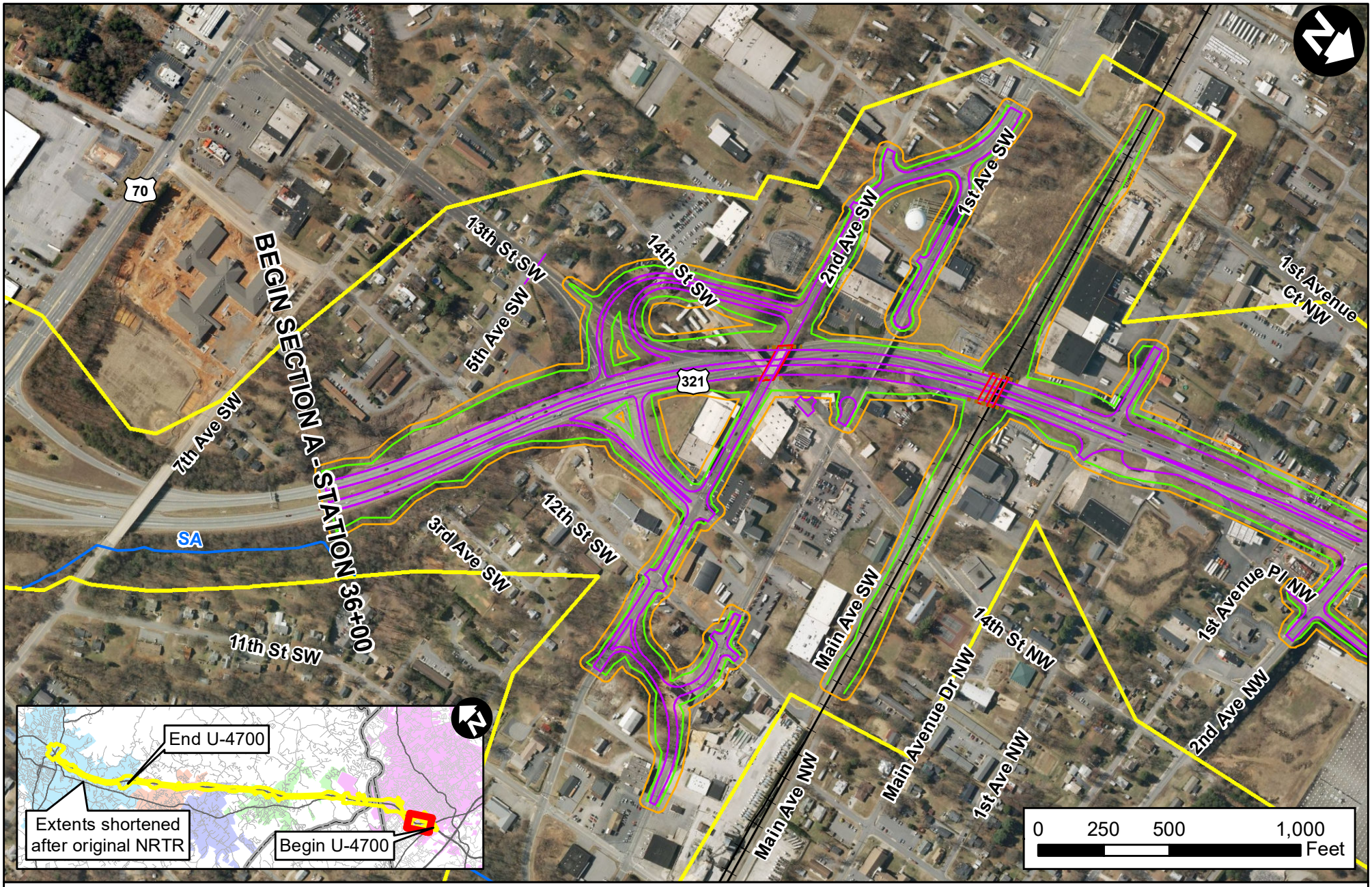

Legend
Highways
Roads
Railroads
US 321 Widening
US 321 Study Area
County Boundary
Water Bodies
Streams
Schools
Connelly Springs
BURKE COUNTY
Catawba River
Sawmills
Cajah's Mountain
End Project
Southwest Blvd
321
Norwood St
Gunpowder Creek
Lenoir
Hudson
Main St
Little Gunpowder Creek
Cedar Valley Rd
Angley Creek
Mount Herman Rd
Freezer Locker Rd
Mission Rd
Hickory Blvd
Deal Mill Rd
Hildebran
Rhodhiss
N Main St
Pinewood Rd
Billy Branch
Granite Falls
Lower Cedar Valley Rd
Falls Ave
Dudley Shoals Rd
CALDWELL COUNTY
S Main St
US-321
Long View
Begin Project
70
Frye Creek
SR-1371
Old Lenoir Rd
Grace Chapel Rd
Lake Hickory
Silver Creek
Hickory
8th Ave SW
1st Ave SW
2nd Ave NW
11th Ave NW
CATAWBA COUNTY
Brookford
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH
US 321 (U-4700)
ENVIRONMENTAL ASSESSMENT
CATAWBA, BURKE, AND CALDWELL COUNTIES
VICINITY MAP
Miles
0
0.5
1
Figure 1
11



U-4700 - U.S. 321 Widening

Figure 2: C.P. 4A Impacts Map

Catawba, Burke, and Caldwell Counties

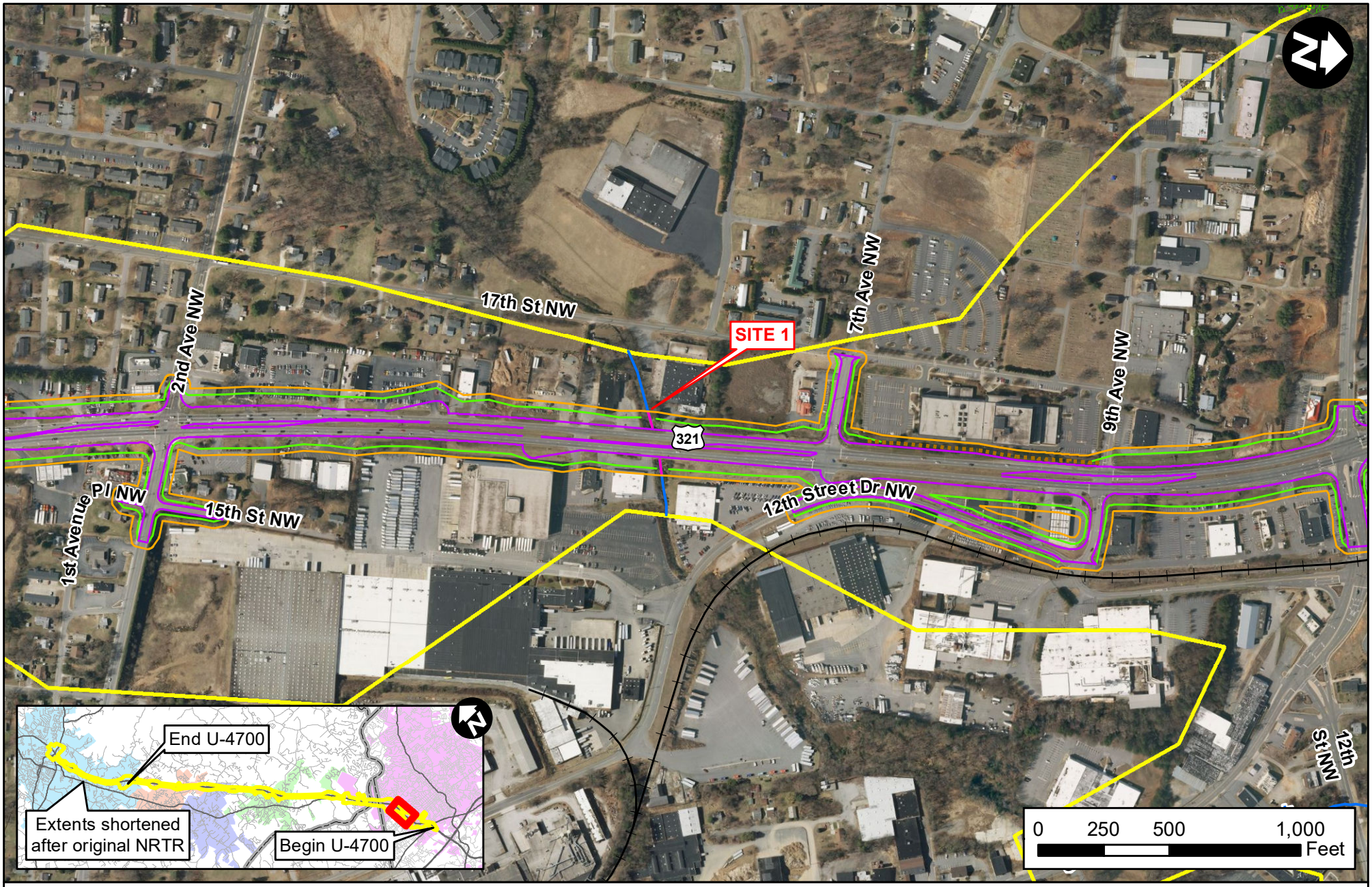


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream

U-4700 - U.S. 321 Widening

Figure 2A: C.P. 4A Impacts Map

Catawba County

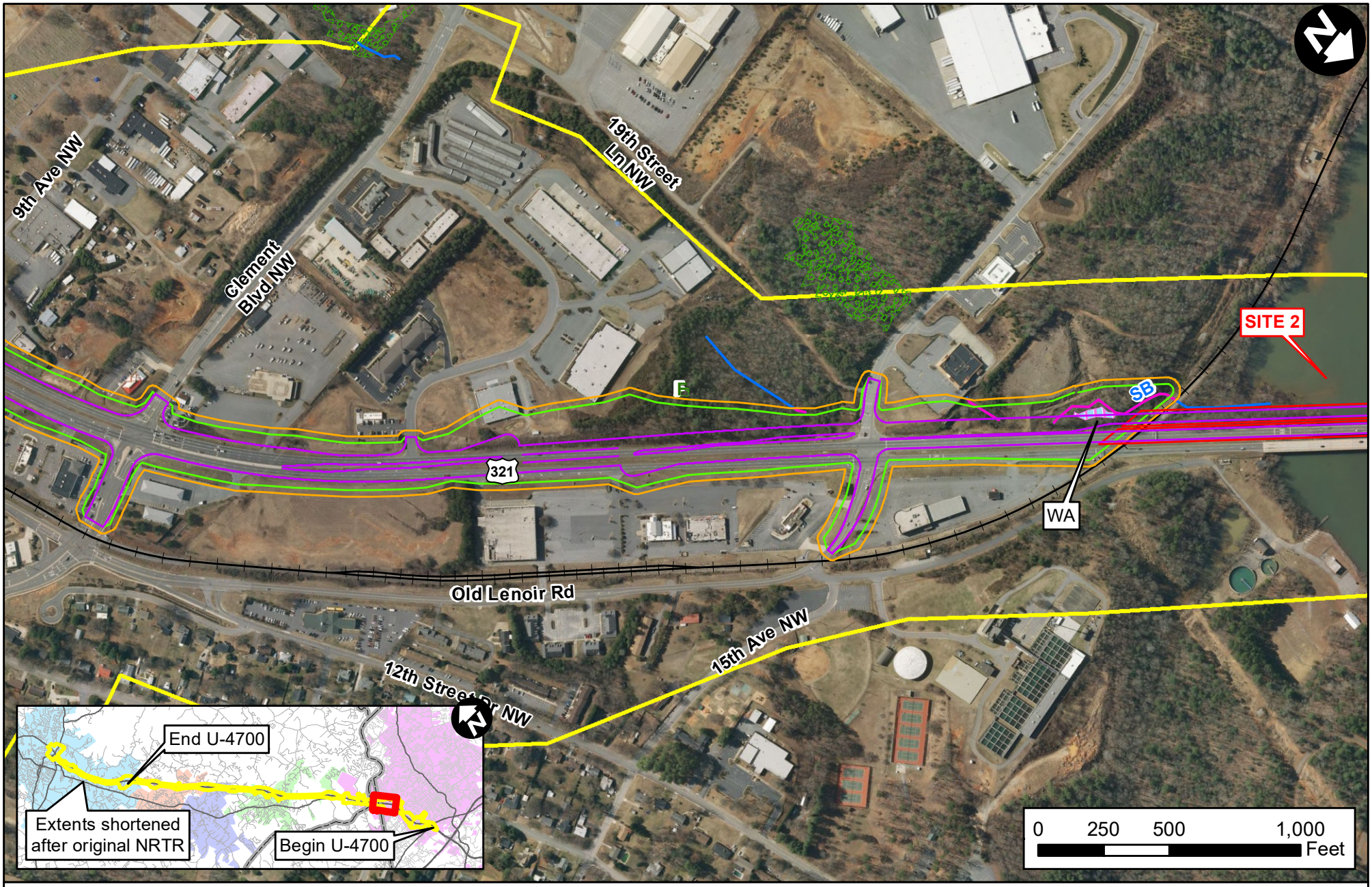


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Dwarf-flowered Heartleaf Population
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2B: C.P. 4A Impacts Map

Catawba County

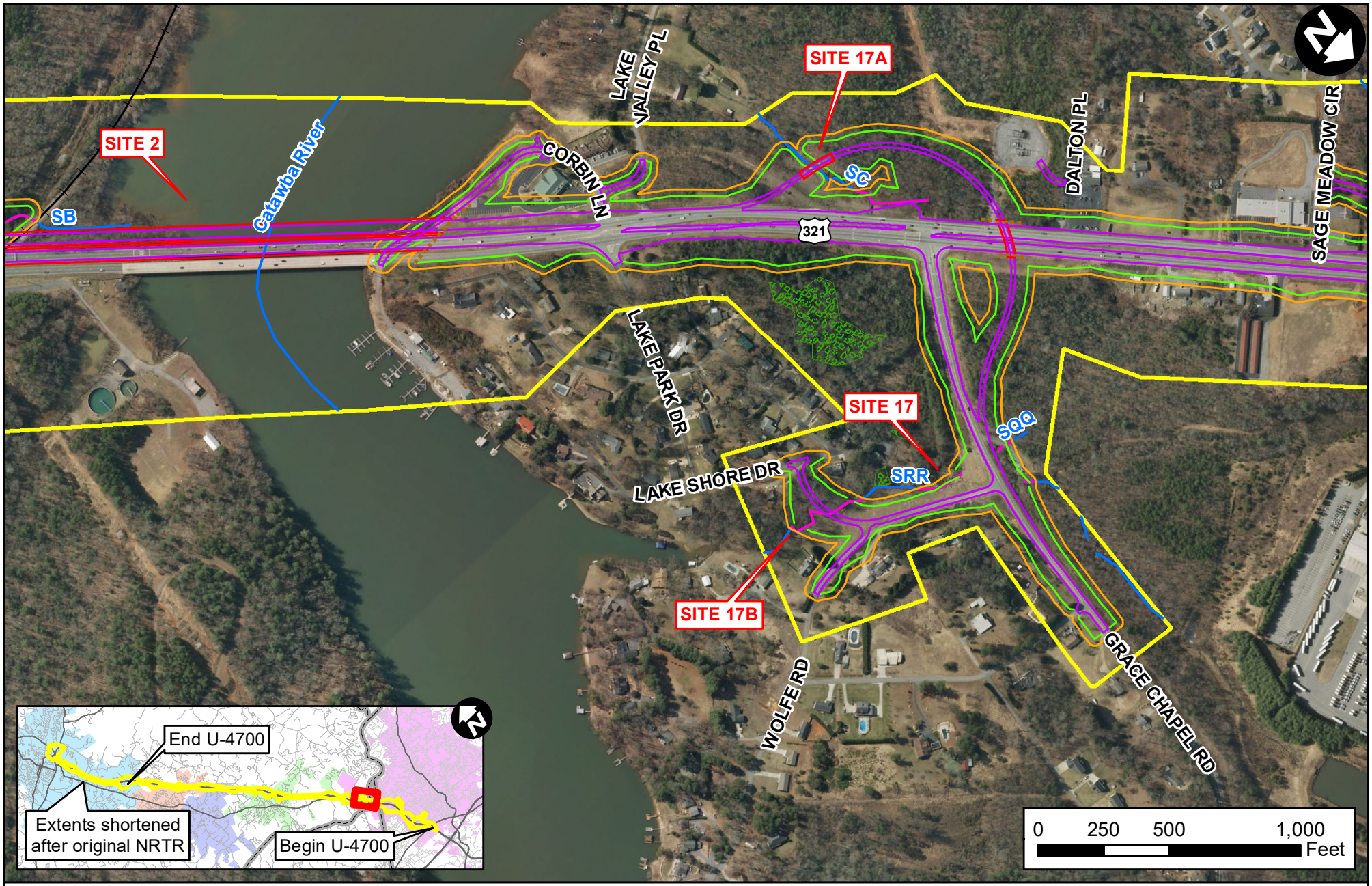


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Dwarf-flowered Heartleaf Population
Dwarf-flowered Heartleaf Impact
Delineated Wetland
Wetland Impact
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2C: C.P. 4A Impacts Map

Catawba and Burke Counties

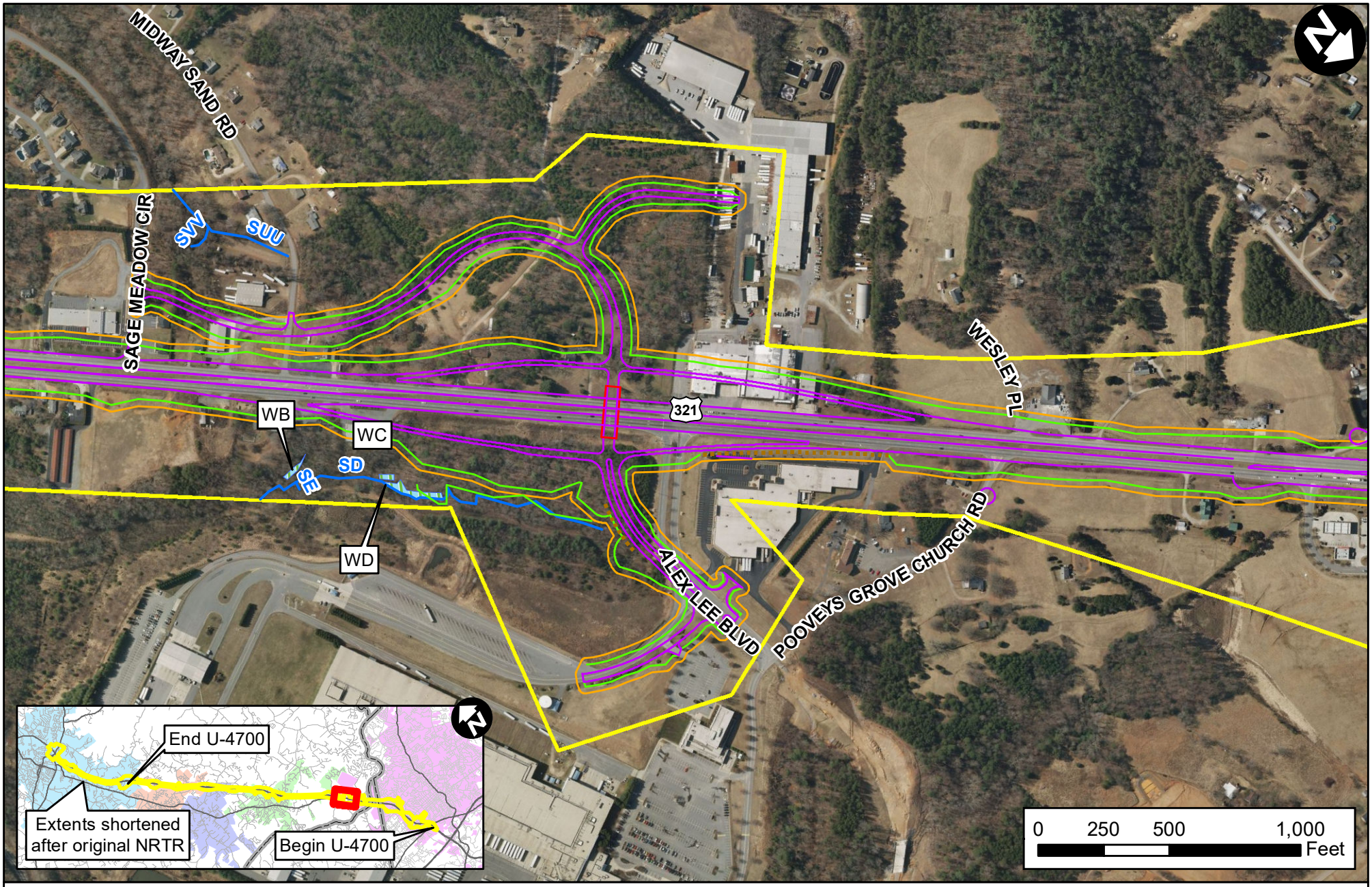


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Dwarf-flowered Heartleaf Population
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2D: C.P. 4A Impacts Map

Burke and Caldwell Counties

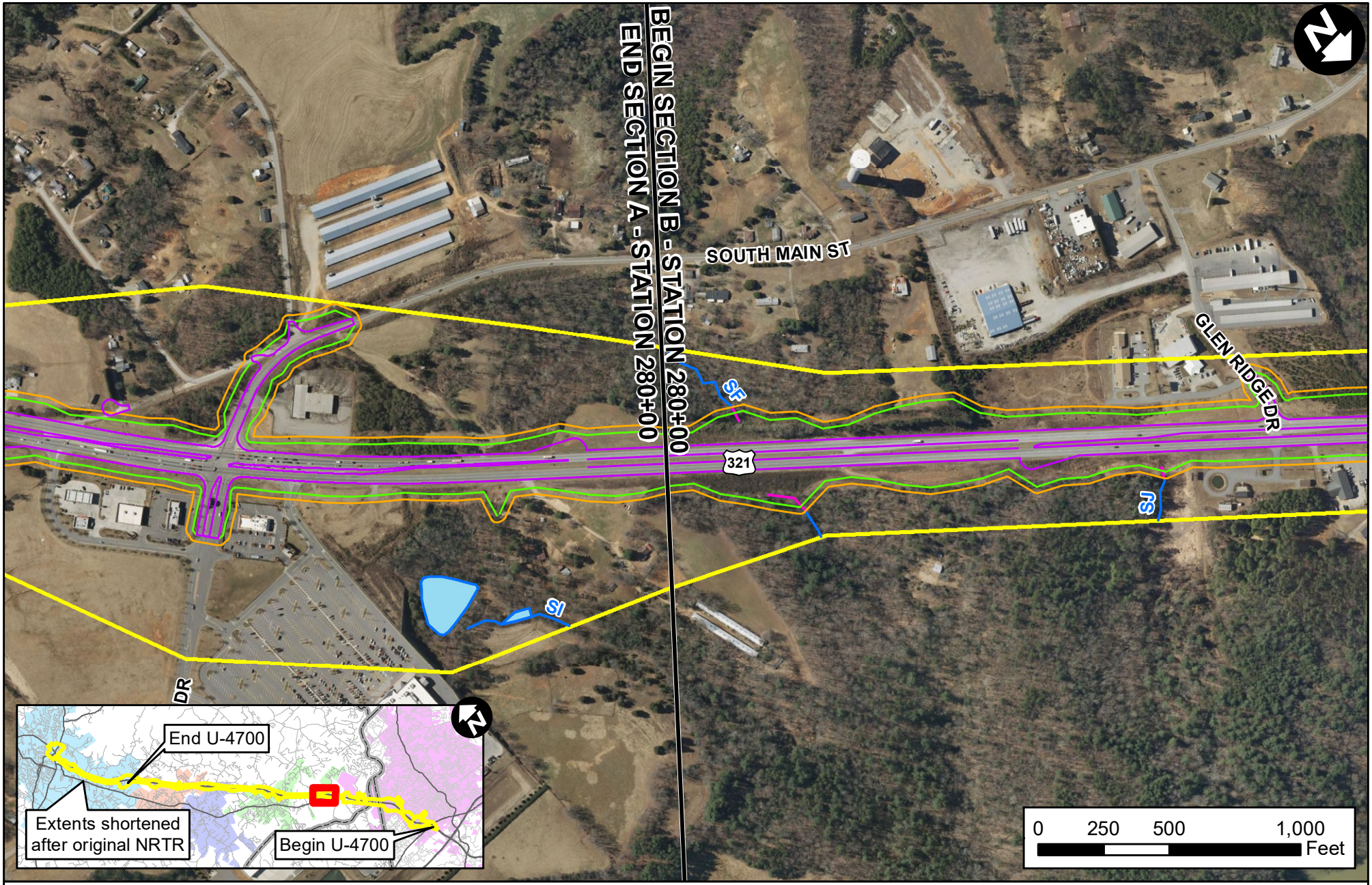


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Delineated Wetland
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream

U-4700 - U.S. 321 Widening

Figure 2E: C.P. 4A Impacts Map

Caldwell County

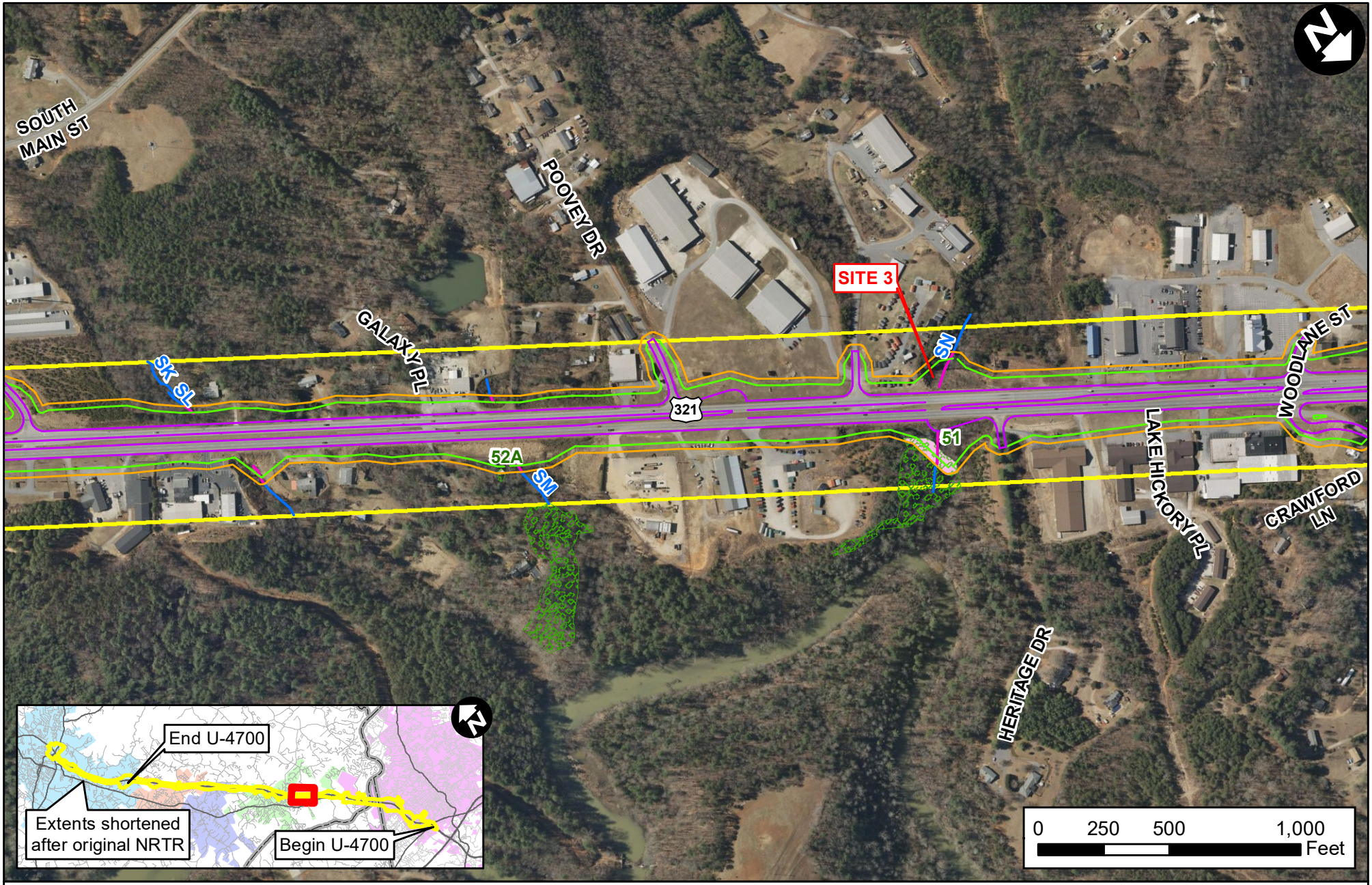


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Delineated Body of Water
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2F: C.P. 4A Impacts Map

Caldwell County

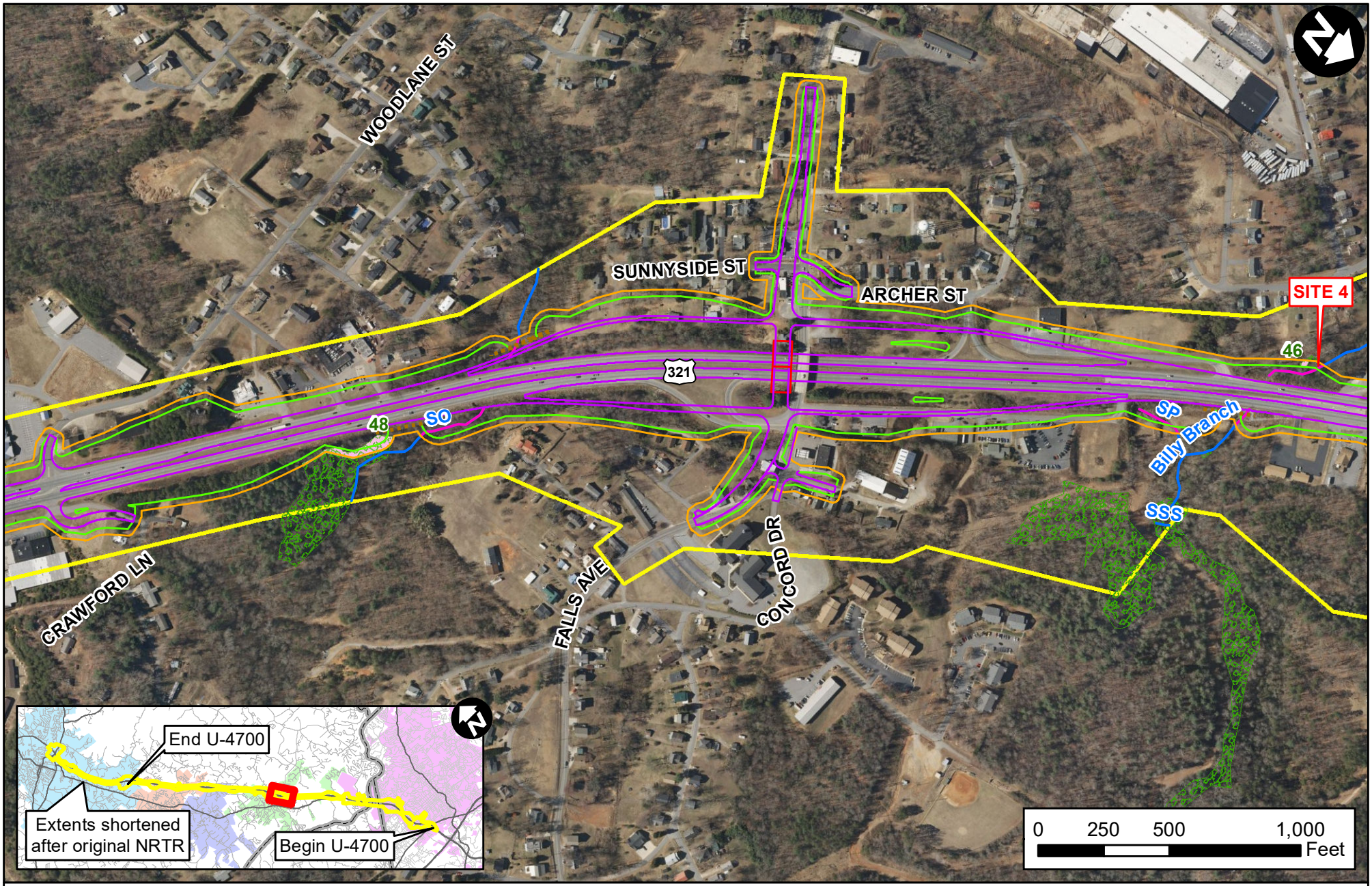


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Dwarf-flowered Heartleaf Population
Dwarf-flowered Heartleaf Impact
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2G: C.P. 4A Impacts Map

Caldwell County

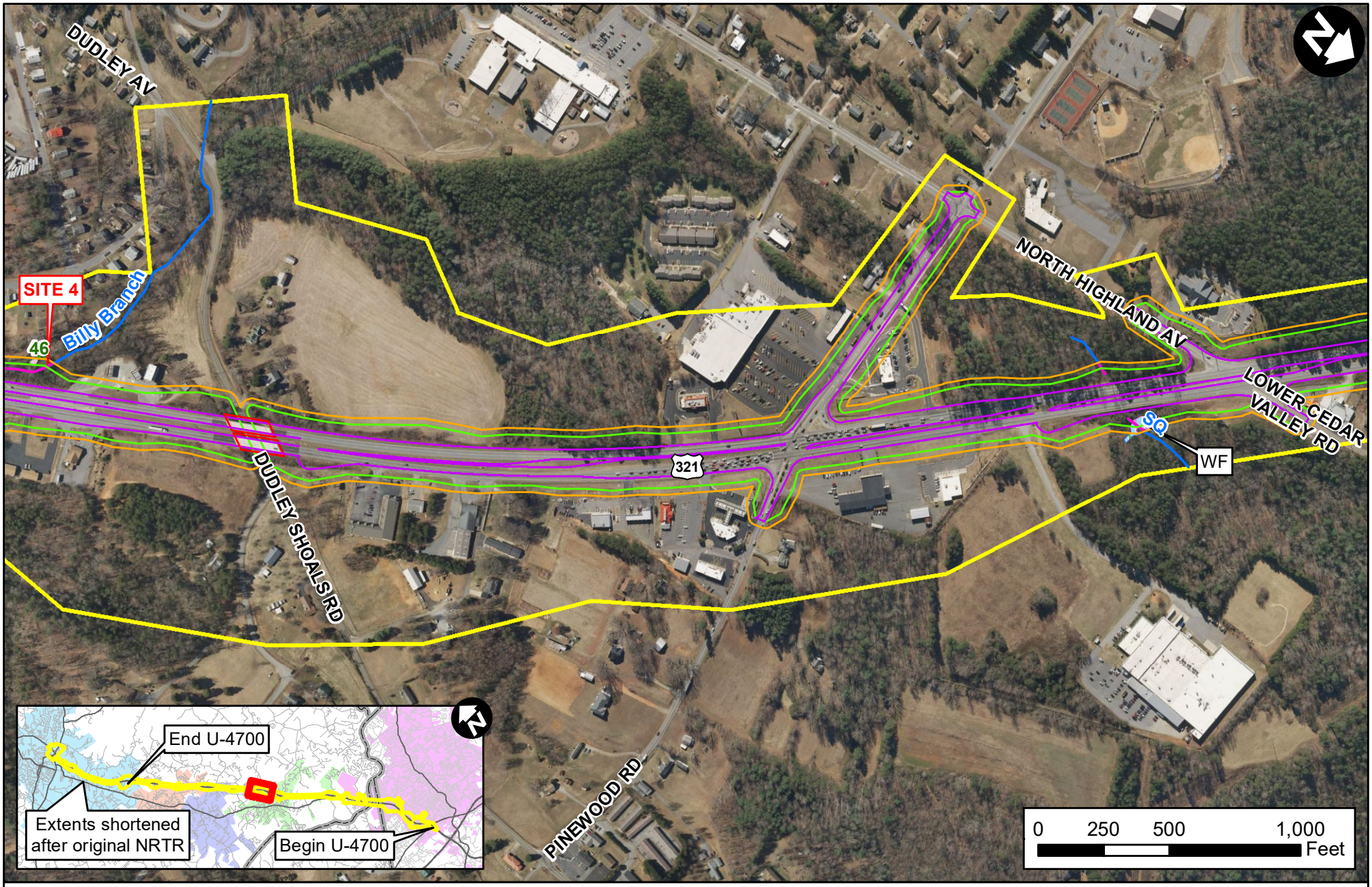


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Dwarf-flowered Heartleaf Population
Dwarf-flowered Heartleaf Impact
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2H: C.P. 4A Impacts Map

Caldwell County

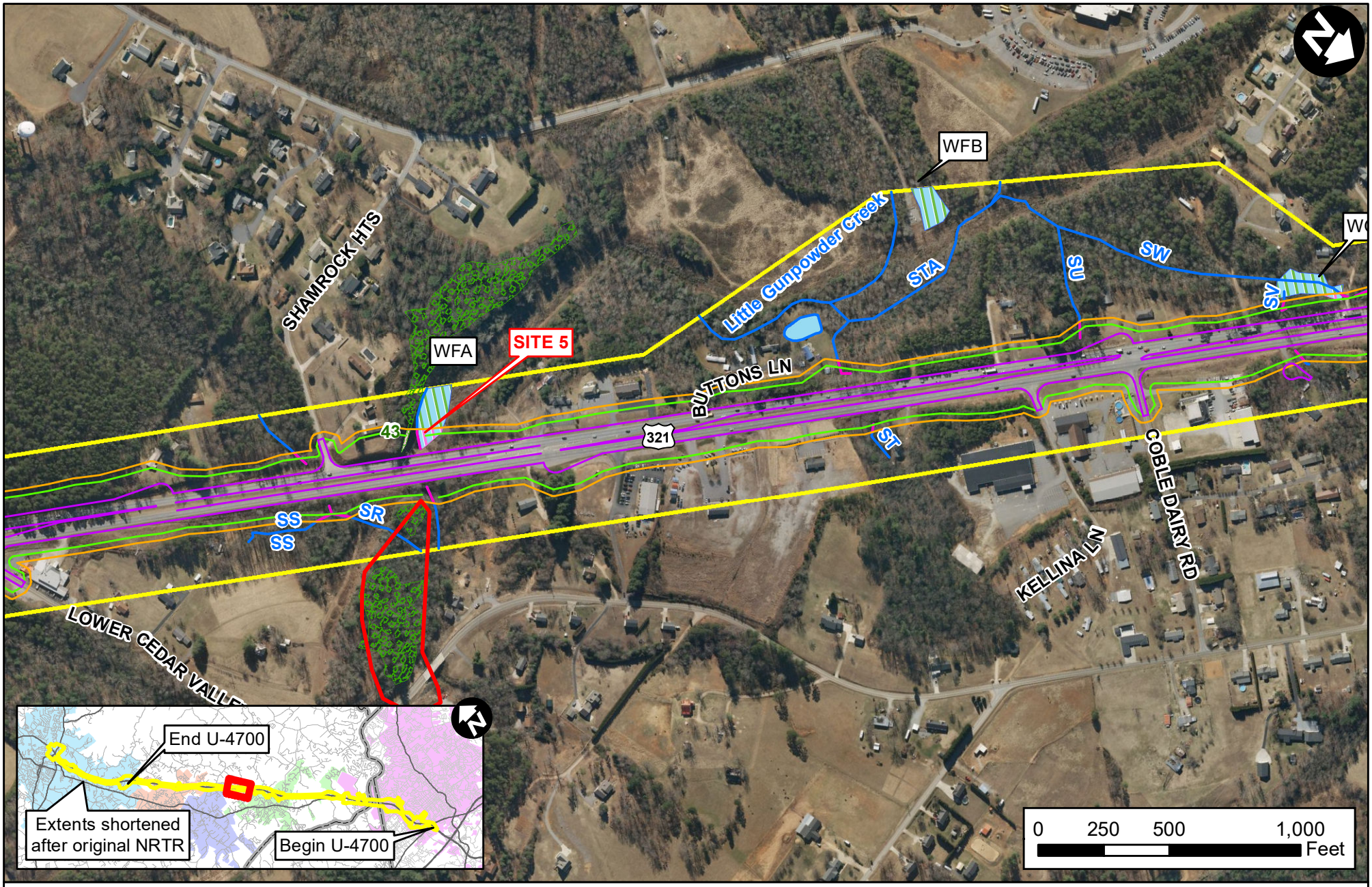


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Dwarf-flowered Heartleaf Population
Dwarf-flowered Heartleaf Impact
Delineated Wetland
Wetland Impact
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2I: C.P. 4A Impacts Map

Caldwell County

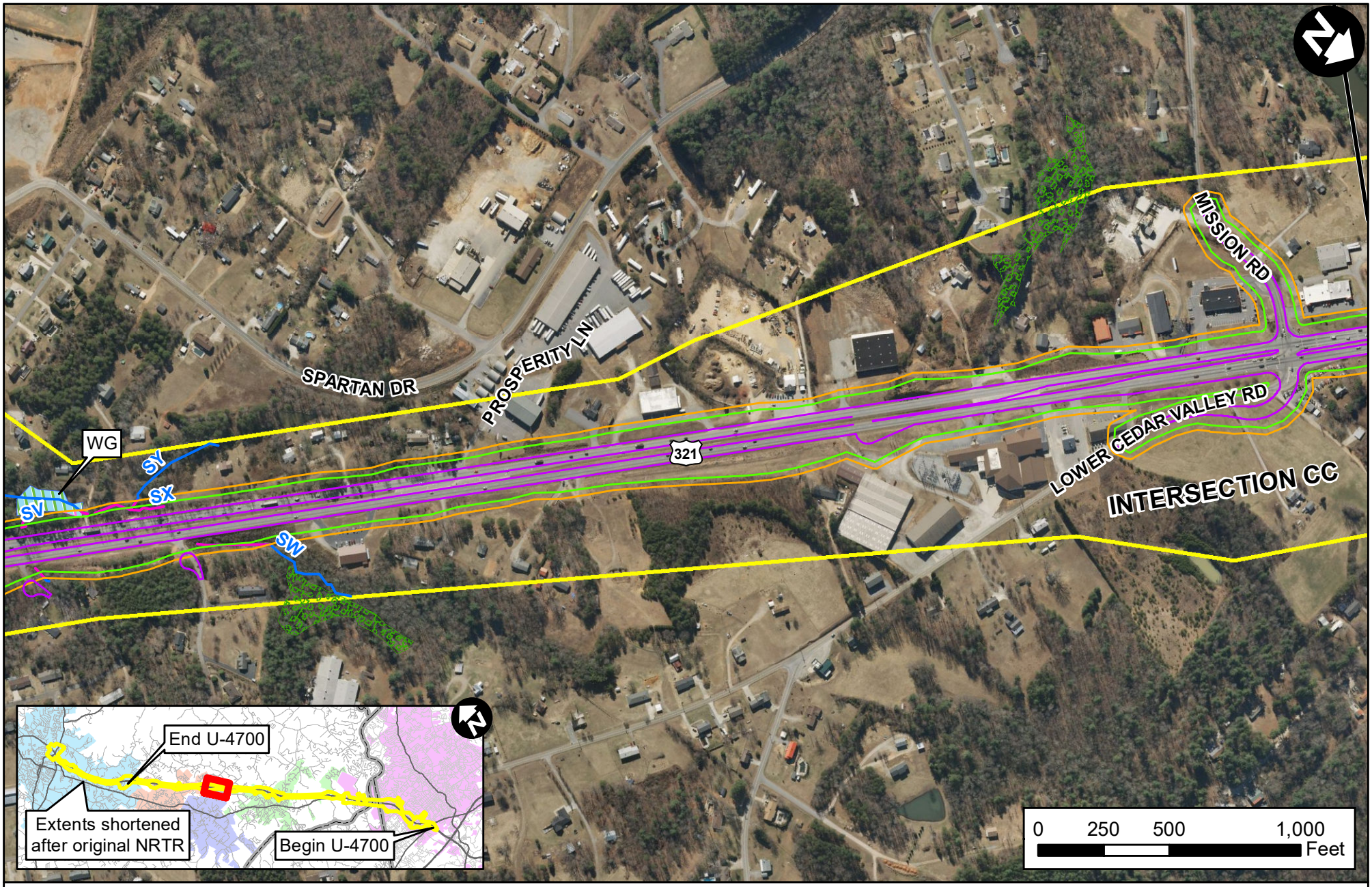


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Dwarf-flowered Heartleaf Conservation Area
Dwarf-flowered Heartleaf Population
Delineated Body of Water
Dwarf-flowered Heartleaf Impact
Delineated Wetland
Wetland Impact
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes

U-4700 - U.S. 321 Widening

Figure 2J: C.P. 4A Impacts Map

Caldwell County

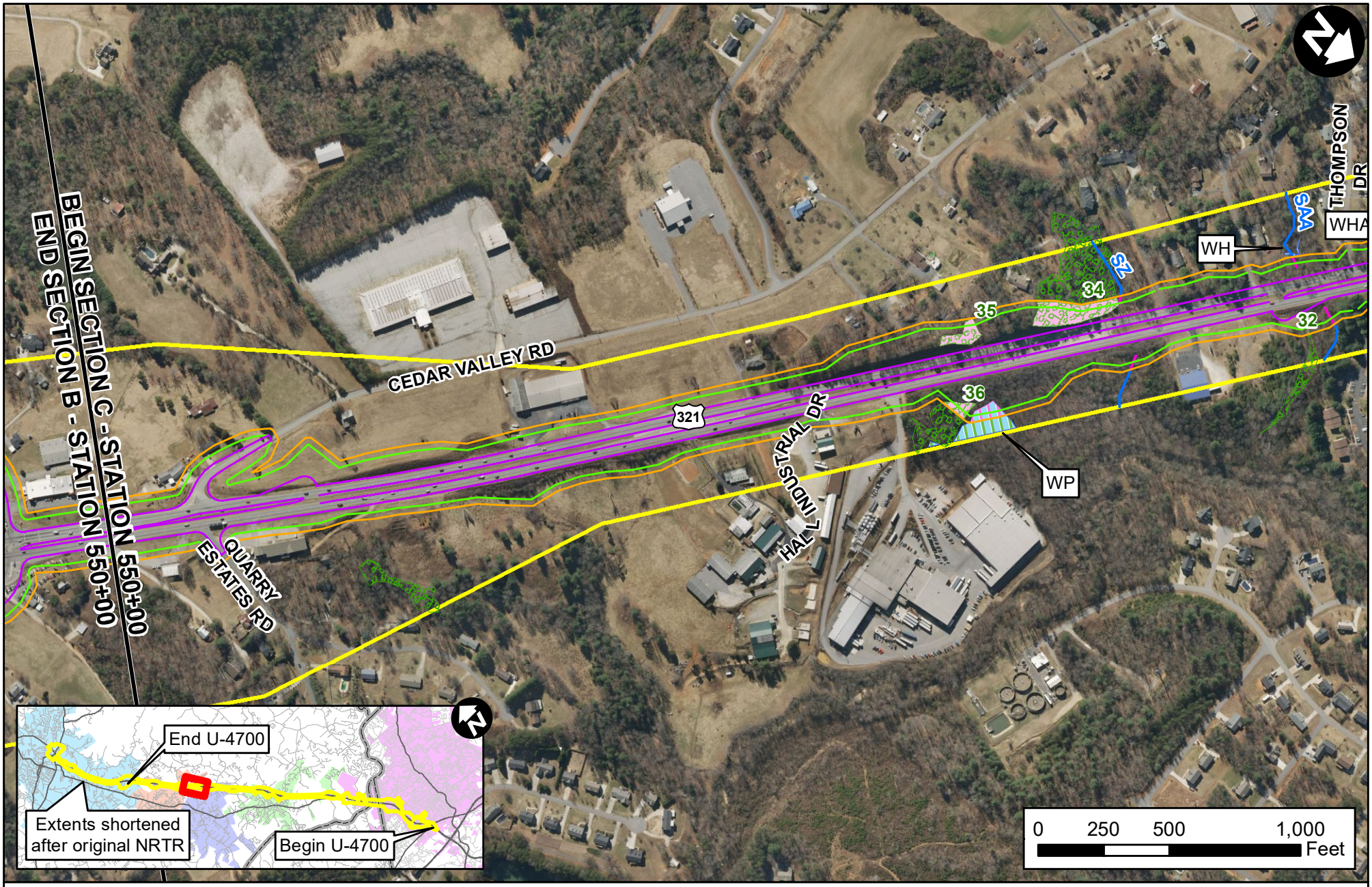


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Dwarf-flowered Heartleaf Population
Delineated Wetland
Wetland Impact
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2K: C.P. 4A Impacts Map

Caldwell County

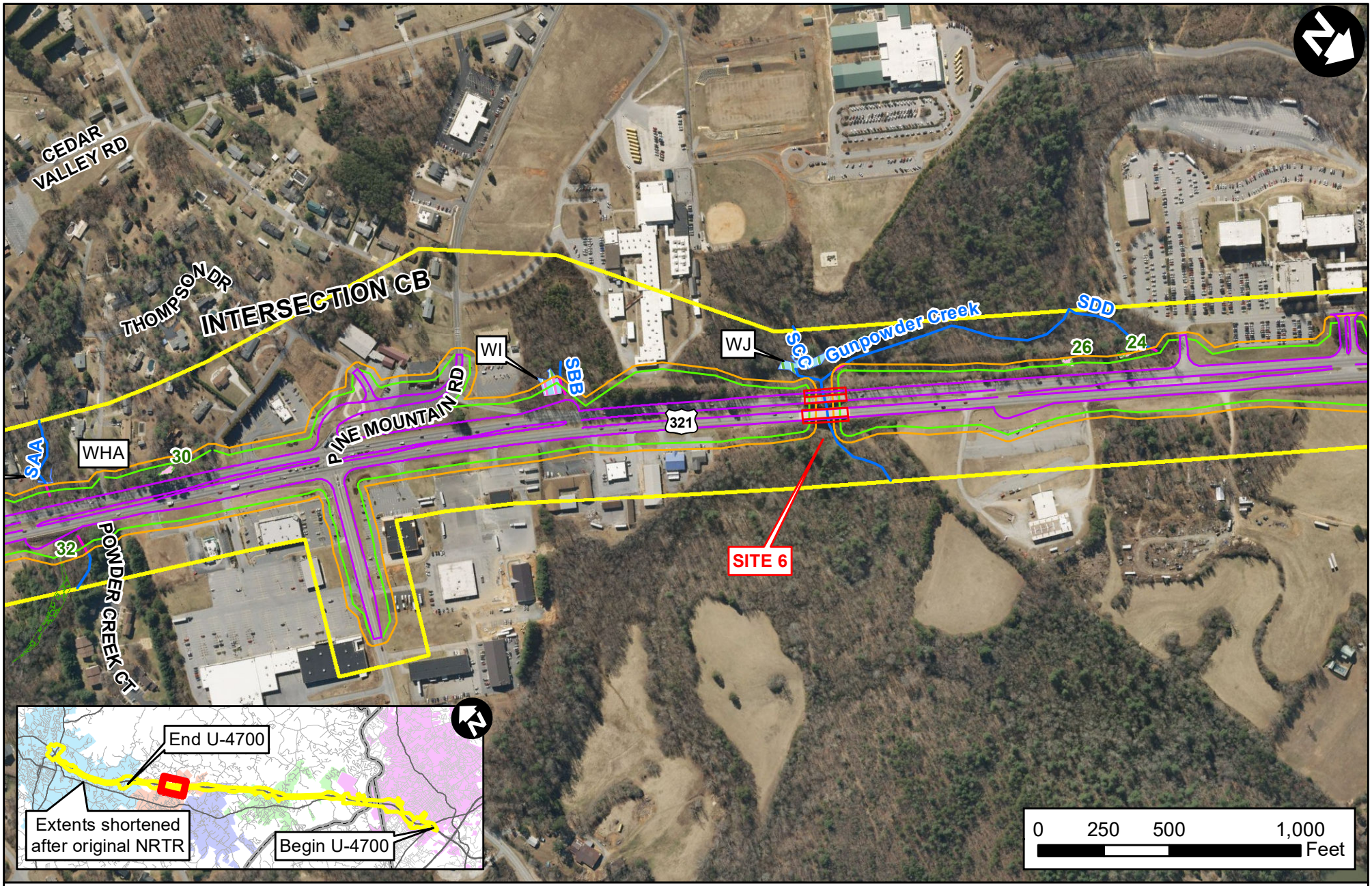


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Dwarf-flowered Heartleaf Population
Dwarf-flowered Heartleaf Impact
Delineated Wetland
Wetland Impact
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2L: C.P. 4A Impacts Map

Caldwell County

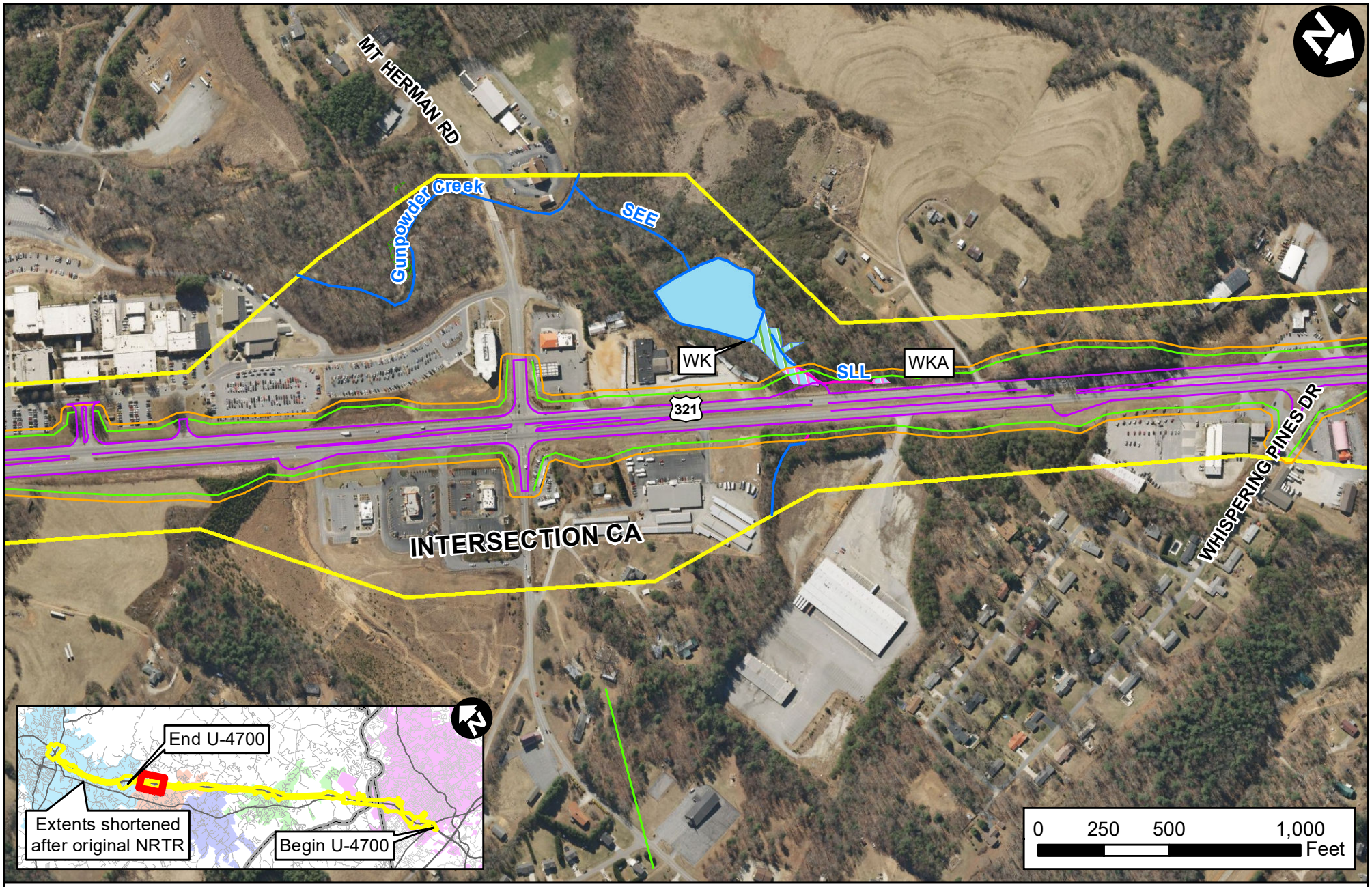


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Dwarf-flowered Heartleaf Population
Dwarf-flowered Heartleaf Impact
Delineated Wetland
Wetland Impact
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2M: C.P. 4A Impacts Map

Caldwell County

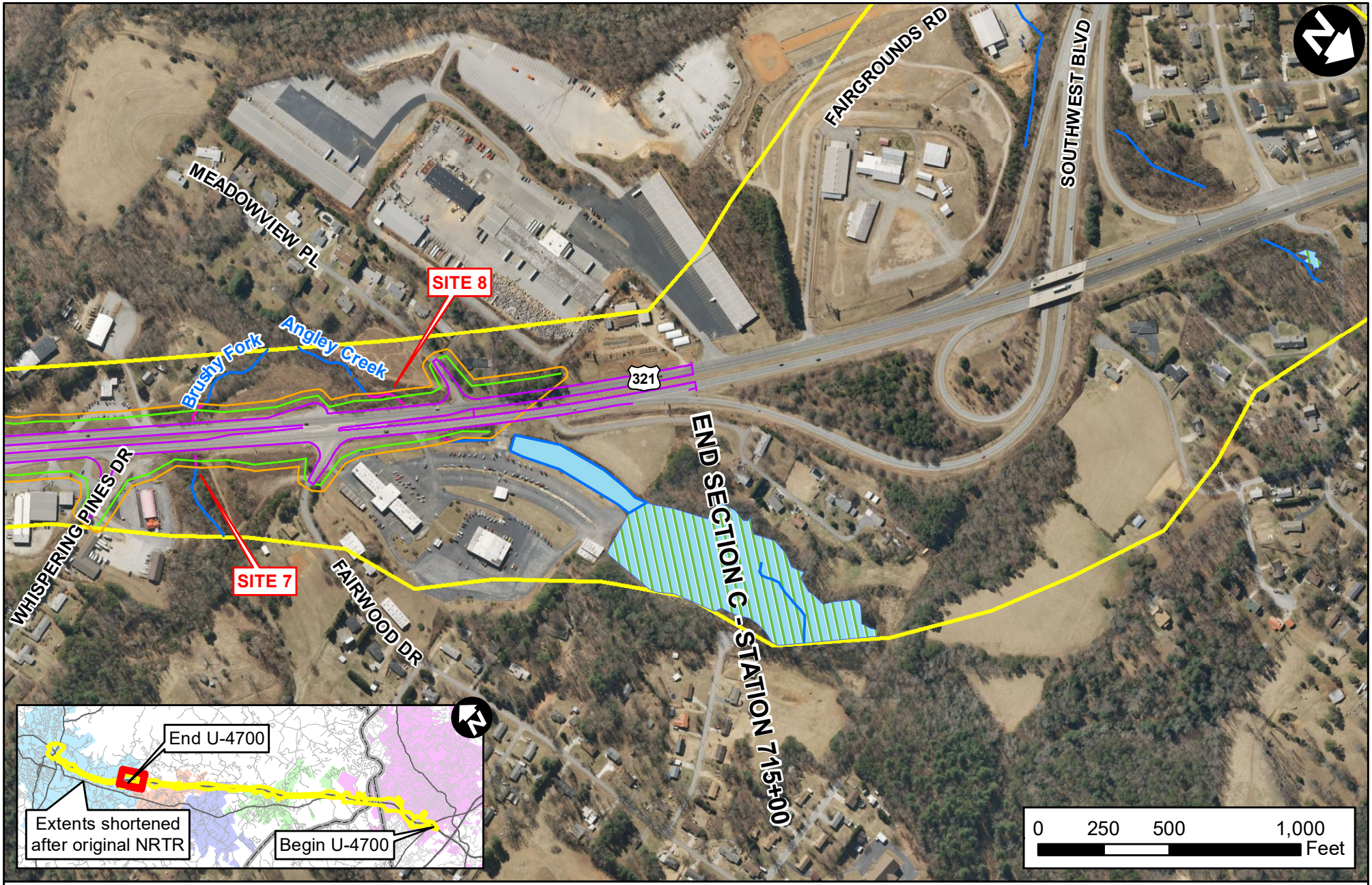


NRTR study area boundary
25-Foot Buffer of Slope Stakes
Dwarf-flowered Heartleaf Population
Delineated Body of Water
Delineated Wetland
Wetland Impact
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2N: C.P. 4A Impacts Map

Caldwell County



NRTR study area boundary
25-Foot Buffer of Slope Stakes
Delineated Body of Water
Delineated Wetland
Proposed Edge of Travel
Proposed Retaining Wall
Proposed Roadway Bridge
Proposed Slope Stakes
Delineated Stream
Stream Impact

U-4700 - U.S. 321 Widening

Figure 2O: C.P. 4A Impacts Map

Caldwell County