

CONCURRENCE POINTS 1 and 2 – PURPOSE AND NEED/ ALTERNATIVES TO BE STUDIED IN DETAIL

NC 211

from US 15-501 in Aberdeen to
East of SR 1244 (West Palmer Street) / SR 1311 (Mockingbird Hill Road) in Raeford
Moore and Hoke Counties

STIP Project R-5709
WBS No. 50205.1.1

June 15, 2017

Purpose of Meeting

The purpose of today's meeting is to discuss the purpose of and need for the proposed project and alternatives to be studied in detail. Concurrence will be requested.

Project Description

The NCDOT proposes to widen NC 211 to a four-lane divided roadway with a grass median from US 15-501 in Aberdeen (Moore County) to east of SR 1244 (West Palmer Street) / SR 1311 (Mockingbird Hill Road) in Raeford (Hoke County), a distance of approximately 15.4 miles. The project vicinity is shown on Figure 1.

Project Setting

NC 211 is the primary route between Aberdeen in Moore County and Raeford in Hoke County. In addition to these municipalities, there are three unincorporated communities located along the project corridor: Ashley Heights, Ashmont, and Five Points. NC 211 also generally parallels the southwest boundary of Fort Bragg. Land use along the corridor varies and includes a mix of businesses, residences (single-family homes on stand-alone lots and in subdivisions), community facilities, agricultural uses, and vacant properties.

Study Area

The study area generally includes a 500-foot wide corridor along NC 211 from US 15-501 (western terminus) to just east of West Palmer Street/Mockingbird Hill Road (eastern terminus). In order to explore intersection improvements and realignments (y-lines), as well as railroad grade separations, the study area was expanded beyond a 500-foot corridor in several locations, including along intersecting roadways.

Project Status and Schedule

The project is state funded and a State Environmental Assessment is being prepared in compliance with North Carolina's State Environmental Policy Act (SEPA). Project development studies began in 2016. Two public meetings were held in July 2016 to introduce the project, discuss the project need, and present the draft study area. Approximately 150 people attended the meetings.

The project is included in the 2016-2025 State Transportation Improvement Program (STIP). Right of way acquisition and construction are scheduled for state fiscal years 2020 and 2022, respectively, in the draft 2017-2027 STIP.

The total cost for the project included in the draft 2017-2027 STIP is \$141,719,000. Of this total, \$42,356,000 is included for right of way acquisition, \$5,083,000 for utility relocation and \$94,280,000 for construction.

The project is supported by local transportation plans, including the draft Hoke County Comprehensive Transportation Plan and the Fayetteville Area Metropolitan Planning Organization Metropolitan Transportation Plan.¹

Concurrence Point 1: Purpose and Need and Study Area Defined

Project Purpose

The purpose of the proposed project is to reduce traffic congestion and travel delays, improve safety and correct roadway deficiencies along NC 211 within the project limits.

Need for Project

The proposed project is intended to address the following needs:

- Traffic congestion along the existing facility is expected to worsen in the future. Traffic volumes are projected to increase up to 66 percent. By 2040, almost all segments of NC 211 within the project limits will exceed the roadway's capacity in at least one peak hour.
- Travel delays occur along the existing facility. Traffic volumes and sight distance limitations due to the horizontal and vertical alignment of the roadway limit passing opportunities.
- Roadway deficiencies include narrow travel lanes and shoulders with inadequate clear zones. In addition, there are sight distance limitations due to the horizontal and vertical alignment in some sections of the roadway, as well as problems with the alignment of intersecting roadways.
- The non-fatal injury crash rate along NC 211 within the project limits exceeds the critical crash rate. The total and fatal crash rates along NC 211 are higher than the statewide crash rate for similar facilities, although they are lower than the critical crash rate.
- Two at-grade railroad crossings expose vehicles to potential conflicts with trains. One of these railroad crossings is in the middle of an intersection.

Traffic Carrying Capacity

Current (2015) NC 211 traffic volumes within the study area range from 4,200 vehicles per day (vpd) to 13,600 vpd. In 2040, traffic volumes are projected to increase approximately 62 to 66 percent, ranging from 6,900 vpd to 22,300 vpd.

Capacity analysis indicates some segments of NC 211 within the study area were determined to operate at capacity (LOS E) in the year 2015. Overall traffic operations for this two-lane roadway are affected by following time, which refers to time spent by vehicles following one another due to the inability to pass. Percent time-spent-following (PTSF)² is greater than 50 percent for a majority of segments. By the year 2040, the analysis results show a predicted decline in LOS, with 20 of the 21 segments operating at LOS E in at least one peak hour. The PTSF is expected to increase with several segments having PTSF greater than 80 percent, affecting operations along NC 211. Arterial travel time results extracted from *SimTraffic* indicate an expected increase by approximately 5 to 7 percent, depending on the direction of travel and peak hour. In addition, average travel speed is anticipated to continue to decline from current conditions.

Traffic capacity analysis results³ are shown in Table 1.

¹ A Comprehensive Transportation Plan for Moore County is currently being developed. Completion is expected in Spring 2018.

² The 2016 Highway Capacity Manual uses PTSF as a primary LOS measure for two-lane highways.

³ Traffic capacity analysis results (April 3, 2017) are draft and subject to change.

Table 1. No-Build HCS 2010 Two-Lane Highway Analysis Results (Eastbound, PM Peak)

Location Description	2015			2040		
	Average Travel Speed (mph)	PTSF (%)	LOS	Average Travel Speed (mph)	PTSF (%)	LOS
Between US 15-501 and Glasgow St.	41.1	60.7	D	39.9	68.7	E
Between Glasgow St. and Keyser St.	39.3	60.9	E	38.1	68.5	E
Between Keyser St. and E. South St.	43.1	60.7	D	42.0	67.4	D
Between E. South St. and E. Main St.	38.1	68.9	E	35.9	79.0	E
Between E. Main St. and Pee Dee Rd.	36.3	73.8	E	33.2	84.9	E
Between Pee Dee Rd. and E. Indiana Ave.	34.0	74.2	E	29.6	86.1	E
Between E. Indiana Ave. and Carolina Rd.	32.2	82.0	E	23.9	92.6	E
Between Carolina Rd. and Hoke County Line	36.2	75.2	E	31.0	88.0	E
Between Hoke County Line and Reservation Rd.	45.8	76.2	D	40.8	88.0	E
Between Reservation Rd. and Ashemont Rd.	44.8	74.8	D	40.3	86.7	E
Between Ashemont Rd. and Old NC 211(1)	50.5	77.3	D	47.3	87.0	E
Between Old NC 211(1) and Old NC 211(2)	51.1	73.4	D	46.7	87.0	E
Between Old NC 211(2) and Plank Rd.	49.0	79.0	D	45.4	89.7	E
Between Plank Rd. and Montrose Rd.	46.4	73.8	D	43.2	86.3	E
Between Montrose Rd. and Equestrian Way	49.6	69.3	D	46.0	82.8	E
Between Equestrian Way and Calloway Rd.	50.6	69.6	D	46.9	83.9	E
Between Calloway Rd. and Fulford McMillan Rd.	47.5	75.9	D	44.3	88.3	E
Between Fulford McMillan Rd. and Turnpike Rd.(1)	49.6	70.9	D	45.5	84.6	E
Between Turnpike Rd.(1) and Turnpike Rd.(2)	48.0	78.9	D	44.3	89.9	E
Between Turnpike Rd.(2) and Mockingbird Hill Rd.	48.9	72.2	D	46.1	83.8	E
East of Mockingbird Hill Rd.	36.3	57.4	E	34.3	69.3	E

HCS – Highway Capacity Software

PTSF – Percent Time Spent Following

Description of Existing Facility

NC 211 traverses the Sandhills and Coastal Plain region of the state generally in a southeast/northwest direction. Within the study area, NC 211 is currently classified by NCDOT as a minor arterial with no access control. The roadway is typically a two-lane shoulder section with turn lanes at some intersections. The posted speed limit along NC 211 is 45 mph in Moore County and 55 mph in Hoke County. Within the project limits there are 74 intersections, including five signalized intersections, and numerous driveway connections.

With a rail line from Aberdeen to Fayetteville, the Aberdeen & Rockfish Railroad follows the NC 211 corridor between Aberdeen and Raeford. There are two at-grade NC 211 rail crossings within the project limits: just east of the NC 211 intersection with SR 2063 (Pee Dee Road) and at the NC 211 intersection with SR 1228 (Reservation Road). The at-grade crossing at the NC 211 intersection with Reservation Road is of concern, as the railroad crosses diagonally through the intersection.

The current typical section on NC 211 includes narrow travel lanes (11 feet) and shoulders with clear zone issues in several locations. There are also sight distance limitations due to the horizontal and vertical alignment in some sections of the project. Based on the current posted speed limit, 32 deficient vertical curves (crests and sags) were identified along NC 211. In addition, the signalized NC 211 intersections with SR 2075 (Indiana Avenue) and SR 2077 (Carolina Road) are closely-spaced, off-set intersections.

Safety

The NCDOT Traffic Safety Unit provided crash data for a five-year period (May 2011 to April 2016) for NC 211 within the project limits. Crash rates are based on average daily traffic, the length of the roadway segment, and the number of recorded crashes that occurred there. Accident rates are stated in the number of crashes per 100 million vehicle miles of travel. The critical crash rate is a statistically derived number that can be used to identify or screen for high accident locations.

During the five-year analysis period, 451 crashes were reported along this approximately 15-mile section of NC 211. (See Table 2.) While the total crash rate is lower than the critical crash rate, the non-fatal injury crash rate is slightly higher than the critical crash rate for similar facilities. Approximately 36 percent of the crashes along this section of NC 211 were injury crashes, including five crashes with eight fatalities. Rear end, slow or stop crashes were the most common crash type, accounting for 30 percent of total crashes. Rear end crashes are typically associated with congested conditions. Run off road and fixed object crashes, which can also be associated with congested conditions, account for more than 15 percent of total crashes. (See Table 3.)

Vertical curve deficiencies result in poor sight distance, which may contribute to the higher crash rates. Adequate sight distance allows a driver time to react to a hazard in the roadway over the top (crest) or bottom (sag) of a hill and bring the vehicle to a complete stop. At night, adequate sight distance allows a vehicle's headlight beam to shine a distance equal to the stopping sight distance for that vehicle.

While crashes occurred along the entire facility, the highest number of crashes occurred at the following NC 211 intersections: US 15-501, Pee Dee Road/East Main Street, Indiana Avenue/Carolina Road and SR 1219 (Army Road)/Plank Road. Most of the crashes at the NC 211 intersections with US 15-501 and with Indiana Avenue/Carolina Road were rear end crashes. Angle crashes accounted for most of the crashes at the intersection with Pee Dee Road/East Main Street. At the NC 211 intersection with Army Road/Plank Road, the predominant crash types were turning, angle, or sideswipe crashes.

Table 2. NC 211 Crash Rate Comparison (2011 to 2016)

	Crashes	Crashes per 100MVM	Statewide Rate ¹	Critical Rate ²
Total	451	170.88	169.17	182.53
Fatal	5	1.89	1.81	3.36
Non-Fatal Injury	156	59.11	51.02	58.44
Night	142	53.80	67.80	76.33
Wet	68	25.76	26.76	32.19

¹ 2012-2014 statewide crash rate for 2-lane undivided rural North Carolina (NC) routes

² Based on the statewide crash rate (95% level of confidence).

Source: NCDOT Traffic Safety Unit

Table 3. NC 211 Crash Type (2011 to 2016)

Crash Type	Number	Percentage
Rear End	138	30.6%
Animal	90	20.0%
Run Off Road & Fixed Object	70	15.5%
Angle	39	8.6%
Left Turn	30	6.7%
Side Swipe	28	6.2%
Head On	9	2.0%
Right Turn	5	1.1%
Other ¹	42	9.3%
Total	451	100.0%

¹ "Other" crash types include movable object, overturn/rollover, parked motor vehicle, backing up, other non-collision, and other collision with vehicle.

Source: NCDOT Traffic Safety Unit

Other Highway Projects in the Area

In addition to STIP Project No. R-5709, the draft 2017-2027 STIP also includes the following roadway projects in the vicinity:

- R-5827: US 15-501, US 401 in Laurinburg to US 1 in Aberdeen. Widen to multilanes. (ROW 2024, Construction 2027)
- U-5815: US 1 (Sandhills Boulevard). Old US 1 to SR 1112 (Roseland Road) in Aberdeen. Access management improvements. (ROW 2019, Construction 2021)
- U-5756: NC 5, US 1 in Aberdeen to south city limits of Pinehurst. Construct turn lanes and add paved shoulders. (ROW 2023, Construction 2025)

These STIP projects are shown on Figure 2.

Concurrence Point 2: Detailed Study Alternatives Carried Forward

Project Alternatives

The following alternatives do not meet the project's purpose and need and are recommended for elimination from further consideration:

- No-Build Alternative - The No-Build Alternative would not provide any improvements to NC 211 in the study area except for routine maintenance. The No-Build Alternative would not incur right of way or construction costs. There would be no impacts to streams, wetlands, or other natural and cultural resources, nor any residential or business relocations. The No-Build Alternative would not reduce traffic congestion and travel delays, improve safety and correct roadway deficiencies along NC 211 within the project limits. While the No-Build Alternative is recommended for elimination, it provides a baseline for comparing the adverse impacts and benefits of the Build Alternatives and will be included in the Environmental Assessment.
- Mass Transit Alternative - The Mass Transit Alternative considered forms of transportation other than the single-occupancy passenger vehicle. Mass transit is not available along NC 211 in Moore and Hoke Counties because of lack of demand, low population density, diffused employment centers, and diversity of trip origins and destinations. For these reasons, mass transit will not capture the requisite number of person trips to make this alternative a reasonable and feasible alternative.
- Transportation Systems Management Alternative - Transportation System Management Alternative improvements typically involve low-cost, minor transportation improvements to increase the capacity of an existing facility, and do not include reconstructing or adding additional through lanes to the existing highway. Transportation System Management improvements on NC 211 in the study area, such as the addition of turn lanes, signalization, and minor realignments, would not noticeably reduce congestion and travel delays. Furthermore, this alternative would not fully correct roadway deficiencies.

To satisfy the purpose and need for the project, NC 211 would be widened to a four-lane, median divided facility. The typical section would include:

- A 30-foot wide, raised grass-median with use of a curb and gutter section is anticipated through the lower speed sections of NC 211 in Aberdeen and Moore County where more residential and commercial development is located close to the existing roadway. Bicycle lanes are proposed, consistent with the Aberdeen Bicycle Plan.
- A 46-foot wide, depressed grass-median shoulder section is proposed for the higher speed, more rural sections of NC 211 from the Moore/Hoke County line to the eastern project limit.

Widening of NC 211 would occur on either side of the roadway (asymmetrical) or a combination ("best fit"). In locations where NC 211 is adjacent to railroad right of way, a track realignment may be required

to facilitate widening toward the railroad. In order to determine a “best fit” alignment, the project corridor is divided into 15 sections. (See Figures 3 – 28.) Widening to the north and widening to the south were considered for all the sections except for Sections 12 and 13. Only widening to the south is being considered in these sections because widening to the north would affect the Calloway Nature Park, which was developed with funding from NCDOT as mitigation for impacts to red-cockaded woodpecker.

Options for grade-separated railroad crossings and/or the realignment of intersecting roadways are presented for the following sections:

- Section 2: Option 2A includes an at-grade railroad crossing; Option 2B includes NC 211 bridges over the railroad
- Section 3: Option 3A realigns Indiana Avenue to intersect NC 211 at the existing Carolina Road intersection; Option 3B realigns Indiana Avenue to increase the distance from the existing Carolina Road intersection
- Section 6: Option 6A includes a railroad bridge over the existing NC 211 intersection with Reservation Road; Option 6B realigns Reservation Road to provide two, three-legged intersections away from the railroad intersection (no grade separation); Option 6C proposes NC 211 bridges over the railroad with NC 211 and Reservation Road on new alignment (removing the at-grade railroad crossing); and Option 6D proposes NC 211 bridges over the railroad with NC 211 on new alignment (maintaining the Reservation Road at-grade railroad crossing)

Superstreet concepts and access management will be considered along the project (e.g., use of right-in/right-out and consolidation of access points where access is also available along another roadway or a second access point is located along NC 211).

Table 4, provided on pages 7 and 8, compares the widening options.

Sources

Fayetteville Area Metropolitan Planning Organization. 2017. <http://fampo.org>. Accessed April 2017.

Lumber River Rural Planning Organization. 2017. www.lumberrivercog.org/rural-transportation-planning. Accessed April 2017.

NCDOT. 2017. Moore County Comprehensive Transportation Plan. www.ncdot.gov/projects/moorechoices/. Accessed March 2017.

NCDOT. 2016. Hoke County Comprehensive Transportation Plan. https://connect.ncdot.gov/projects/planning/Pages/CTP-Details.aspx?study_id=Hoke%20County. Accessed March 2017.

Triangle Area Rural Planning Organization. 2017. www.tarpo.org. Accessed April 2017.

Table 4. Alternative Comparisons (based on conceptual design and estimated right of way limits)

Sheet No.	Section No.	Length (miles)	Widening Side	Relocations				Right of Way Impacts ¹				Stream Crossings	Delineated Streams (lin. ft)	Delineated Wetlands (ac.)	Federally Protected Species Present ²	Red-cockaded woodpecker – Foraging Habitat (ac)	Comments – Community Facilities
				Total	Home	Business	Church	Community Facilities	Cemetery	USTs / Junk Yard							
4	1	0.65	North	5	1	3	1	-	-	4	3	220	0.9	No	-		
			South	7	3	3	1	-	-	4	3	245	0.4	No	-		
4, 5	2A	1.29	North	27	19	8	-	2	1	1	-	-	-	No	-	churches	
			South	14	5	7	2	-	1	1	-	-	-	No	-		
4, 6	2B	1.29	North	28	19	9	-	2	1	1	-	-	-	No	-	churches	
			South	16	7	7	2	-	1	1	-	-	-	No	-		
6, 7	3A	0.97	North	7	3	3	1	1	-	4	-	-	-	No	-	Crestline Fire Department	
6, 8			South	15	10	4	1	-	-	4	-	-	-	No	-		
6, 9	3B	0.97	North	6	2	3	1	1	-	4	-	-	-	No	-	Crestline Fire Department	
6, 10			South	15	10	4	1	-	-	4	-	-	-	No	-		
10, 11	4	0.48	North	2	2	-	-	-	-	-	-	35	0.1	No	-		
			South	6	6	-	-	-	-	-	-	-	60	0.4	No	-	
11	5	0.72	North	2	2	-	-	1	-	1	2	500	0.4	No	-	dam	
			South	2	2	-	-	-	-	1	1	190	0.3	No	-		
11, 12, 19	6A	1.29	North	9	8	1	-	1	-	1	1	140	0.2	No	-	church	
			South	7	6	-	1	-	-	1	1	140	0.1	No	-		
11, 13, 19	6B	1.29	North	9	8	1	-	1	-	1	-	-	0.1	No	-	church	
11, 14, 19			South	7	6	-	1	-	-	1	-	-	<0.1	No	-		
11, 15, 19	6C	1.33	North	6	6	-	-	1	-	-	-	-	-	No	-	church	
11, 16, 19			South	7	7	-	-	1	-	-	-	-	-	No	-	church	
11, 17, 19	6D	1.33	North	5	5	-	-	1	-	-	-	-	-	No	-	church	
11, 18, 19			South	5	5	-	-	1	-	-	-	-	-	No	-	church	
19, 20	7	1.49	North	5	2	3	-	-	-	1	-	-	-	No	9.1		
			South	7	6	1	-	-	-	1	-	-	-	-	No	8.5	
20, 21	8	1	North	-	-	-	-	1	-	-	-	14	-	No	6.0	Hoke Correctional Institution	
			South	-	-	-	-	-	-	-	-	125	-	No	5.3		
21, 22	9	1.58	North	5	4	1	-	2	1	1	-	-	-	No	5.4	church, Hoke Correctional Institution	
			South	8	7	1	-	1	1	1	-	-	-	-	No	1.8	church
23	10	0.81	North	9	6	3	-	-	-	2	-	-	-	No	-		
			South	7	16	1	-	-	-	1	-	-	-	-	No	-	

Table 4. Alternative Comparisons (based on conceptual design and estimated right of way limits)

Sheet No.	Section No.	Length (miles)	Widening Side	Relocations				Right of Way Impacts ¹				Delineated Streams (lin. ft)	Delineated Wetlands (ac.)	Federally Protected Species Present ²	Red-cockaded woodpecker – Foraging Habitat (ac)	Comments – Community Facilities
				Total	Home	Business	Church	Community Facilities	Cemetery	USTs / Junk Yard	Stream Crossings					
23, 24	11	0.5	North	10	10	-	-	1	1	-	1	130	0.9	No	-	church
			South	3	2	-	1	-	1	-	1	135	0.9	No	-	
24, 25	12	1.24	North													
			South	3	3	-	-	-	-	-	-	-	-	-	No	
25	13	0.59	North													
			South	-	-	-	-	-	-	-	-	-	<0.1	No	-	
25, 26	14	0.44	North	1	1	-	-	-	-	-	-	-	-	No	-	
			South	3	3	-	-	-	-	-	-	-	-	-	No	
26, 27, 28	15	2.55	North	14	8	4	2	3	-	4 ³	-	-	-	No	-	2 churches, West Hoke Middle School church, West Hoke Middle School
			South	20	16	2	2	2	-	4 ³	-	-	-	No	-	
Totals			North	93 - 96	63 - 66	25 - 27	4	12	3	18 - 19	6 - 7	1,010 - 1,150	2.3 - 2.5	No	20.5	
			South	102 - 104	75 - 78	19	7 - 8	3 - 4	3	17 - 18	5 - 6	755 - 895	2.0 - 2.1	No	15.6	

Information is preliminary and subject to change.

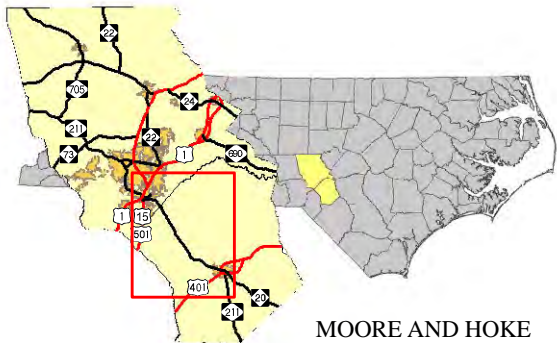
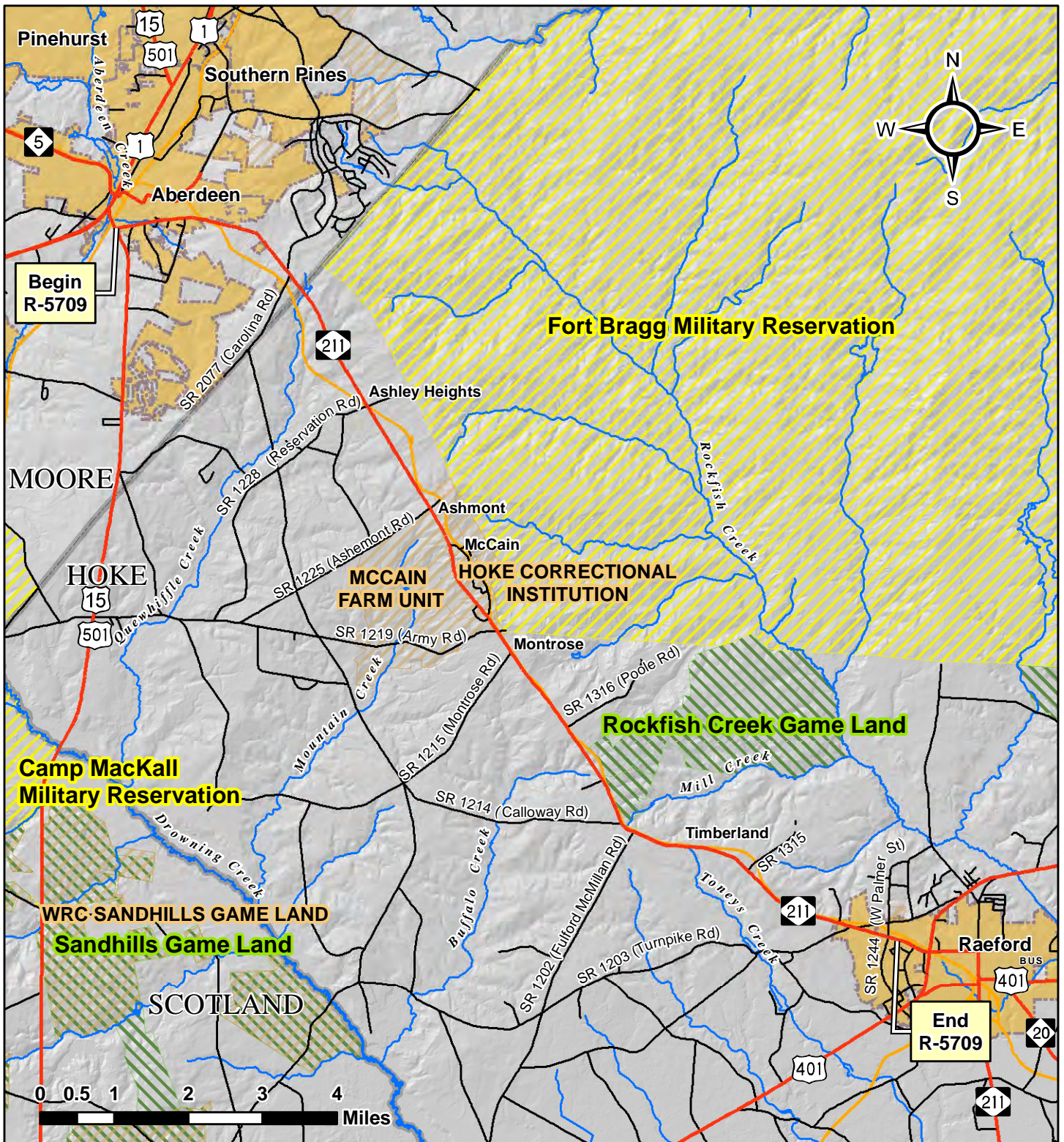
Notes:

¹Two properties listed in the National Register of Historic Places are within the study area; however, these properties are not adjacent to NC 211 and right of way impacts are not expected based on current designs.

Surveys are nearing completion to determine if any additional properties within the study area are eligible for listing in the National Register.

² Federally protected species: Saint Francis' satyr butterfly, Cape Fear shiner, American chaffseed, Michaux's sumac, and Rough-leaved loosestrife.

³ Includes one junkyard.



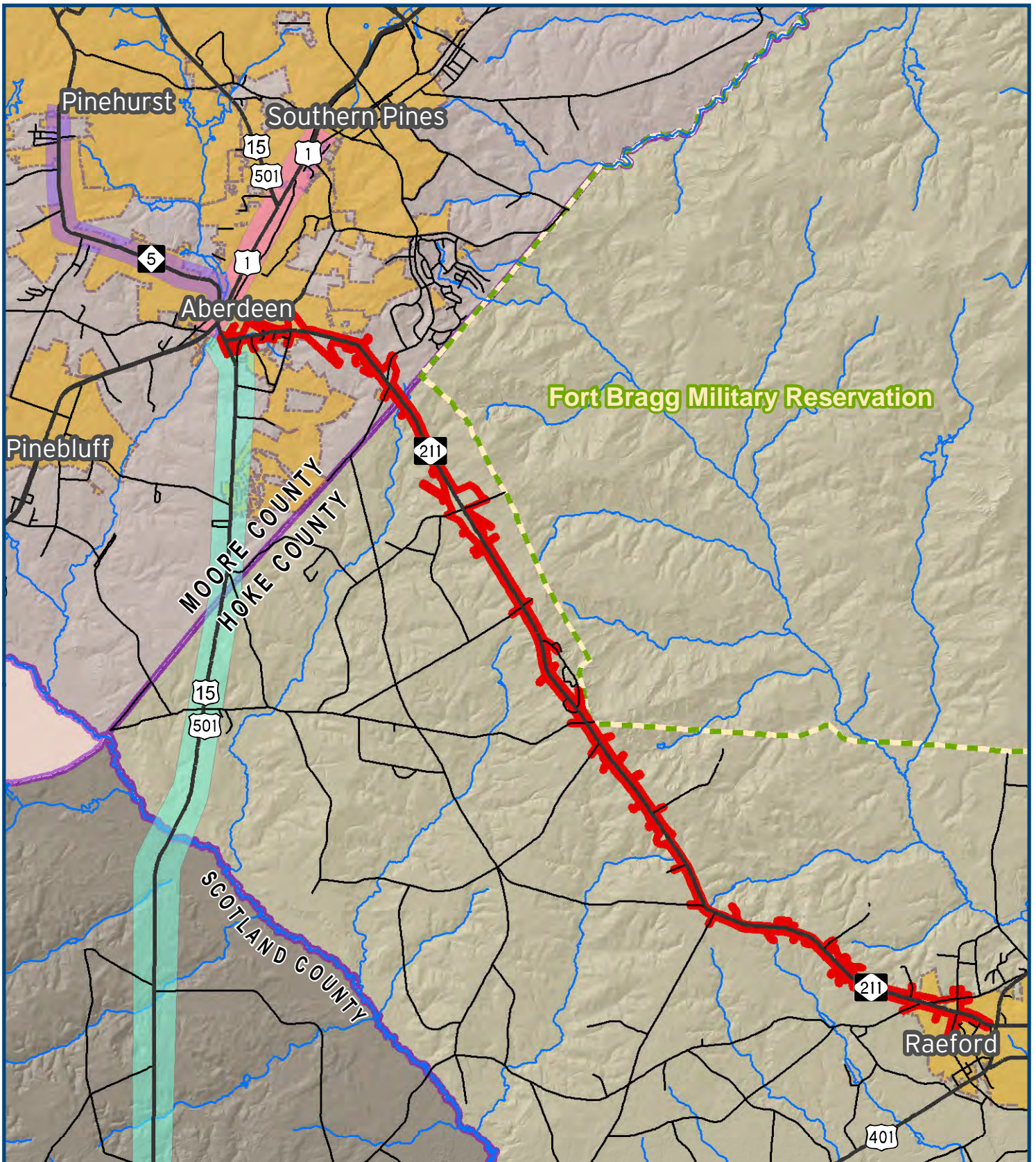
NORTH CAROLINA DEPARTMENT OF
TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT &
ENVIRONMENTAL ANALYSIS UNIT



**VICINITY
NC 211**

FROM US 15 - 501 IN ABERDEEN
TO SR 1244 - SR 1311 IN RAEFORD,
MOORE, AND HOKE COUNTIES
STIP PROJECT R-5709

**FIGURE
1**



- R-5709 Study Area
- Fort Bragg Boundary

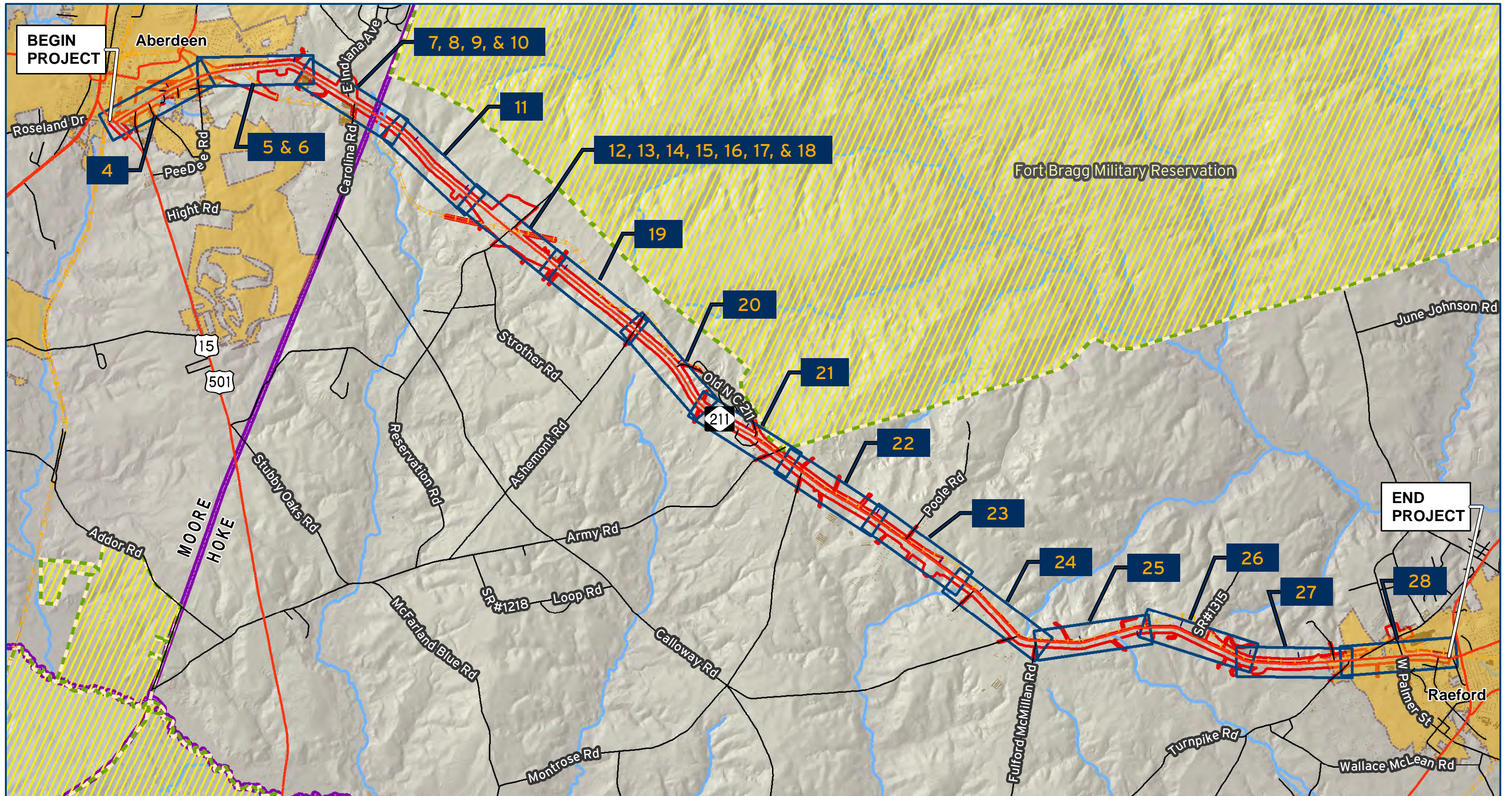
Adjacent Projects

- R-5827
- U-5756
- U-5815

**ADJACENT PROJECTS
NC 211**

FROM US 15 - 501 IN ABERDEEN
TO SR 1244 - SR 1311 IN RAEFORD,
MOORE, AND HOKE COUNTIES
STIP PROJECT R-5709

**FIGURE
2**



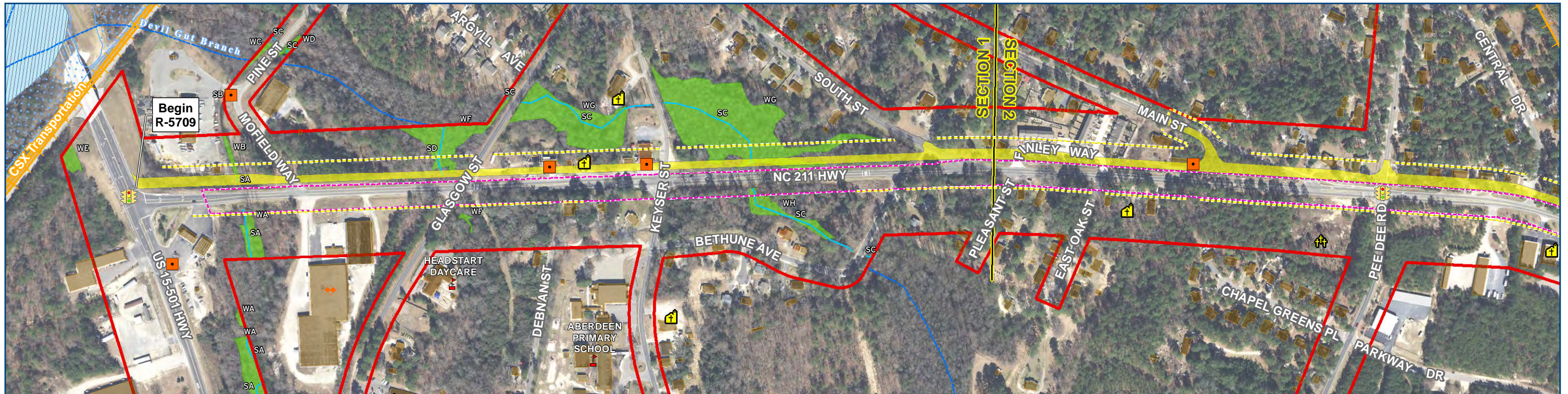
- Study Area
- Figure Borders
- Municipal Boundaries
- Federally Owned Lands
- Railroad
- County Line

**INDEX
NC 211**
FROM US 15 - 501 IN ABERDEEN
TO SR 1244 - SR 1311 IN RAEFORD,
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STIP PROJECT R-5709

**FIGURE
3**

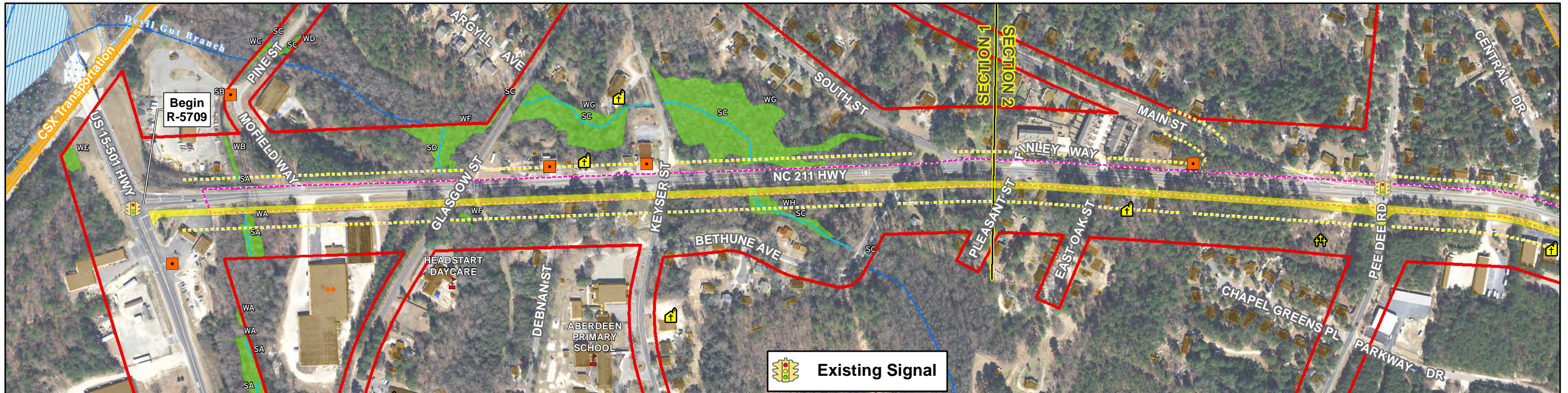
NORTH ALTERNATIVE NC 211

















SECTIONS 1 AND 2



SOUTH ALTERNATIVE NC 211

SECTIONS 1 AND 2



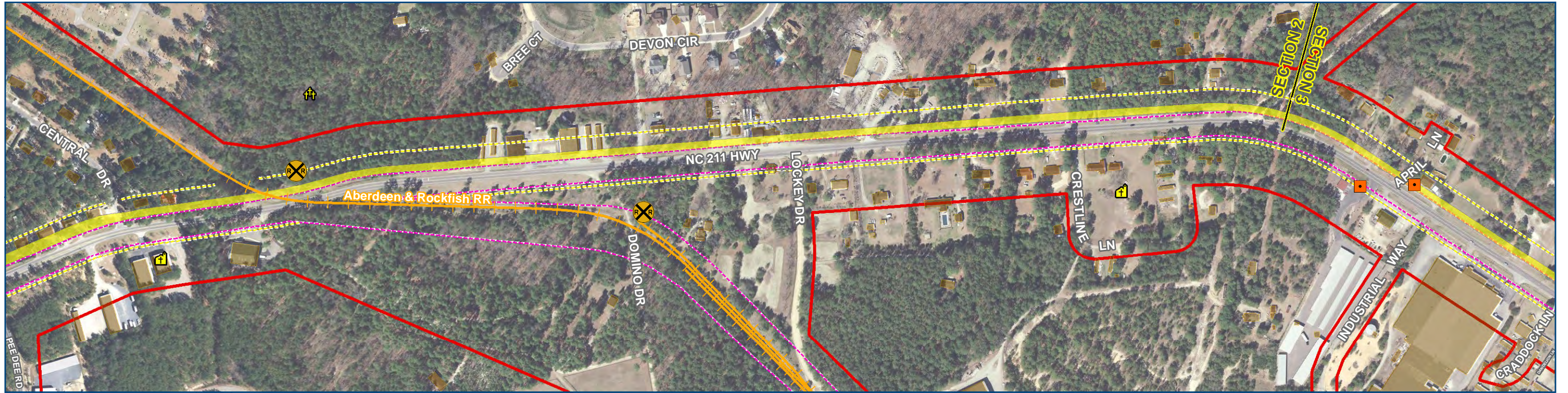
 0 200 400 Feet	 Study Area	 Fort Bragg Boundary	 USGS Streams
	 New Pavement	 FEMA Floodway	 Hazardous Waste Site
	 Potential Impact Area	 100 Year Floodplain	 UST
	 Proposed Rail Realignment	 Delineated Wetlands	 Cemetery
	 Existing Right-Of-Way	 Delineated Streams	 Church

ALTERNATIVES
NC 211
 FROM US 15 - 501 IN ABERDEEN
 TO SR 1244 - SR 1311 IN RAEFORD,
 MOORE, AND HOKE COUNTIES
 STIP PROJECT R-5709

FIGURE
4

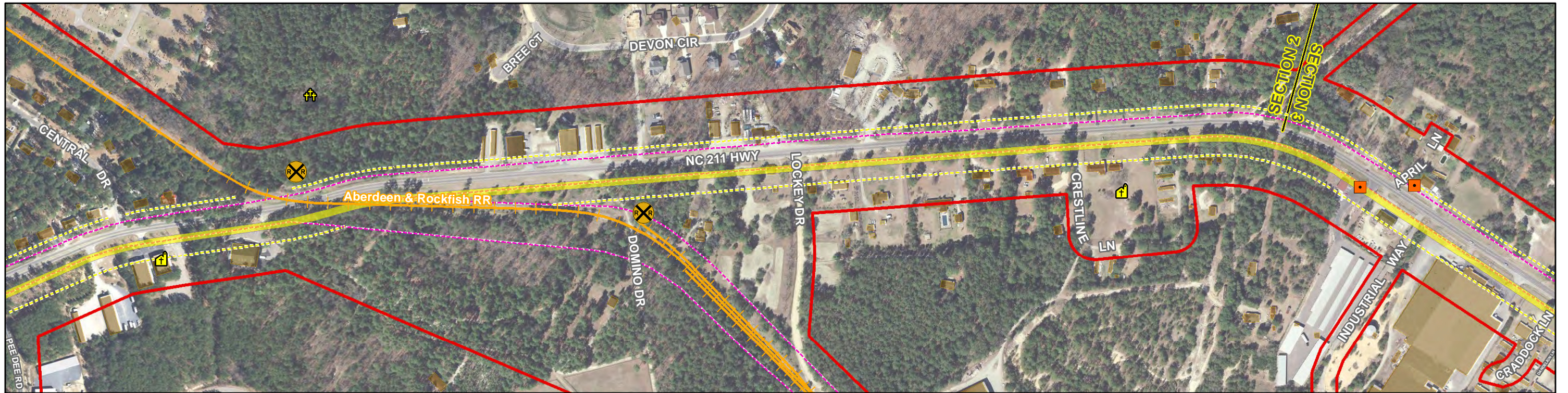
NORTH ALTERNATIVE OPTION 2A - NC 211 AT-GRADE RAILROAD CROSSING

















SECTIONS 2 AND 3



SOUTH ALTERNATIVE OPTION 2A - NC 211 AT-GRADE RAILROAD CROSSING

SECTIONS 2 AND 3



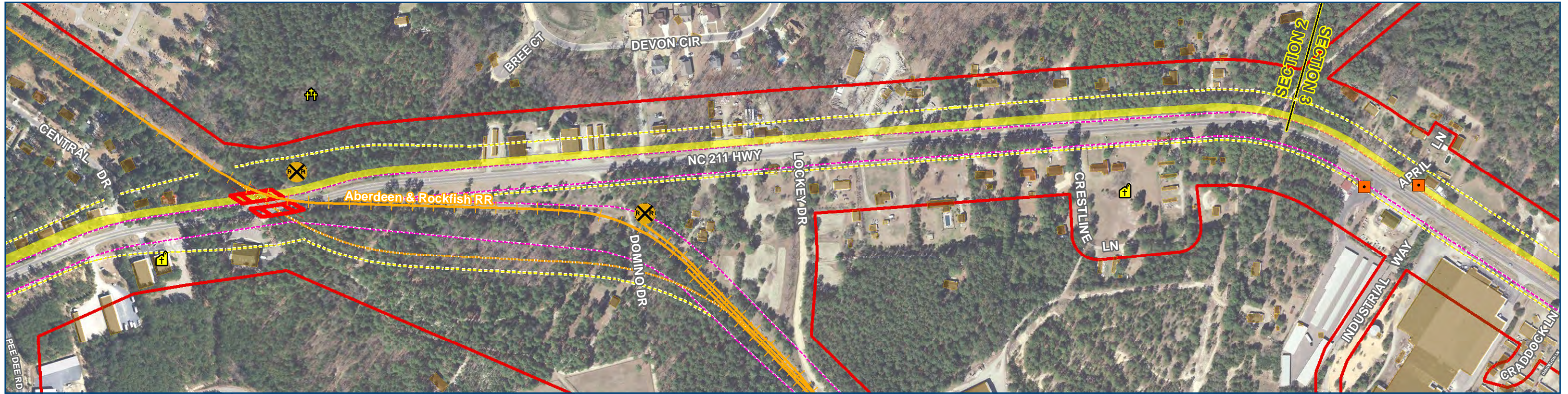
 0 200 400 Feet	 Study Area	 Fort Bragg Boundary	 USGS Streams
	 New Pavement	 FEMA Floodway	 Hazardous Waste Site
	 Potential Impact Area	 100 Year Floodplain	 UST
	 Proposed Rail Realignment	 Delineated Wetlands	 Cemetery
	 Existing Right-Of-Way	 Delineated Streams	 Church

ALTERNATIVES
NC 211
 FROM US 15 - 501 IN ABERDEEN
 TO SR 1244 - SR 1311 IN RAEFORD,
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FIGURE
5

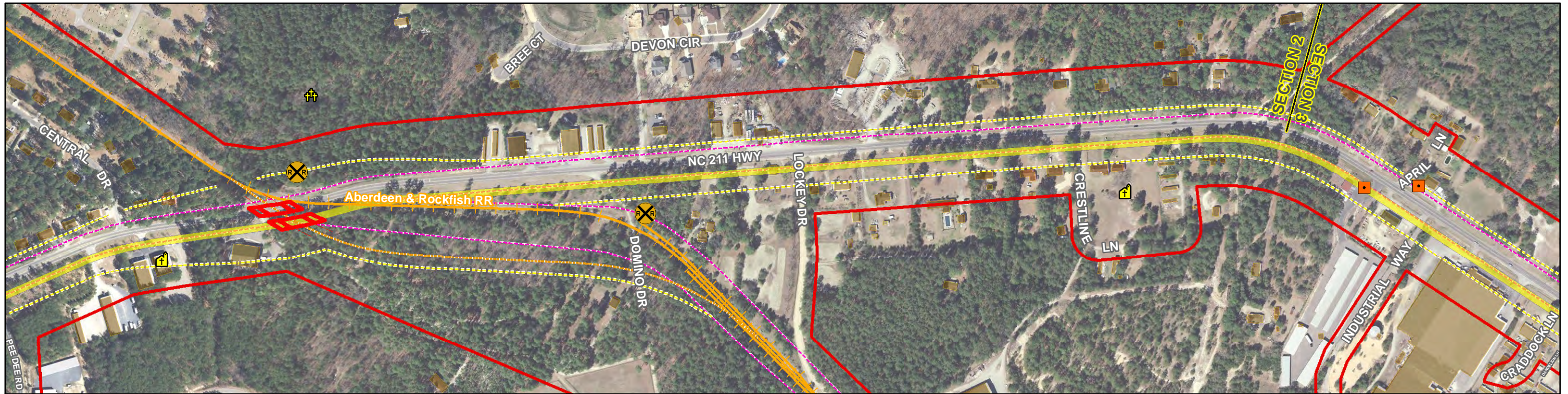
NORTH ALTERNATIVE OPTION 2B - NC 211 OVER RAILROAD

















SECTIONS 2 AND 3



SOUTH ALTERNATIVE OPTION 2B - NC 211 OVER RAILROAD

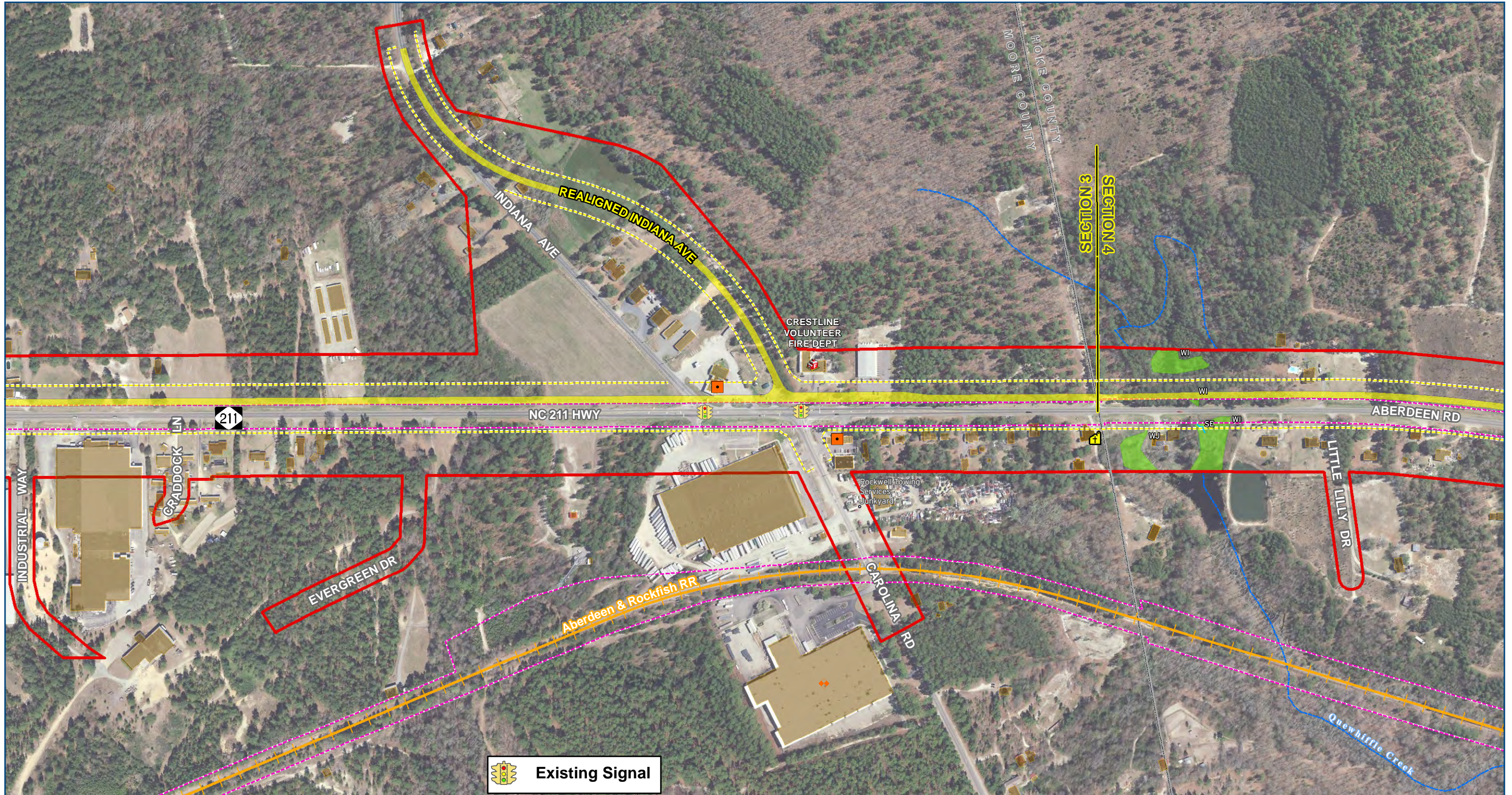
SECTIONS 2 AND 3



 0 200 400 Feet	 Study Area	 Fort Bragg Boundary	 USGS Streams
	 New Pavement	 FEMA Floodway	 Hazardous Waste Site
	 Potential Impact Area	 100 Year Floodplain	 UST
	 Proposed Rail Realignment	 Delineated Wetlands	 Cemetery
	 Existing Right-Of-Way	 Delineated Streams	 Church

ALTERNATIVES
NC 211
 FROM US 15 - 501 IN ABERDEEN
 TO SR 1244 - SR 1311 IN RAEFORD,
 MOORE, AND HOKE COUNTIES
 STIP PROJECT R-5709

FIGURE
6

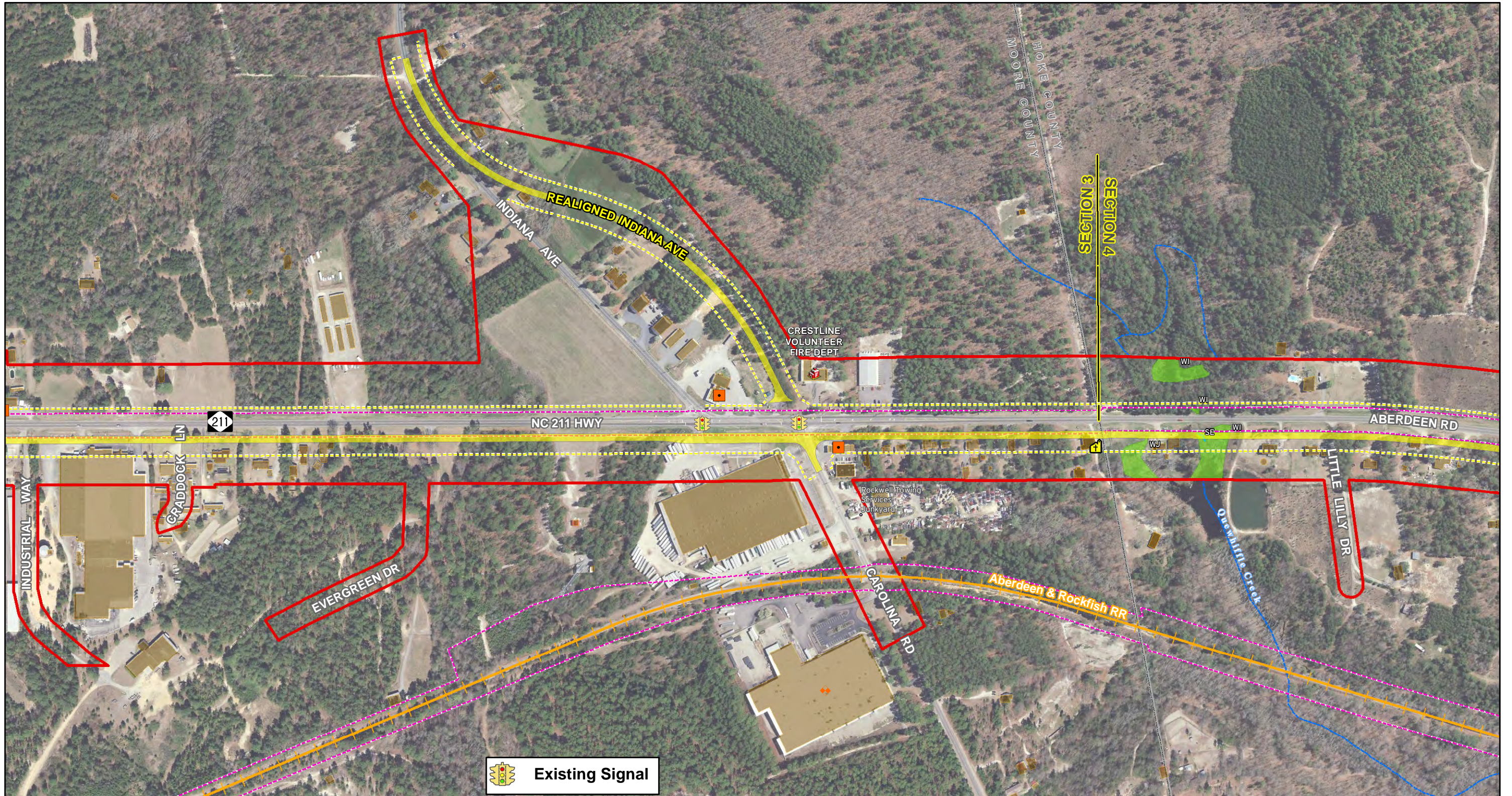


0 200 400 Feet

Study Area	Fort Bragg Boundary	USGS Streams
New Pavement	FEMA Floodway	Hazardous Waste Site
Potential Impact Area	100 Year Floodplain	UST
Proposed Rail Realignment	Delineated Wetlands	Cemetery
Existing Right-Of-Way	Delineated Streams	Church
Existing Signal		

ALTERNATIVES
NC 211
 FROM US 15 - 501 IN ABERDEEN
 TO SR 1244 - SR 1311 IN RAEFORD,
 MOORE, AND HOKE COUNTIES
 STIP PROJECT R-5709

FIGURE
7

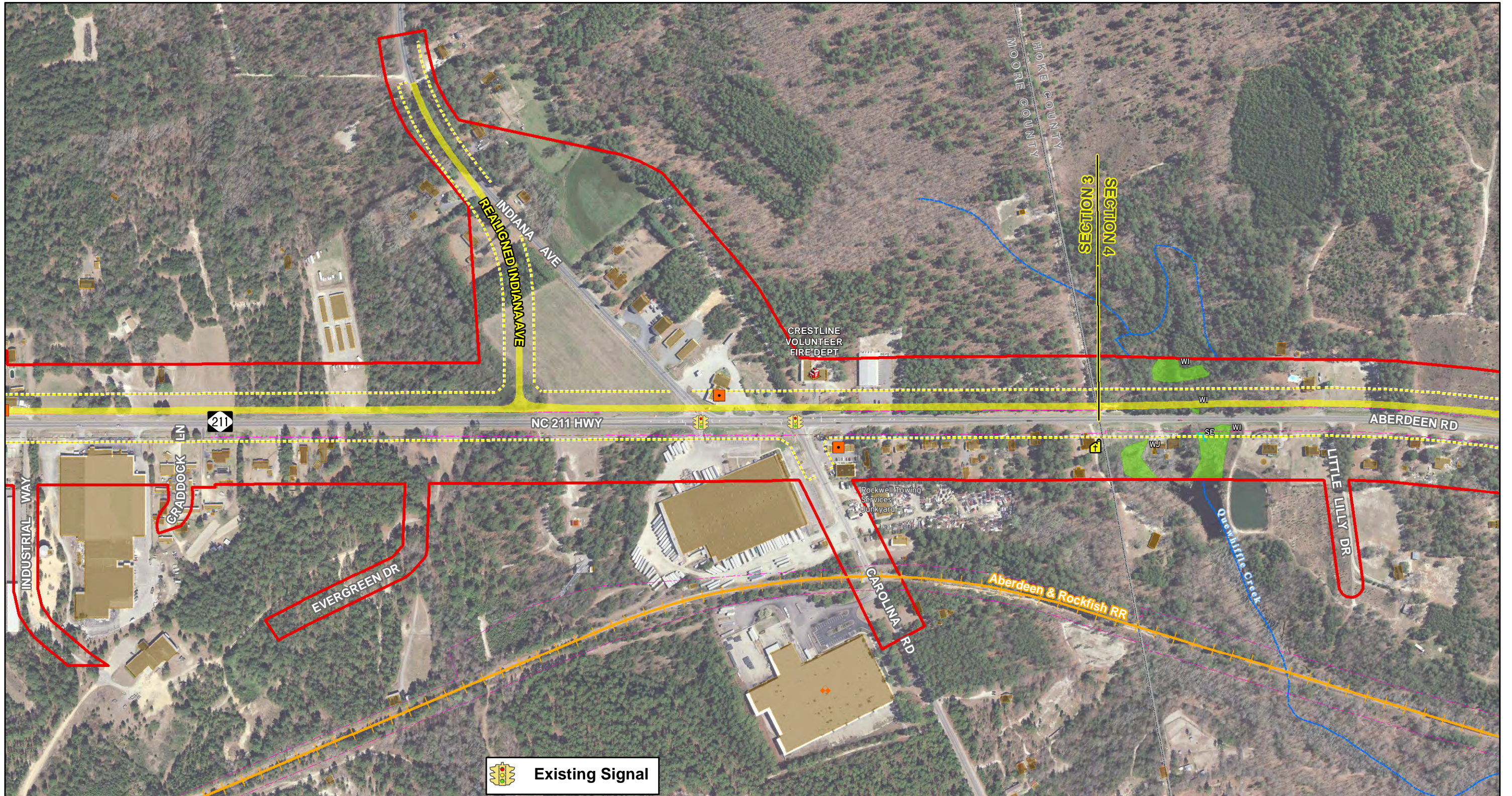


0 200 400 Feet

Study Area	Fort Bragg Boundary	USGS Streams
New Pavement	FEMA Floodway	Hazardous Waste Site
Potential Impact Area	100 Year Floodplain	UST
Proposed Rail Realignment	Delineated Wetlands	Cemetery
Existing Right-Of-Way	Delineated Streams	Church

ALTERNATIVES
NC 211
 FROM US 15 - 501 IN ABERDEEN
 TO SR 1244 - SR 1311 IN RAEFORD,
 MOORE, AND HOKE COUNTIES
 STIP PROJECT R-5709

FIGURE
8

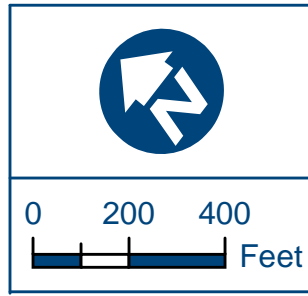
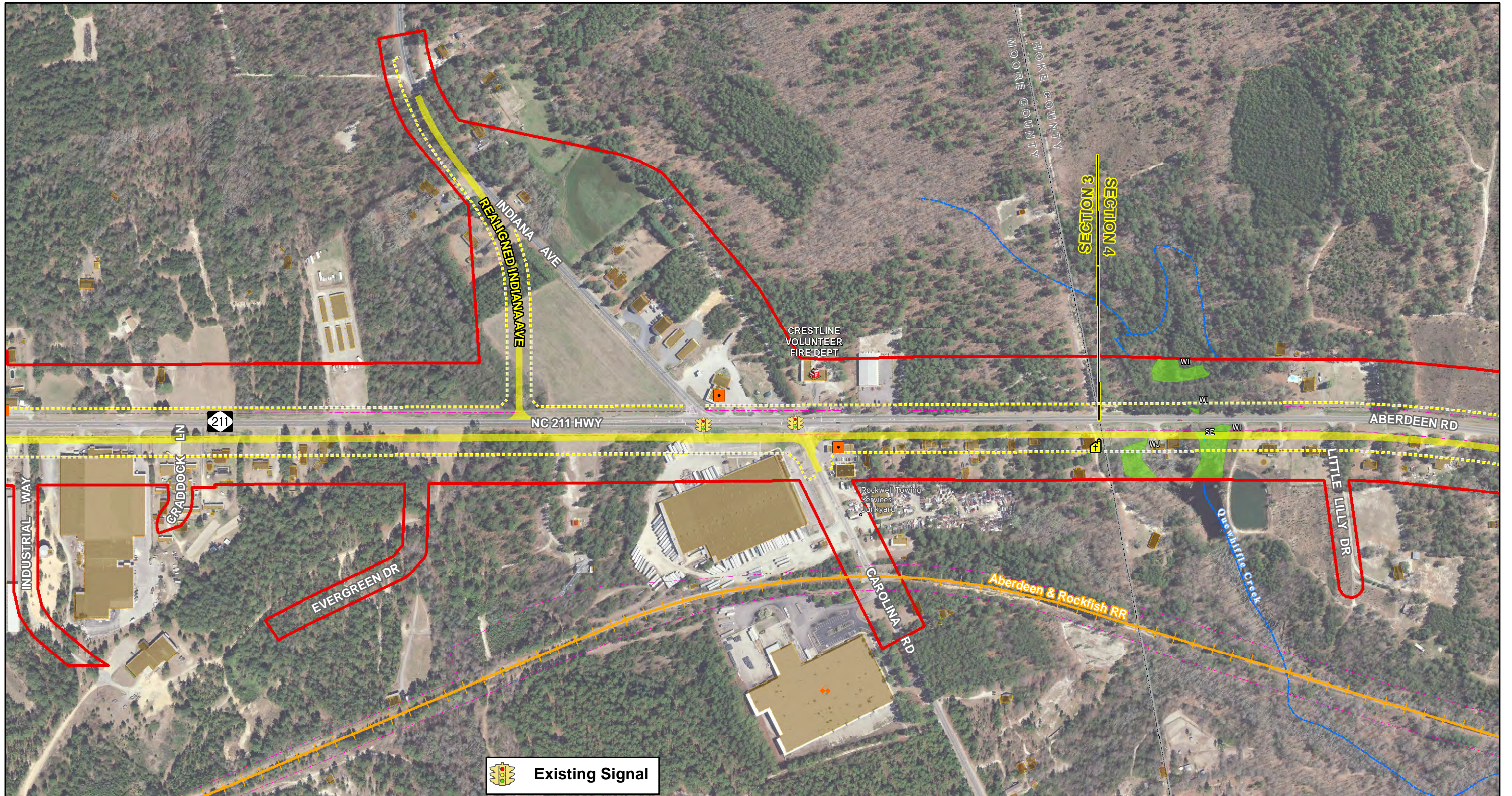


0 200 400 Feet

Study Area	Fort Bragg Boundary	USGS Streams
New Pavement	FEMA Floodway	Hazardous Waste Site
Potential Impact Area	100 Year Floodplain	UST
Proposed Rail Realignment	Delineated Wetlands	Cemetery
Existing Right-Of-Way	Delineated Streams	Church
Existing Signal		

ALTERNATIVES
NC 211
 FROM US 15 - 501 IN ABERDEEN
 TO SR 1244 - SR 1311 IN RAEFORD,
 MOORE, AND HOKE COUNTIES
 STIP PROJECT R-5709

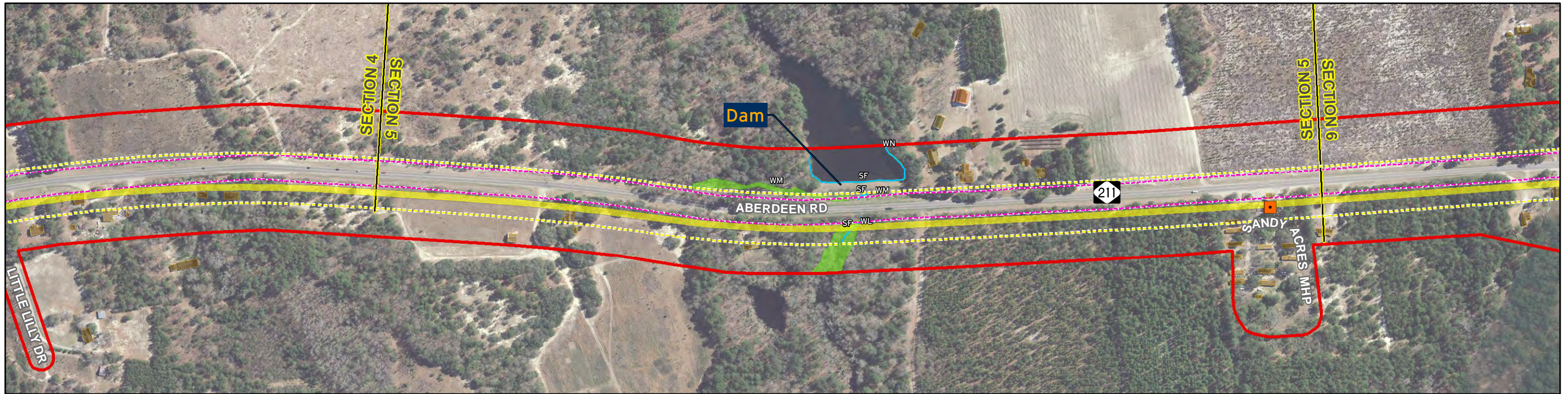
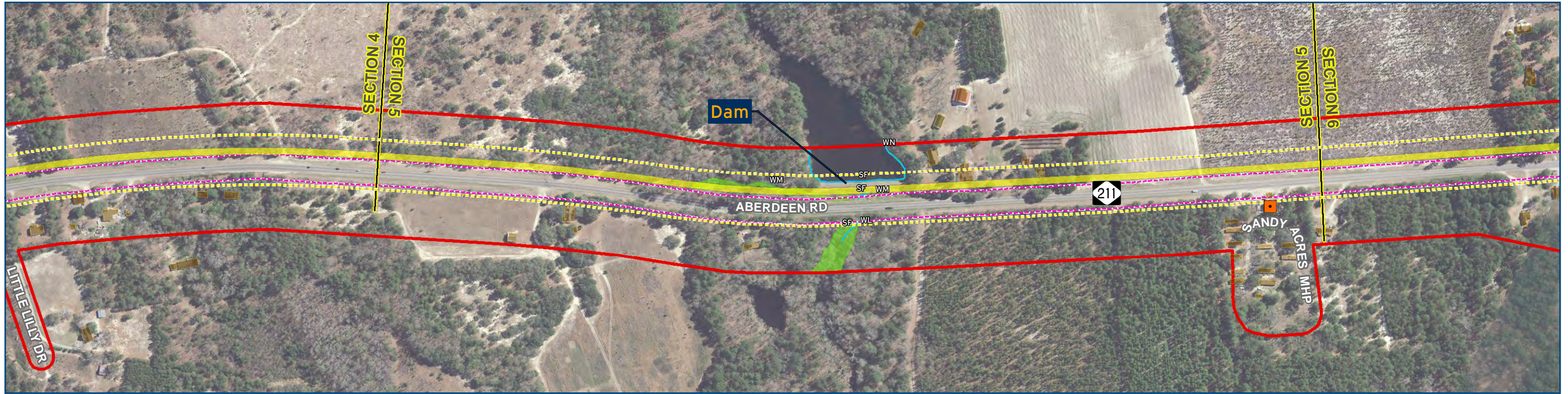
FIGURE
9


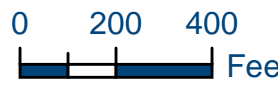

















Study Area	Fort Bragg Boundary	USGS Streams
New Pavement	FEMA Floodway	Hazardous Waste Site
Potential Impact Area	100 Year Floodplain	UST
Proposed Rail Realignment	Delineated Wetlands	Cemetery
Existing Right-Of-Way	Delineated Streams	Church

ALTERNATIVES
NC 211
 FROM US 15 - 501 IN ABERDEEN
 TO SR 1244 - SR 1311 IN RAEFORD,
 MOORE, AND HOKE COUNTIES
 STIP PROJECT R-5709

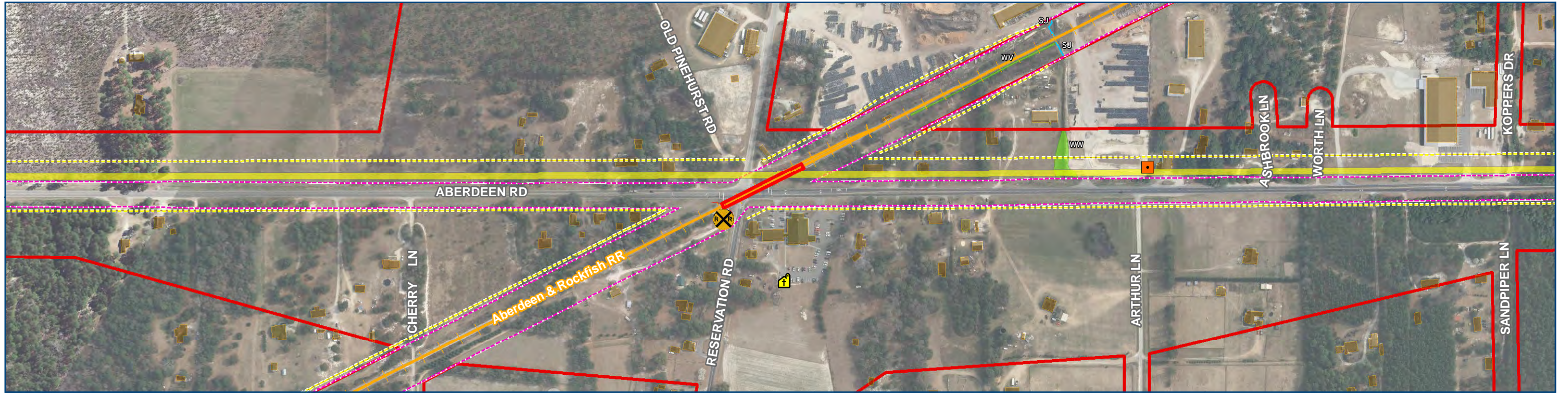
FIGURE
10



 	<ul style="list-style-type: none">  Study Area  New Pavement  Potential Impact Area  Proposed Rail Realignment  Existing Right-Of-Way 	<ul style="list-style-type: none">  Fort Bragg Boundary  FEMA Floodway  100 Year Floodplain  Delineated Wetlands  Delineated Streams 	<ul style="list-style-type: none">  USGS Streams  Hazardous Waste Site  UST  Cemetery  Church 	<p>ALTERNATIVES NC 211 FROM US 15 - 501 IN ABERDEEN TO SR 1244 - SR 1311 IN RAEFORD, MOORE, AND HOKE COUNTIES STIP PROJECT R-5709</p>	<p>FIGURE 11</p>
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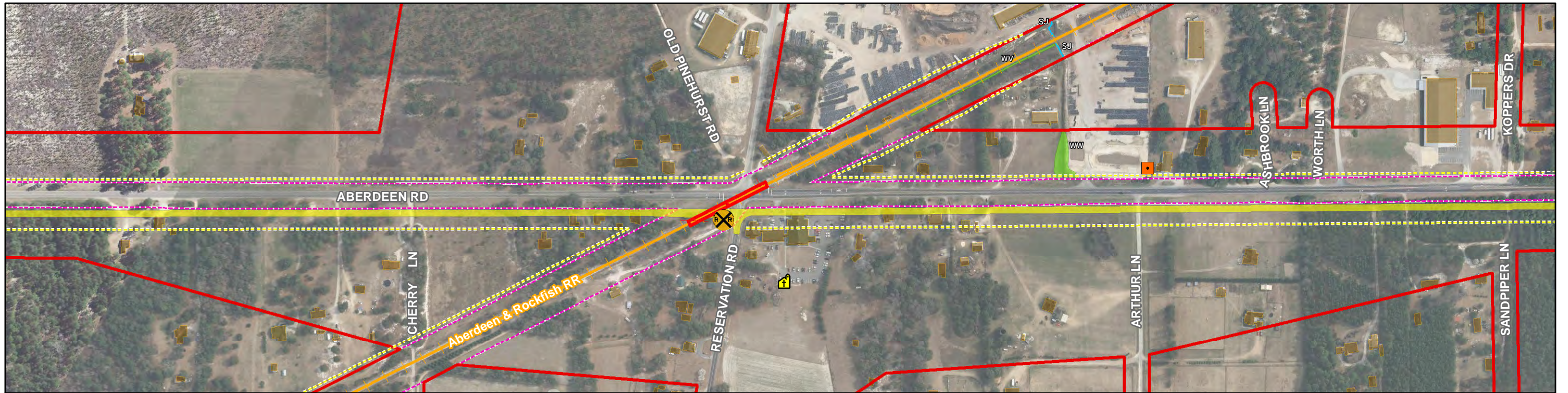
NORTH ALTERNATIVE OPTION 6A - RAILROAD OVER NC 211

















SECTION 6

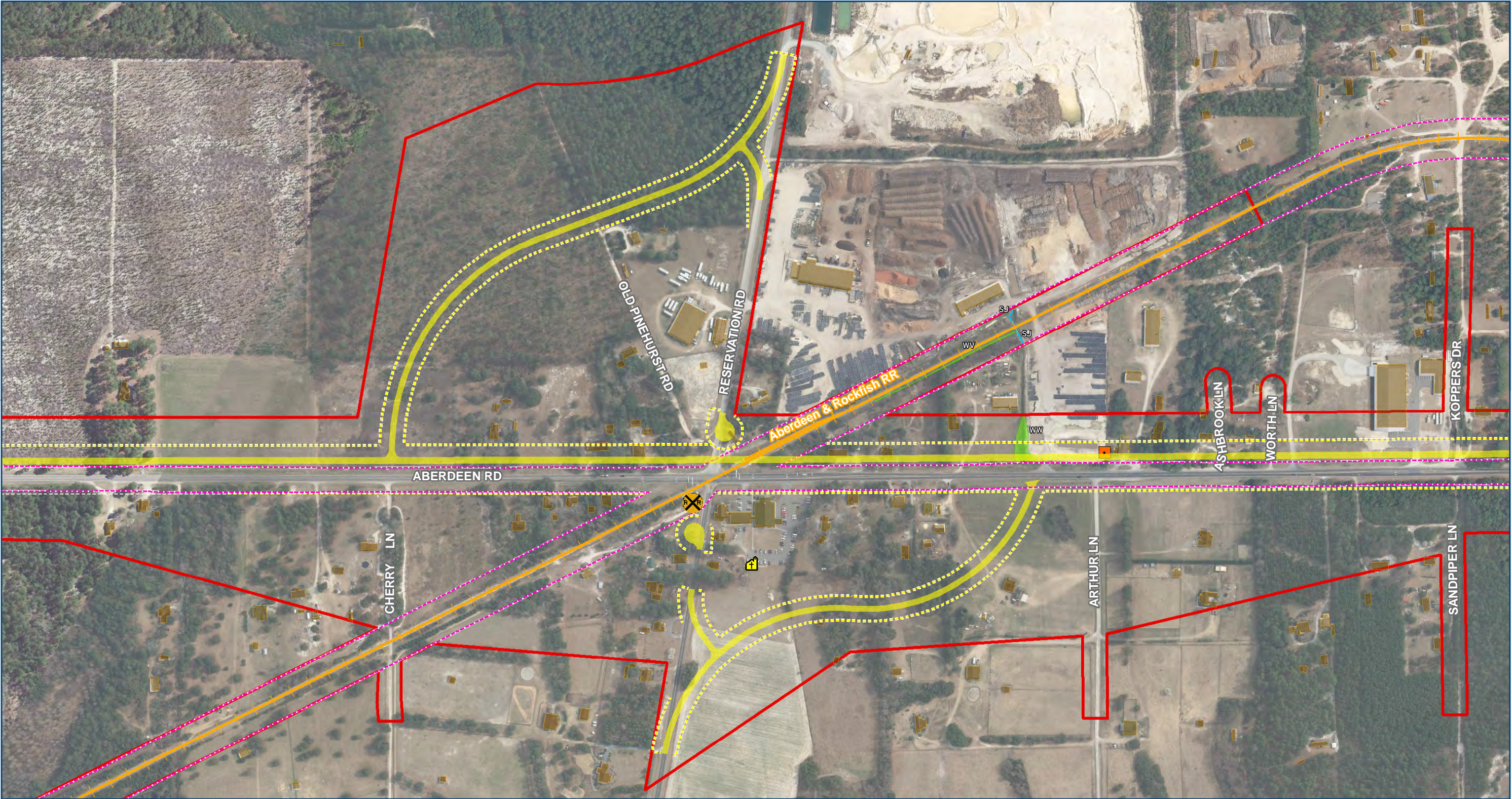


SOUTH ALTERNATIVE OPTION 6A - RAILROAD OVER NC 211

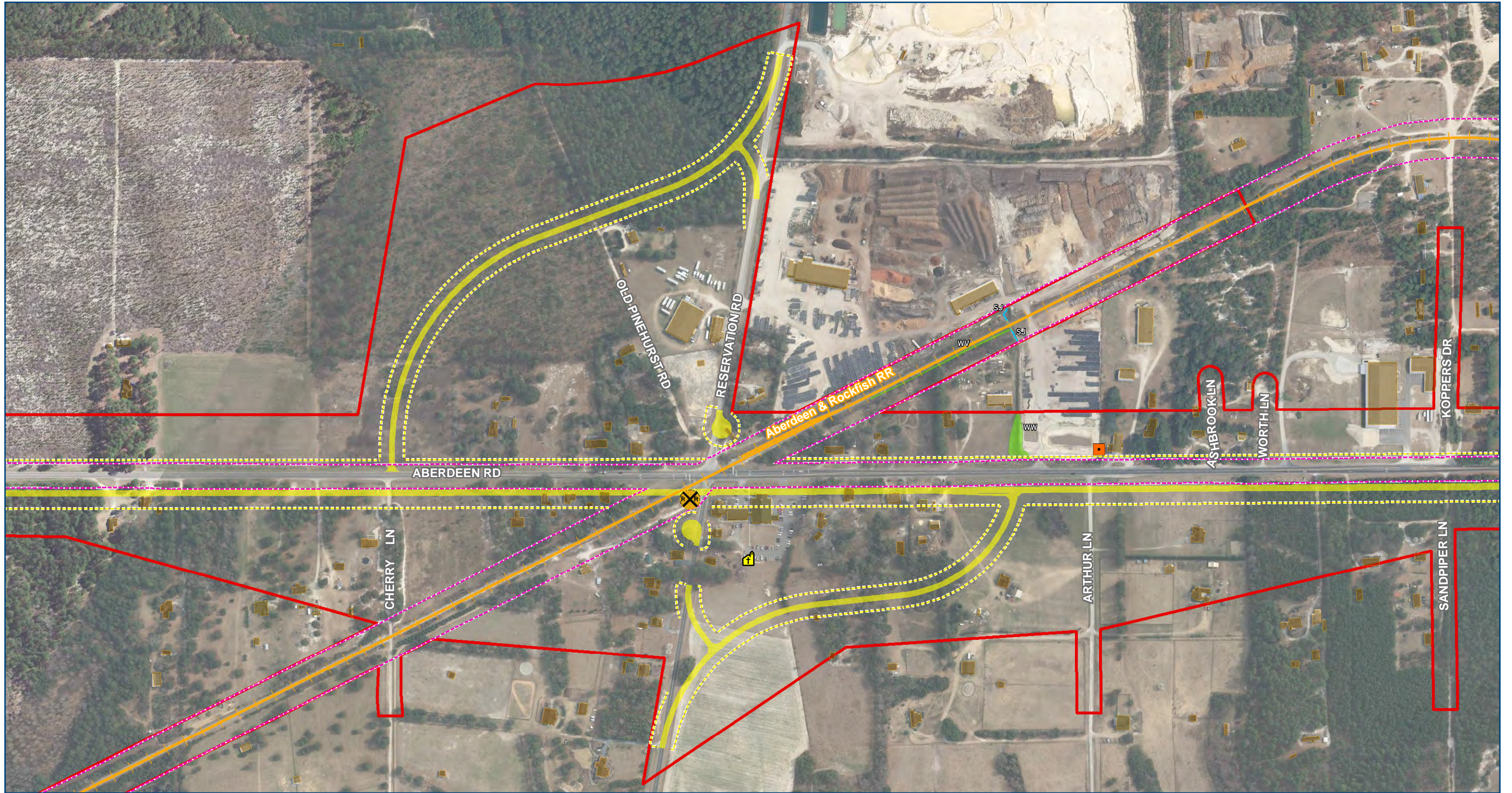
SECTION 6



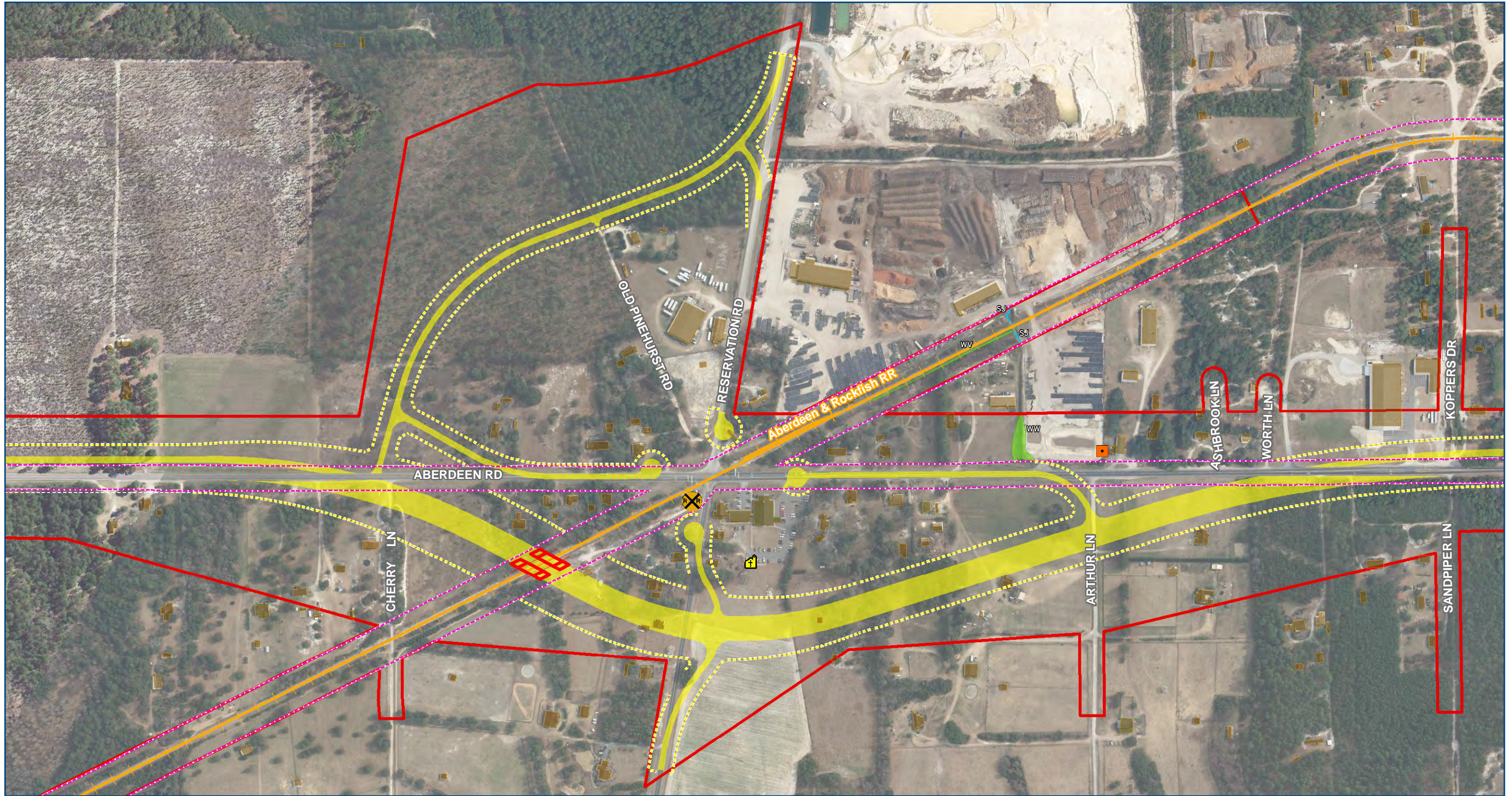
 0 200 400 Feet	 Study Area  New Pavement  Potential Impact Area  Proposed Rail Realignment  Existing Right-Of-Way	 Fort Bragg Boundary  FEMA Floodway  100 Year Floodplain  Delineated Wetlands  Delineated Streams	 USGS Streams  Hazardous Waste Site  UST  Cemetery  Church	<p align="center">ALTERNATIVES NC 211 FROM US 15 - 501 IN ABERDEEN TO SR 1244 - SR 1311 IN RAEFORD, MOORE, AND HOKE COUNTIES STIP PROJECT R-5709</p>	<p align="center">FIGURE 12</p>
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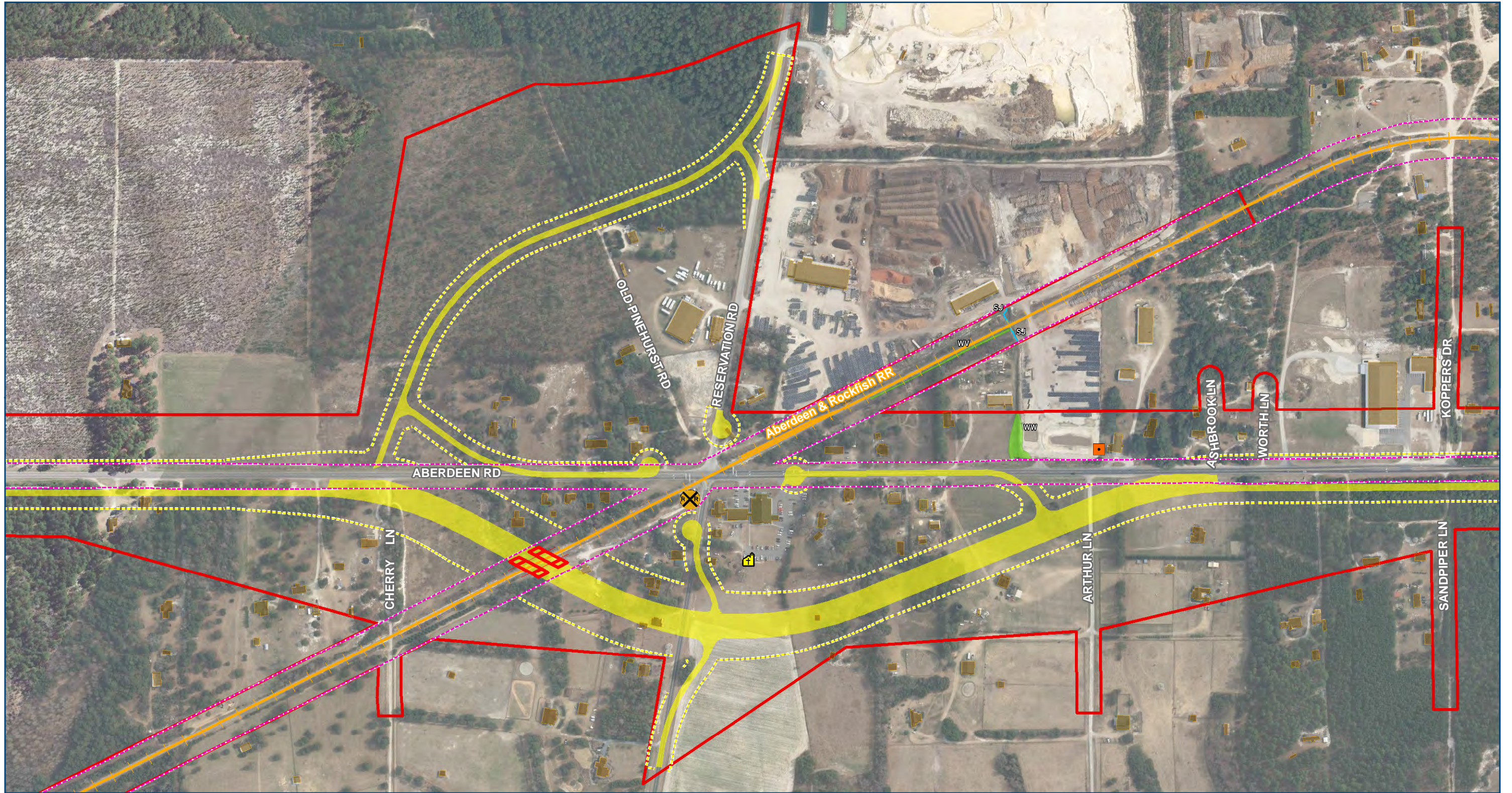
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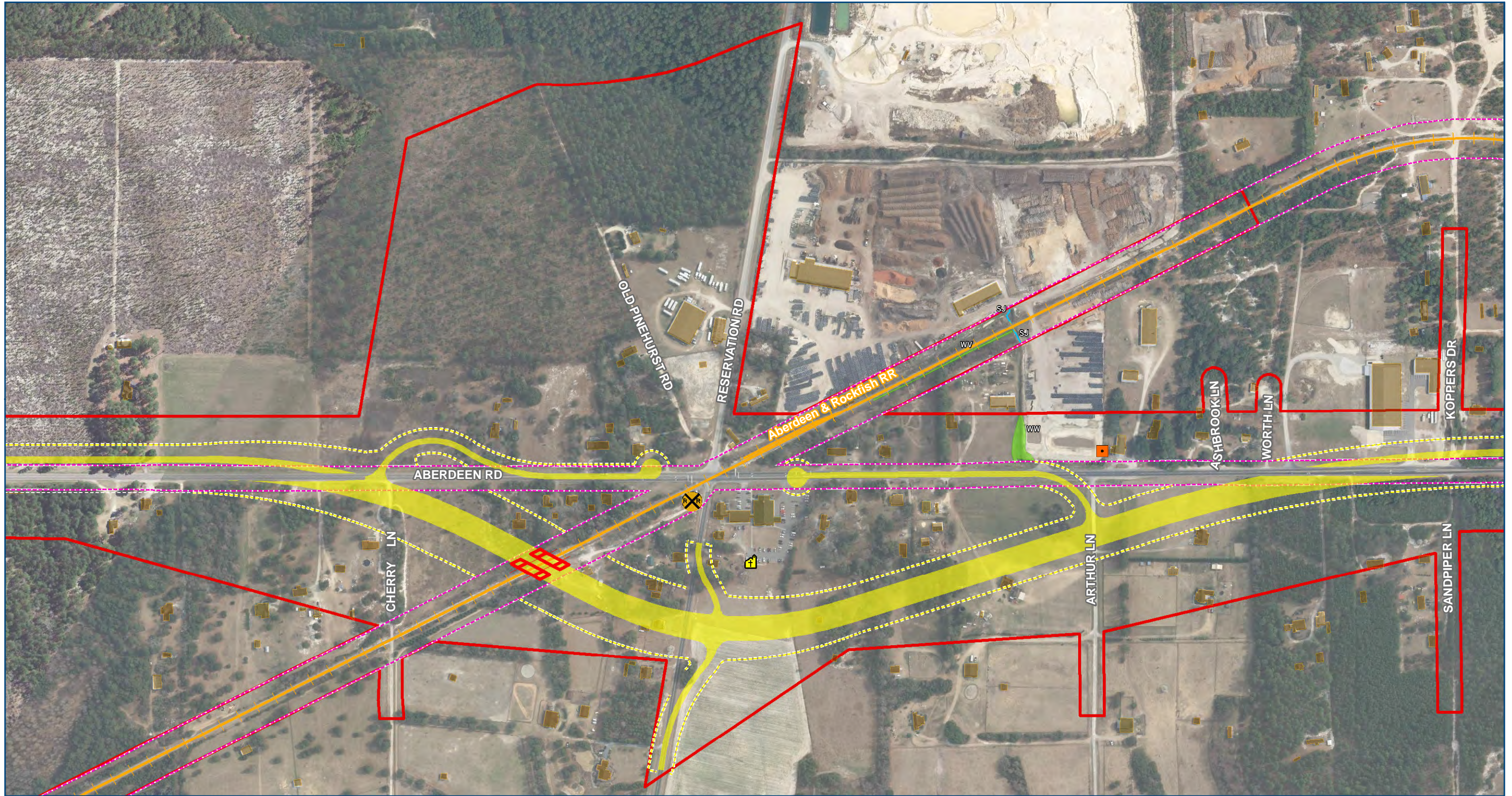
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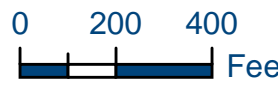

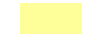















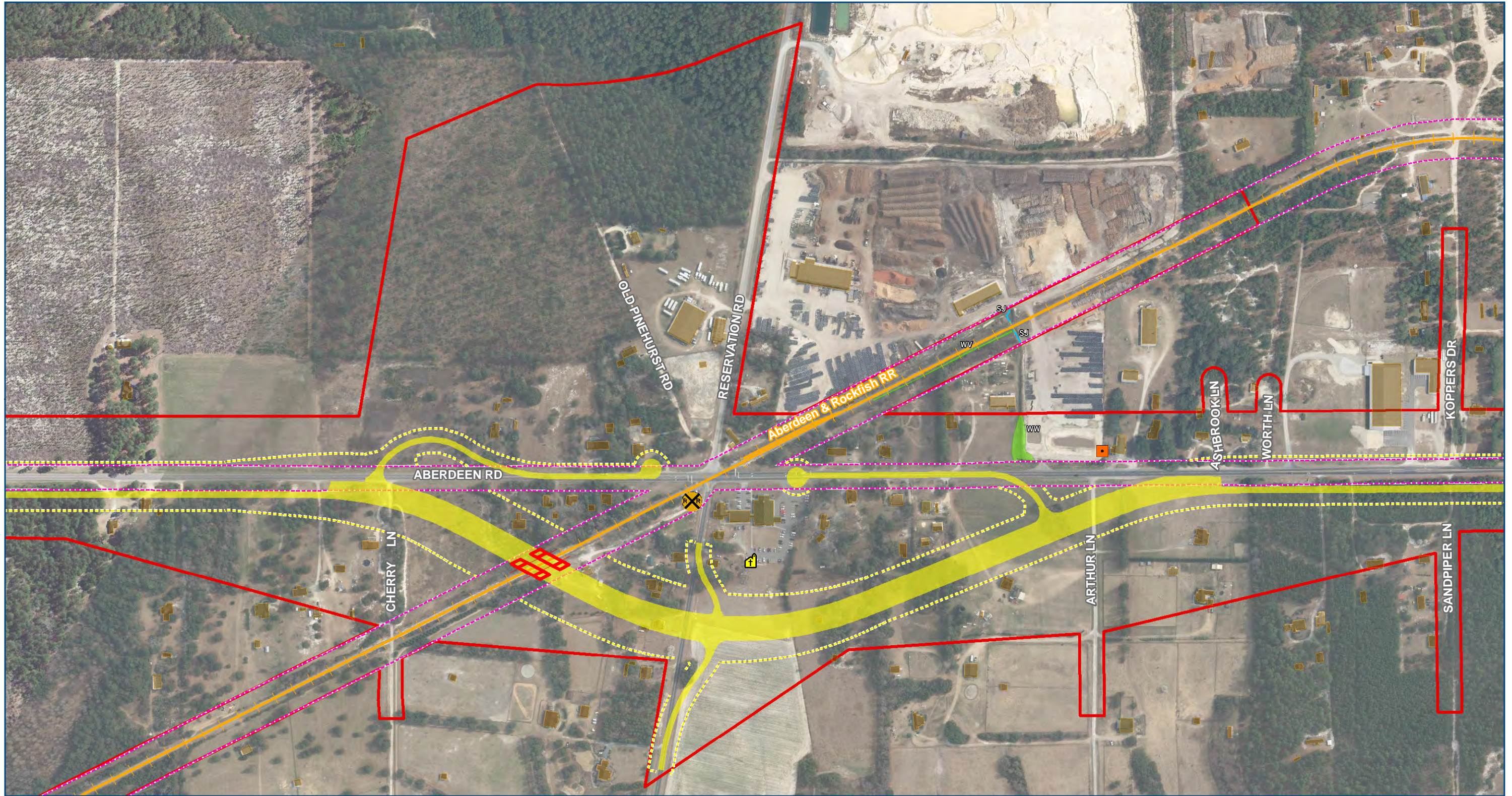
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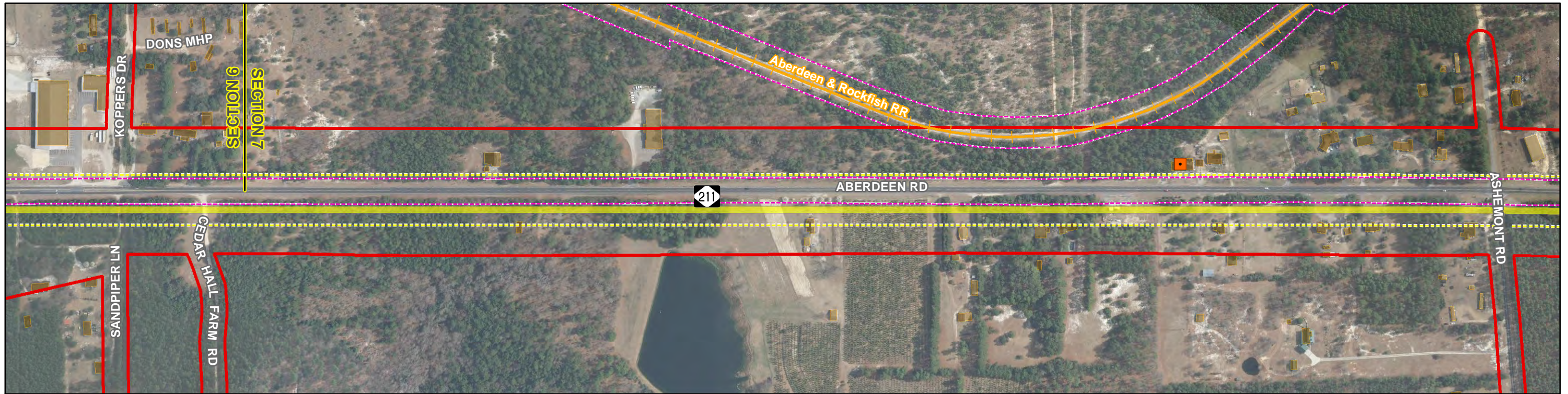
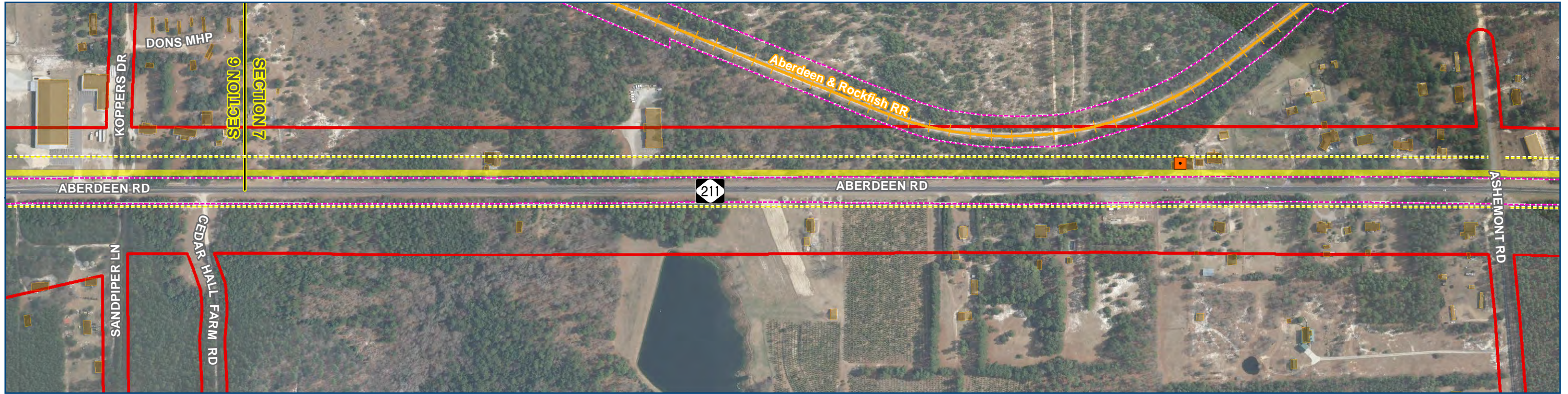
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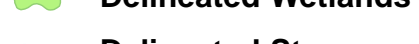








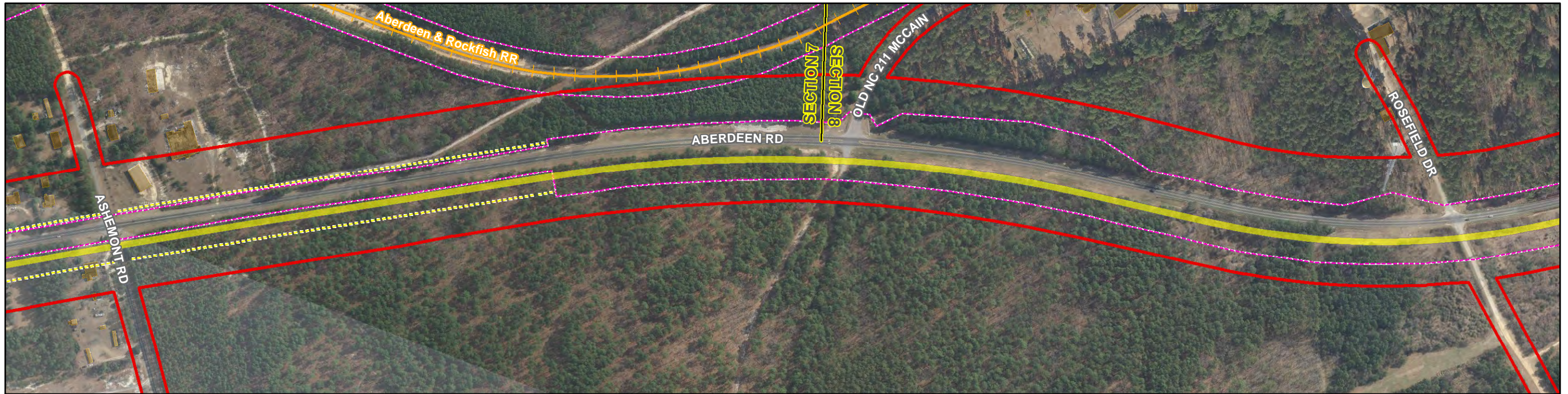
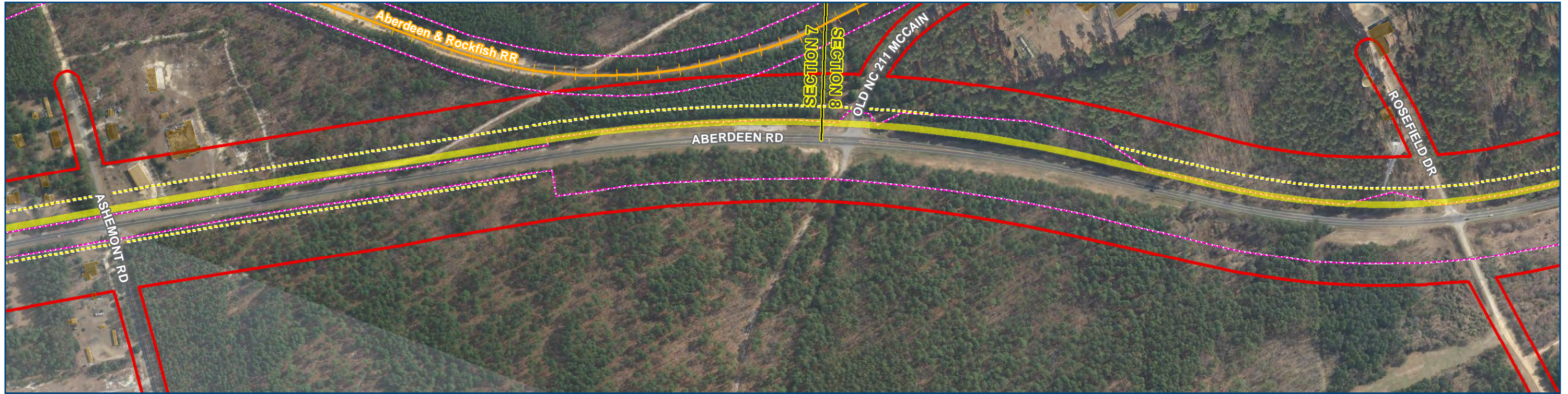
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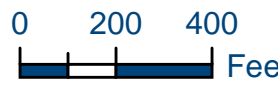

















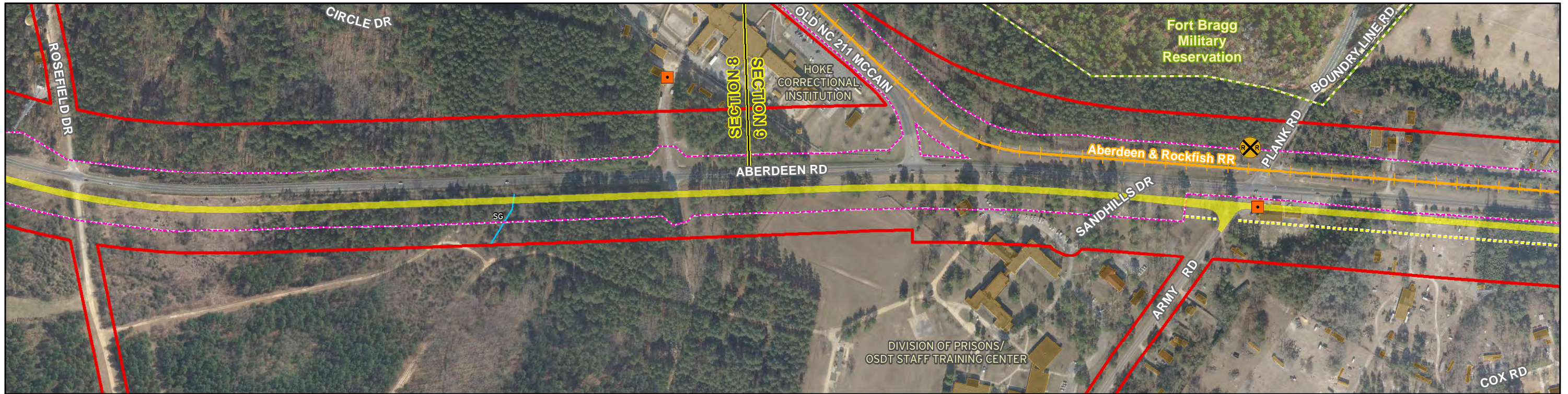
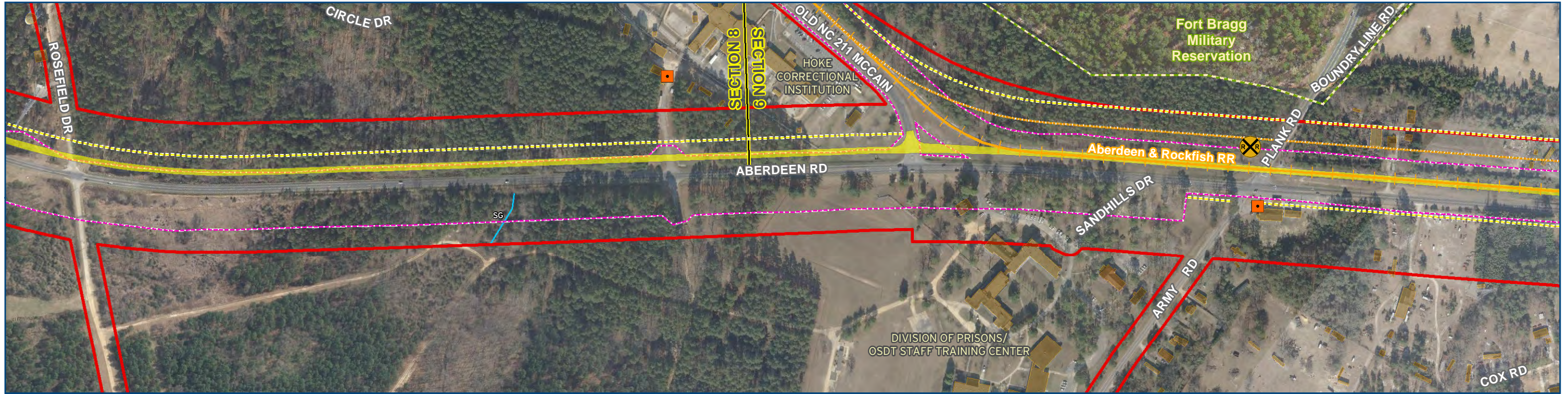
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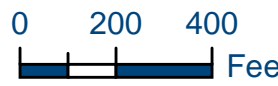


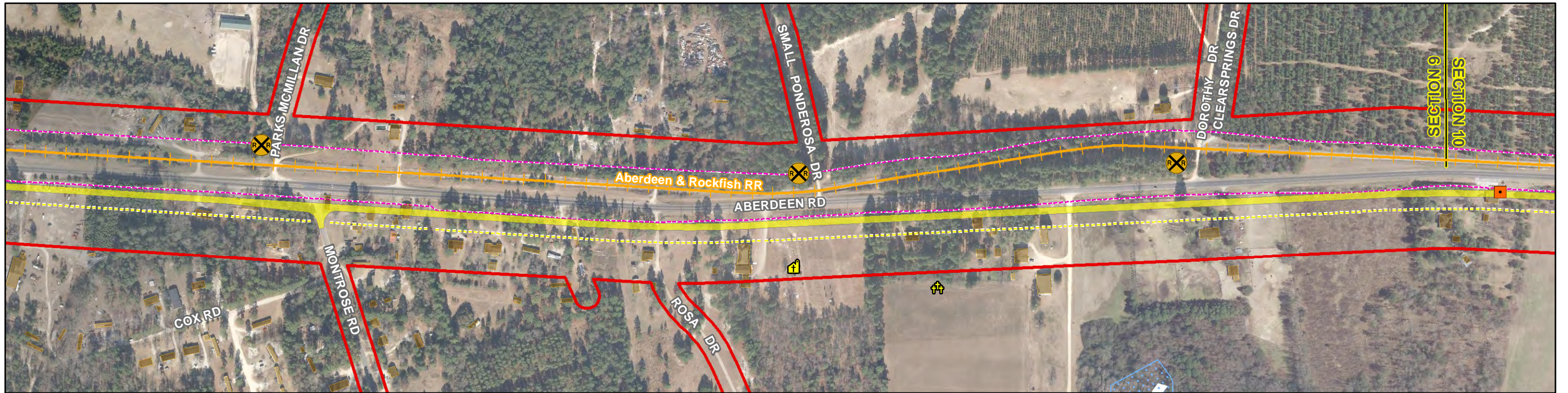
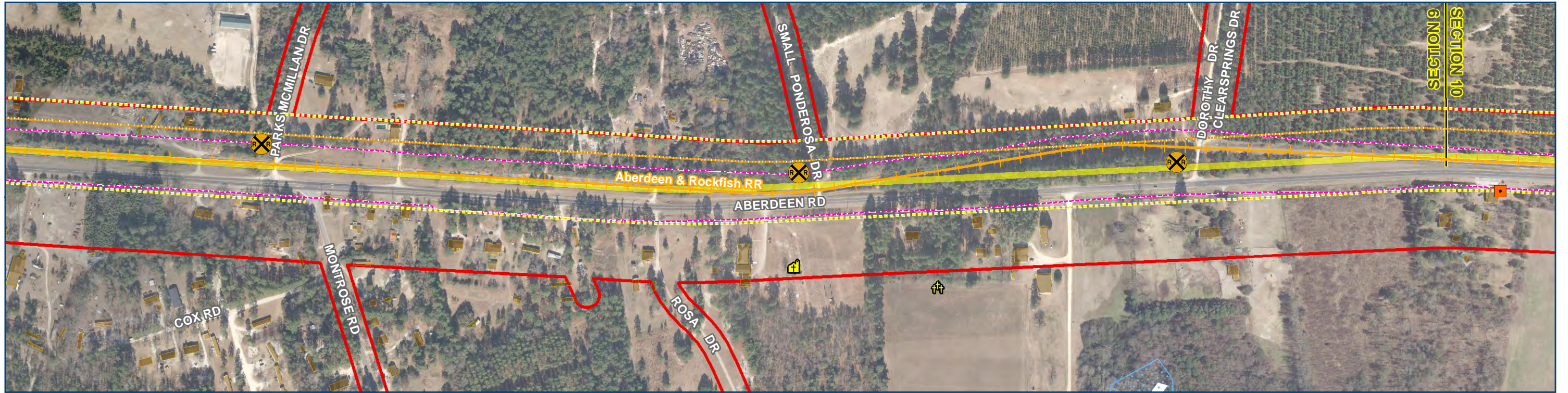
 0 200 400 Feet	 Study Area  New Pavement  Potential Impact Area  Proposed Rail Realignment  Existing Right-Of-Way	 Fort Bragg Boundary  FEMA Floodway  100 Year Floodplain  Delineated Wetlands  Delineated Streams	 USGS Streams  Hazardous Waste Site  UST  Cemetery  Church	<p style="text-align: center;">ALTERNATIVES NC 211 FROM US 15 - 501 IN ABERDEEN TO SR 1244 - SR 1311 IN RAEFORD, MOORE, AND HOKE COUNTIES STIP PROJECT R-5709</p>	<p style="text-align: center;">FIGURE 19</p>
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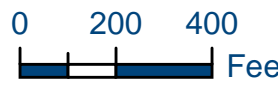


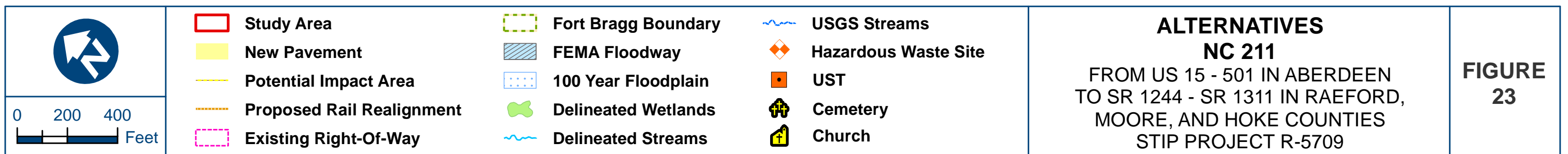
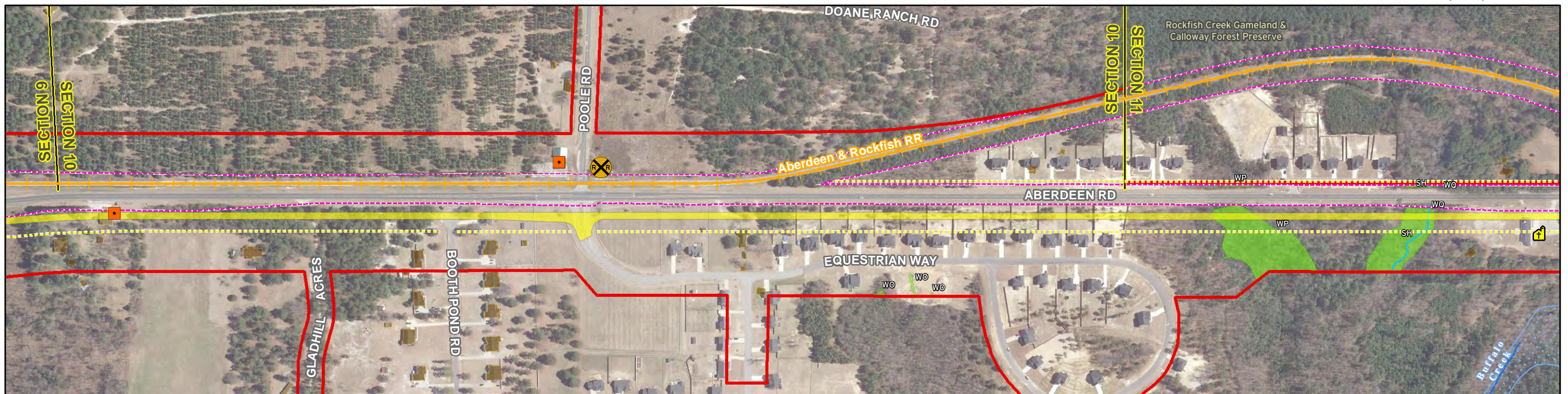
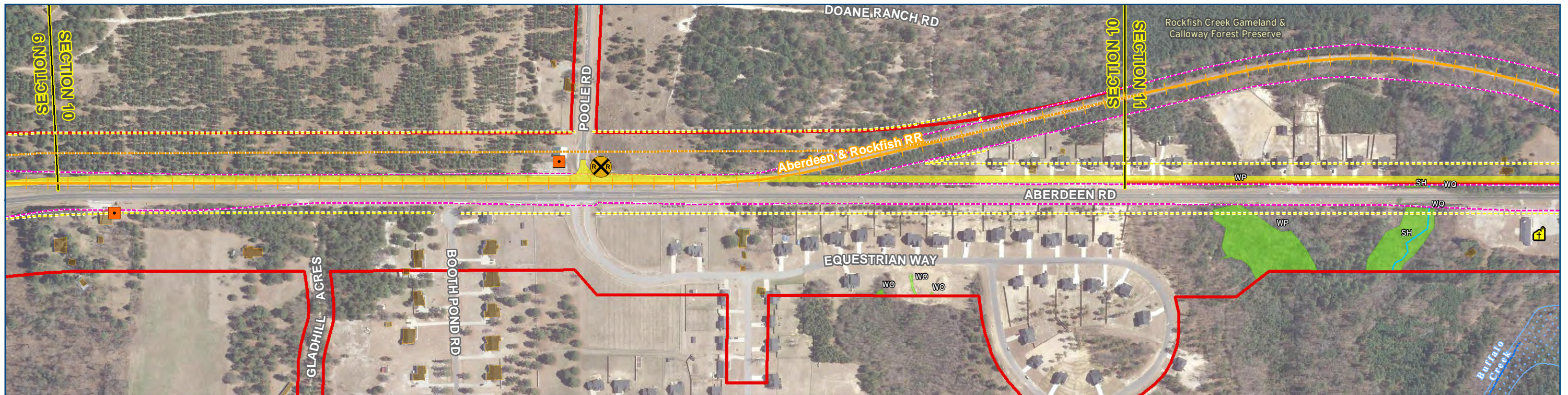
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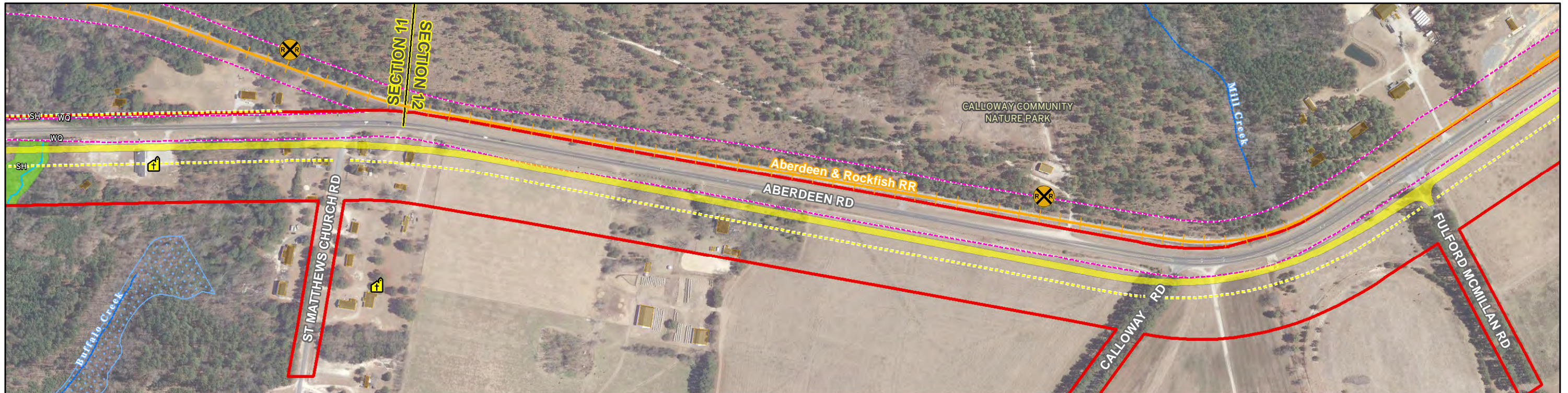
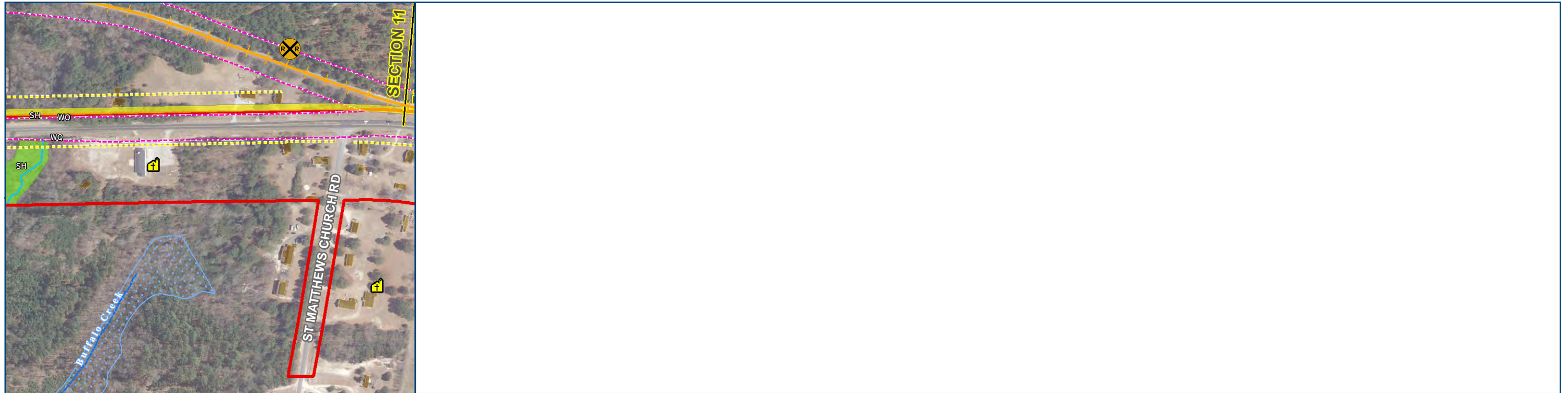



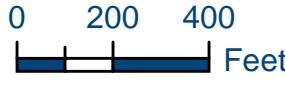
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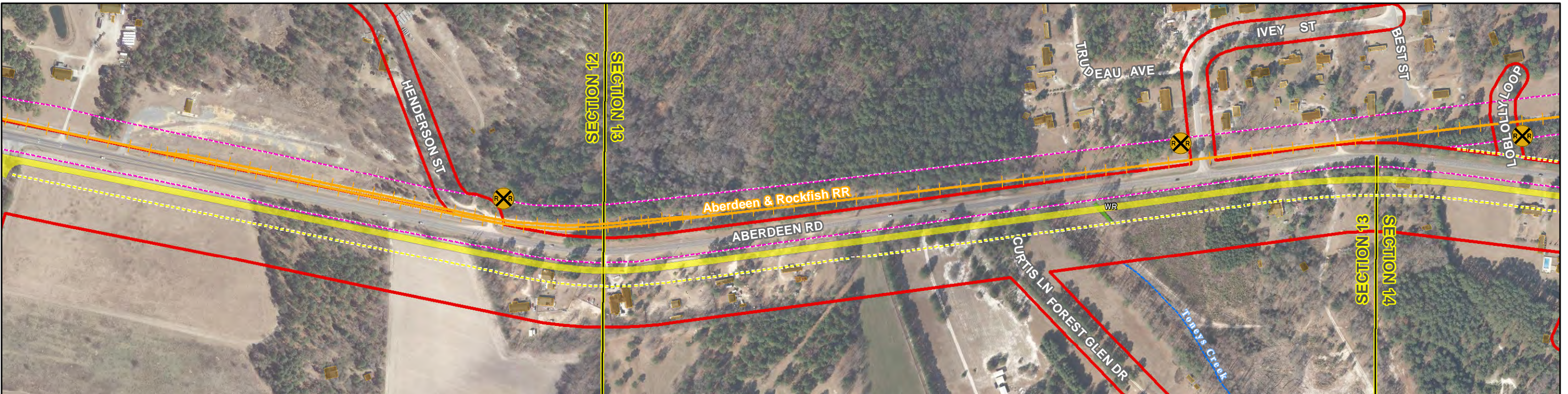
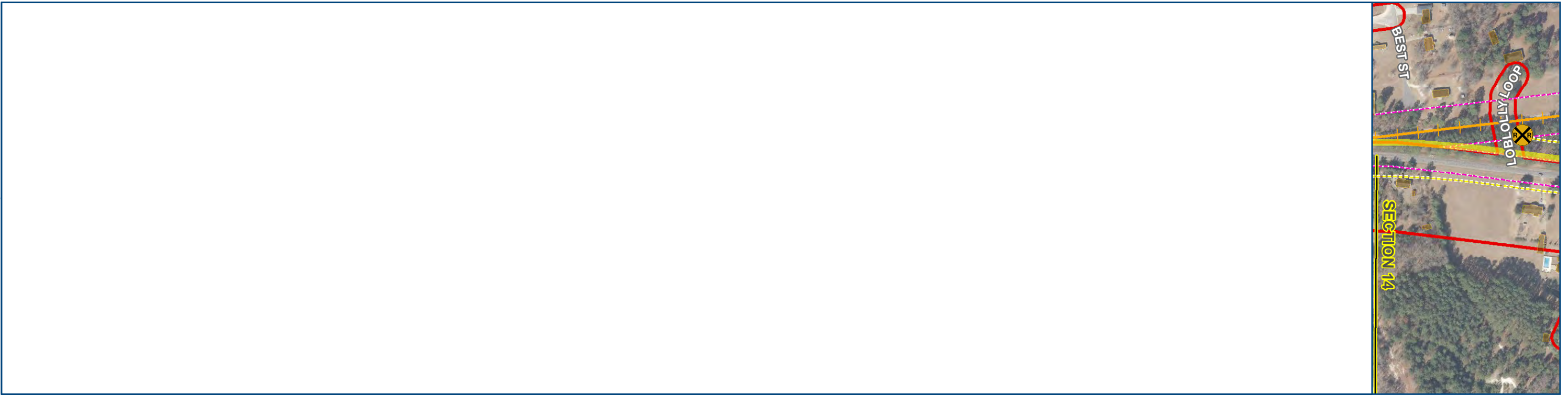


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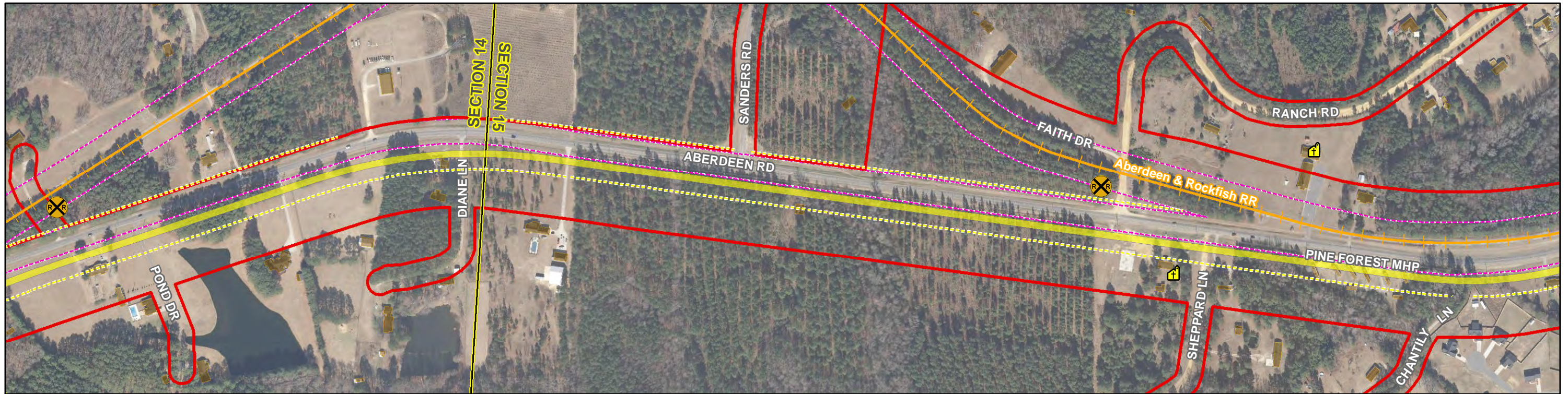
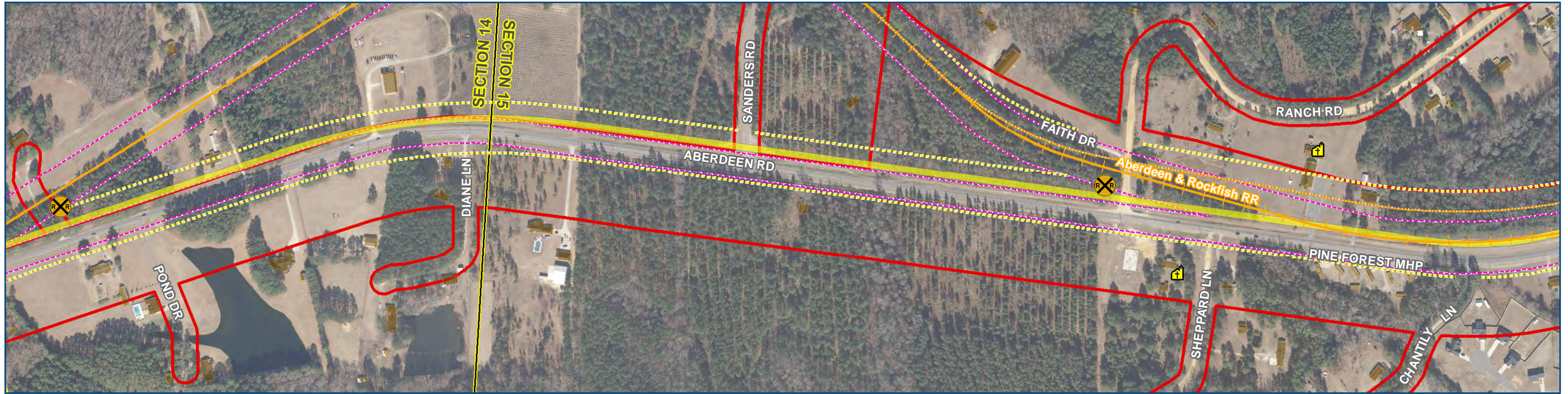



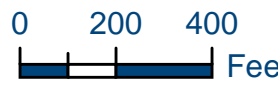


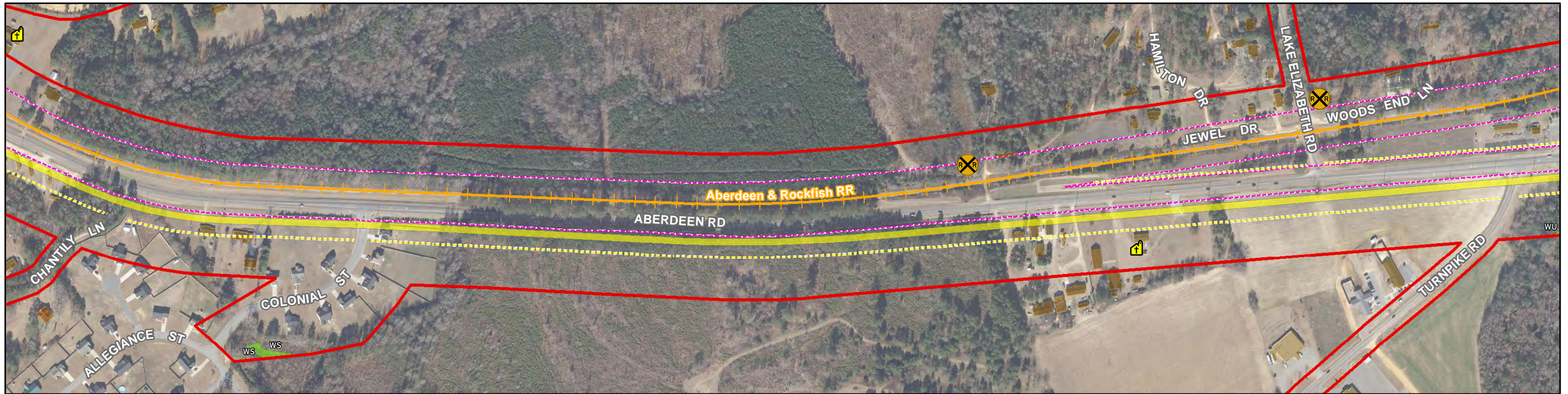
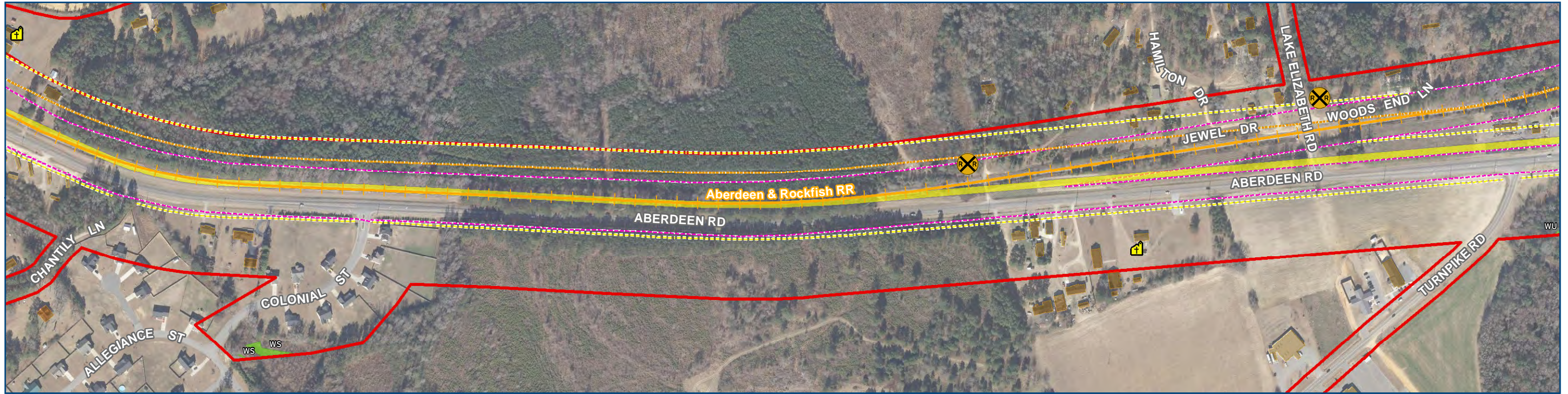
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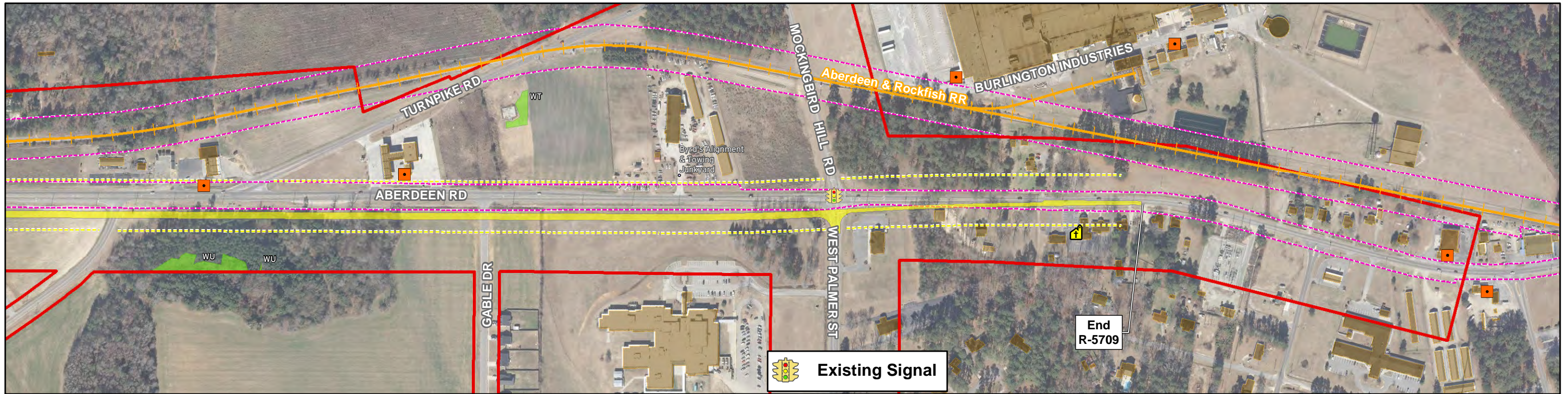
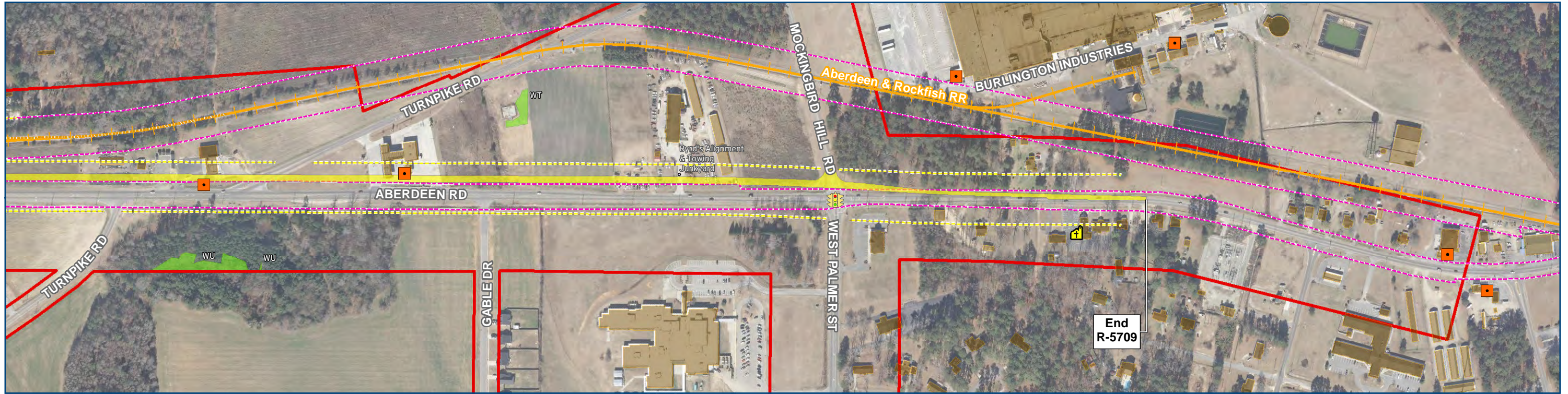
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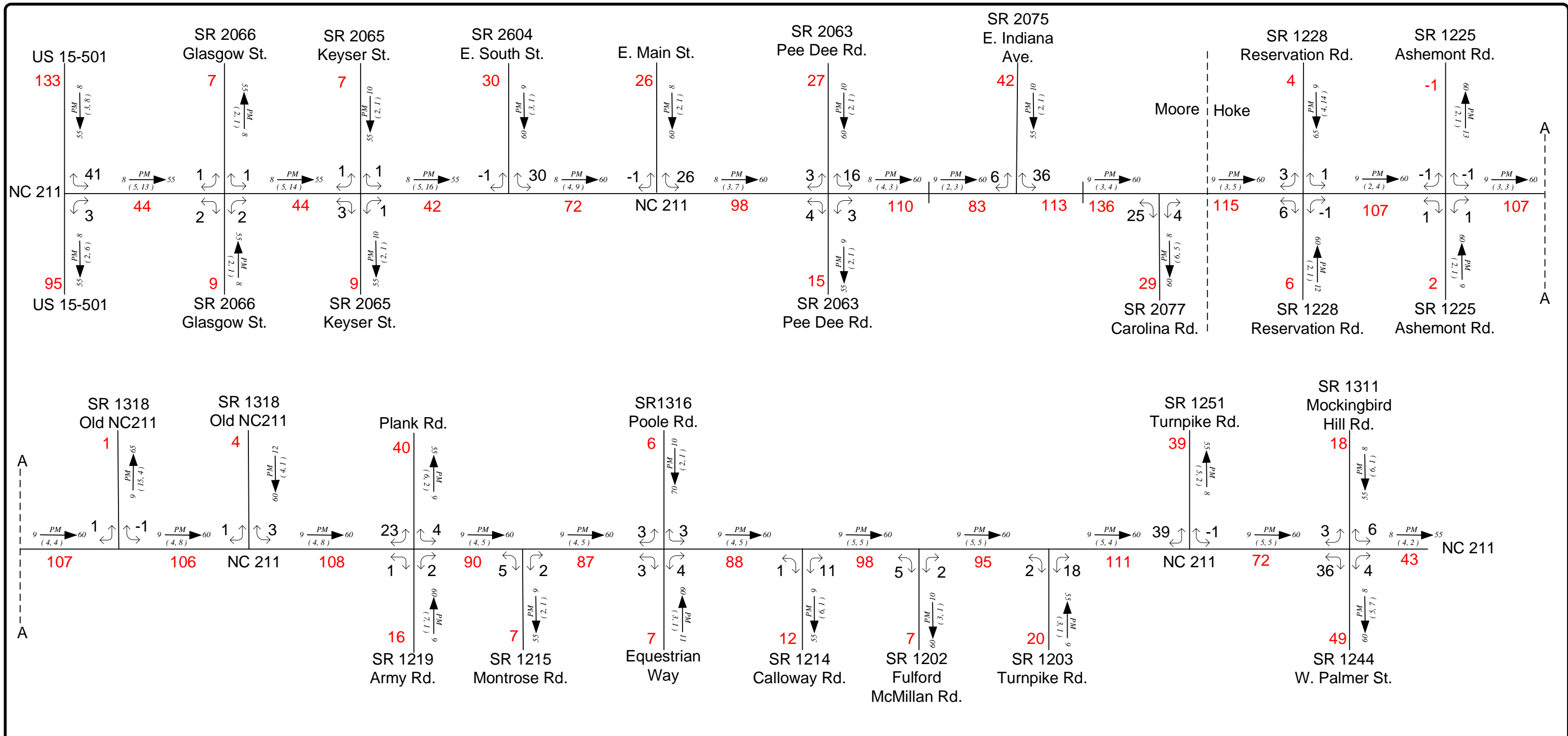
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 0 200 400 Feet	 Study Area  New Pavement  Potential Impact Area  Proposed Rail Realignment  Existing Right-Of-Way	 Fort Bragg Boundary  FEMA Floodway  100 Year Floodplain  Delineated Wetlands  Delineated Streams	 USGS Streams  Hazardous Waste Site  UST  Cemetery  Church	ALTERNATIVES NC 211 FROM US 15 - 501 IN ABERDEEN TO SR 1244 - SR 1311 IN RAEFORD, MOORE, AND HOKE COUNTIES STIP PROJECT R-5709	FIGURE 28
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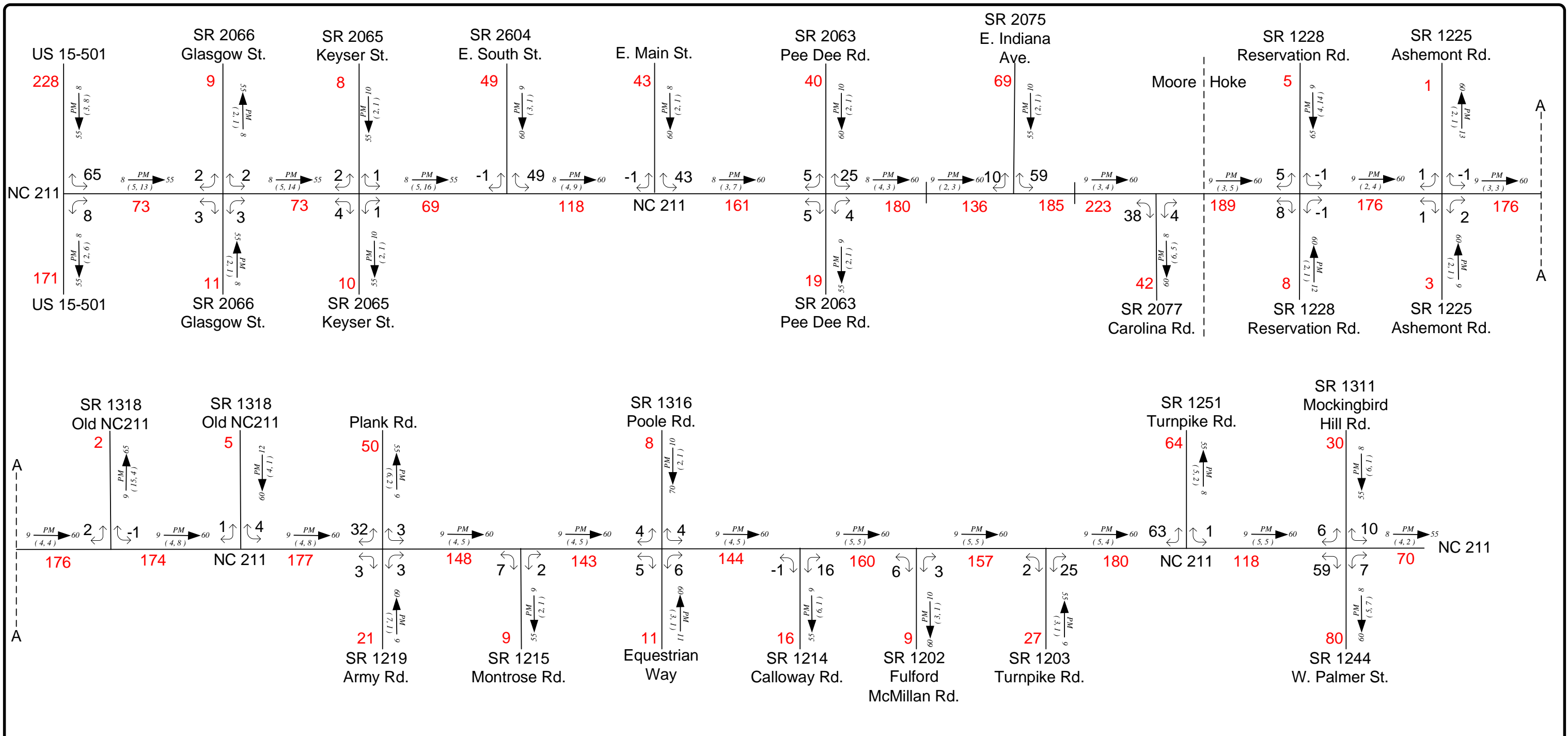


2015 No Build

LEGEND	
###	No. of Vehicles Per Day (VPD) in 100s
1-	Less than 50 VPD
X	Movement Prohibited
.....	Proposed Roadway
DHV	Design Hourly Volume (%) = K30
PM	PM Peak Period
D	Peak Hour Directional Split (%)
→	Indicates Direction of D
(d, t)	Duals, TT-STs (%)

TIP: R-5709	WBS: 50205.1.1
COUNTY: Moore-Hoke	DIVISION: 8
DATE: 12-2015	
PREPARED BY: Chris McKoy	
LOCATION: NC 211	
PROJECT: Widen and improvements to NC-211	

FIGURE 29



2040 No Build

LEGEND

DHV $\frac{PM}{(d, t)} \rightarrow D$

No. of Vehicles Per Day (VPD) in 100s

1- Less than 50 VPD

X Movement Prohibited

..... Proposed Roadway

DHV Design Hourly Volume (%) = K30

PM PM Peak Period

D Peak Hour Directional Split (%)

→ Indicates Direction of D

(d, t) Duals, TT-STs (%)

TIP: R-5709	WBS: 50205.1.1
COUNTY: Moore-Hoke	DIVISION: 8
DATE: 12-2015	
PREPARED BY: Chris McKoy	
LOCATION: NC 211	
PROJECT: Widen and improvements to NC-211	

FIGURE 30