Section 3.2

DURHAM COUNTY RECOMMENDATIONS

The DCHC MPO is recommending ten (10) projects for Durham County (two (2) reside in the City of Durham) as part of this plan. The list of projects can be found below in Table 3.2, and a map showing these sites are found in Figure 3.2: Map of complete list of wildlife crossing project recommendations in Durham County. Project recommendations assigned two project IDs signify two separate structures at the site.

Project ID	Project Name	Jurisdiction
DurhamCo1	Cole Mill Road over Eno River	Durham County
DurhamCo2	Rivermont Road over Nancy Rhodes Creek	Durham County
DurhamCo3	US 501 (Roxboro Road) over Eno River	Durham County
DurhamCo4	Guess Road over Eno River	Durham County
DurhamCo5	Old Oxford Road over Eno River	Durham County
DurhamCo6 DurhamCo7	NC 54 over New Hope Creek	City of Durham
DurhamCo8 DurhamCo9	I-40 Bridge over New Hope Creek	City of Durham
DurhamCo10	Stagecoach Road over New Hope Creek	Durham County
DurhamCo11	Old Chapel Hill Road over New Hope Creek	Durham County
DurhamCo12	Farrington Road over Little Creek	Durham County

Table 3.2: Complete list of wildlife crossing project recommendations in Durham County.

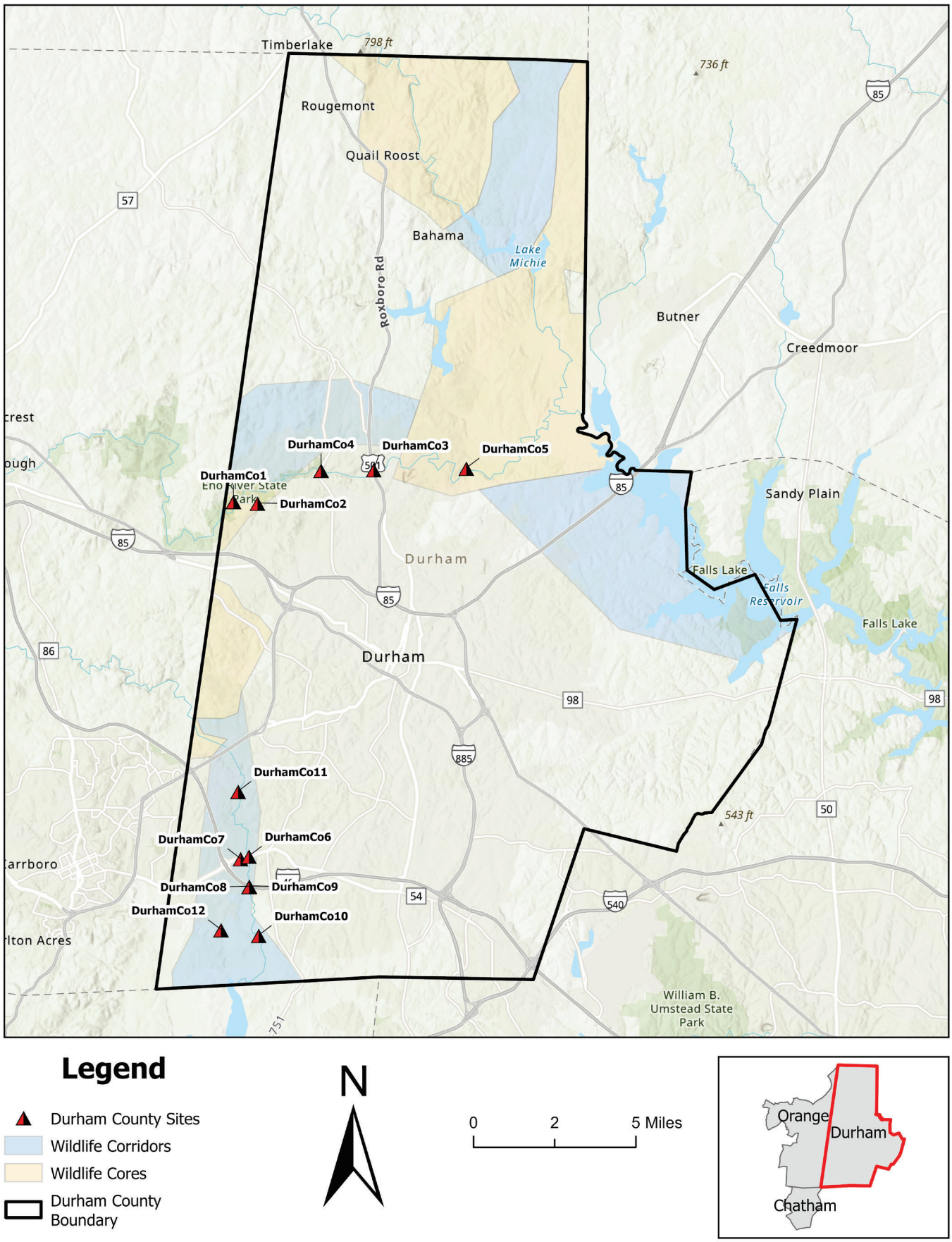


Figure 3.2: Map of complete list of wildlife crossing project recommendations in Durham County.

Durham County

Cole Mill Road over Eno River

Summary and Problem Statement

Cole Mill Road over the Eno River has been identified as a priority wildlife crossing. This crossing resides within a wildlife core identified by the Wildlands Network. The bridge at this site is a two-lane undivided with no bicycle and pedestrian facilities. This site has 10 reported WVCs within a one-mile buffer, has a posted speed limit of 45 mph, and garners 8,600 vehicles per day (2021 AADT). This site is adjacent to natural managed lands. The NC DNCR, Division of Parks and Recreation maintains Eno River State Park along the western side of the crossings, the Mountains-to-Sea Trail, the Middle Eno River Bluffs and Slope, and the Eno River Aquatic Habitat. The US Fish and Wildlife Service has identified the site as a critical habitat for the Altantic Pigtoe, Carolina Madtom, Neuse River Waterdog, and Green Floater.

Barriers to wildlife travel exist within this core and under the bridge, which encourages wildlife travel on the roadway and results in conflicts with motorists. Riprap placed on the east side of the bridge on the north bank from the top of the steep slope all the way into the river to the base of the incised bank prevents dry passage for wildlife at any elevation. A bench created midway up this riprap slope that has been choked with pea gravel has not been connected to the habitat up or downstream. The natural surface slope under the bridge is steeply sloping from abutment at the top to the riverbank. The remains of the eroded and abandoned Pea Creek Trail (wood boardwalk, steps) interfere with dry passage on the north bank from the east, and the entire north bank is steeply sloped with no benches for wildlife access or human foot traffic. On the south bank, scour has narrowed to the width of the dry passage between the toe of the steep concrete paved slope protection surrounding the abutment, and woody vegetation at the top of the eroding bank interferes with passage of both wildlife and foot traffic of the Mountains-to-Sea Trail (MST) along the south bank of the Eno River under the bridge. All replacement, repair, and/or remediation work should be closely coordinated between NCDOT staff, Eno River State Park (ERSP) staff (Pea Creek trail, ERSP lands), and NC Division of Parks and Recreation.

East side of Cole Mill Road bridge over Eno River, facing southwest. DCHC MPO.

West side of Cole Mill Road bridge over Eno River, facing northeast. DCHC MPO.

Aerial photograph of Cole Mill Road bridge over Eno River. Nearmap.

Site Facts

Location ID	DurhamCo1
Date of Site Visit	April 17, 2024
Jurisdiction	Durham County
Coordinates	36°03'33.6"N 78°58'41.0"W
NCDOT Crossing/Structure Code	310049
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	CTP Pedestrian: Cole Mill Rd CTP Highway: Cole Mill Rd
Managed and Natural Lands	NC DNCR Division of Parks and Recreation, US Fish and Wildlife Service
Average Annual Daily Traffic (AADT) (2019)	9,500
Average Annual Daily Traffic (AADT) (2021)	8,600
Projected Average Weekday Traffic (AWDT)	10,754
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 10 ($250,000) **Total crashes and cost estimate: 10 ($250,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 85 ($2,125,000) **Total crashes and cost estimate: 85 ($2,125,000)**

10
Reported WVCs within 1-mile buffer (2018-2022)

$250,000
Reported WVCs cost estimate

8,600
Annual average daily traffic (2021)

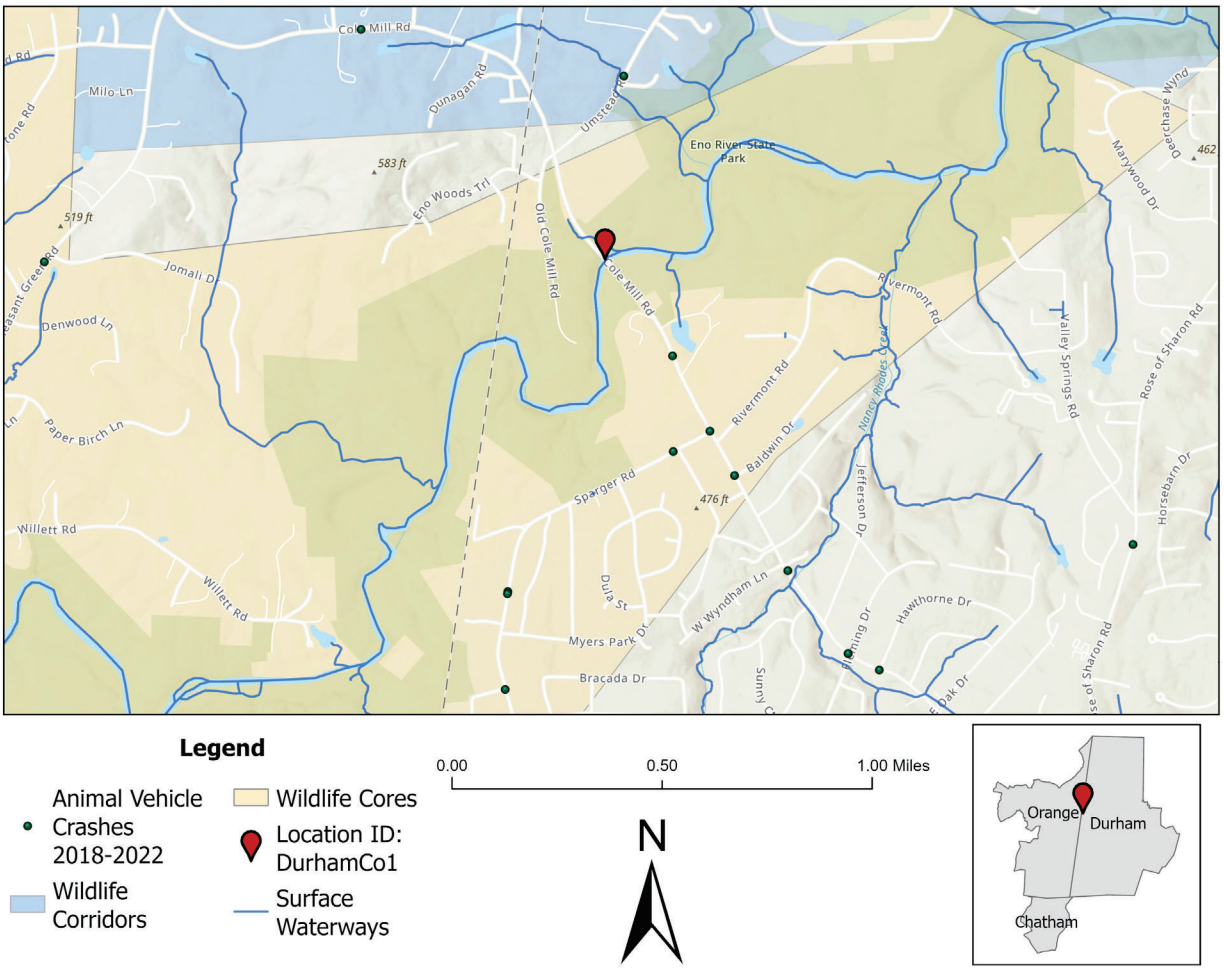
Adjacent managed natural land

Preferred Scenario

Replace the bridge with a longer span that provides sufficient room for dry wildlife and trail passage on both banks of the river. Vertical bents at the abutments are recommended to maximize low slope dry passages and provide additional high water flow capacity to minimize bank scour. Connect dry passages to habitat up and downstream on both sides of the river.

Alternate Scenario

Bench into the north bank slope to provide a minimum of 8 feet of dry passage for wildlife and trail foot traffic. Similarly, bench into the paved slope protection on the south bank. Connect dry passages to habitat up and downstream on both sides of the river. Repair the scour around the bent piers that are eroding into both banks and potentially threatening the integrity of the piers.



Durham County

Rivermont Road over Nancy Rhodes Creek

Summary and Problem Statement

Rivermont Road over Nancy Rhodes Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife core identified by Wildlands Network, and 11 WVCs have been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities. Since there are no active ordinances for this route, the roadway falls under statutory speed limits, which is 55 mph outside of city limits. However, the road's gravel surface, curves, and narrow bridge suggests that a maximum safe speed would be closer to 35 mph.

This site is adjacent to several managed and natural lands. The N.C. Department of Natural & Cultural Resources Division of Parks & Recreation maintains Eno River State Park along the north side of the site, and the Middle Eno River Bluffs and Slope natural heritage area. The Eno River Association maintains a conservation easement covering 8.84 acres on the southwest side of the site. The City of Durham maintains Valley Spring Park, which covers 124.58 acres on the southeast side of the site.

Barriers to wildlife travel exist within this core and under the bridge, which encourages wildlife travel on the roadway and results in conflicts with motorists. Barriers include scattered riprap, steep and actively eroding and undercut banks, and abandoned temporary silt fence and posts. The banks beneath the bridge appear to need immediate stabilization from creek bank erosion. The once uniformly steep, riprap slopes are now eroded, leaving hardpan and saprolite benches that are discontinuously present on both banks. Neither side provides continuous dry stream bank passage at any stream level.

The slopes from the creek bank to the abutments appear to have been once covered by riprap slope protection, but all that remains is some riprap within a few feet of each abutment; the rest has been eroded away and the underlying subgrades have been significantly scoured away. These slopes should be rebuilt to provide natural surface dry passage benches, while also providing critical stabilization of the abutment slopes. The bridge appears to be a recent replacement span and of adequate span length to provide dry passage on both sides if the slopes are reconstructed and stabilized adequately.

Rivermont Road ridge over Nancy Rhodes Creek looking Southwest. DCHC MPO.

Rivermont Road bridge over Nancy Rhodes Creek looking East. Pete Schubert.

Aerial photograph of Rivermont Road bridge over Nancy Rhodes Creek. Nearmap

Site Facts

Location ID	DurhamCo2
Date of Site Visit	April 17, 2024
Jurisdiction	Durham County
Coordinates	36°03'31.1"N 78°57'58.1"W
NCDOT Crossing/Structure Code	310458
Existing Structure Type	Bridge
Property Owner Type	Local, private, state
Existing Plan Alignment	CTP Pedestrian: Rivermont Rd
Managed and Natural Lands	NC DNCR Division of Parks and Recreation, Eno River Association, City of Durham
Average Annual Daily Traffic (AADT) (2019)	Unavailable
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	Unavailable
Speed Limit	55 mph (statutory speed limit outside of city limits)
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 10 ($250,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 11 ($357,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 85 ($2,125,000) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 93.5 ($3,034,500)**

11
Reported WVCs within 1-mile buffer (2018-2022)

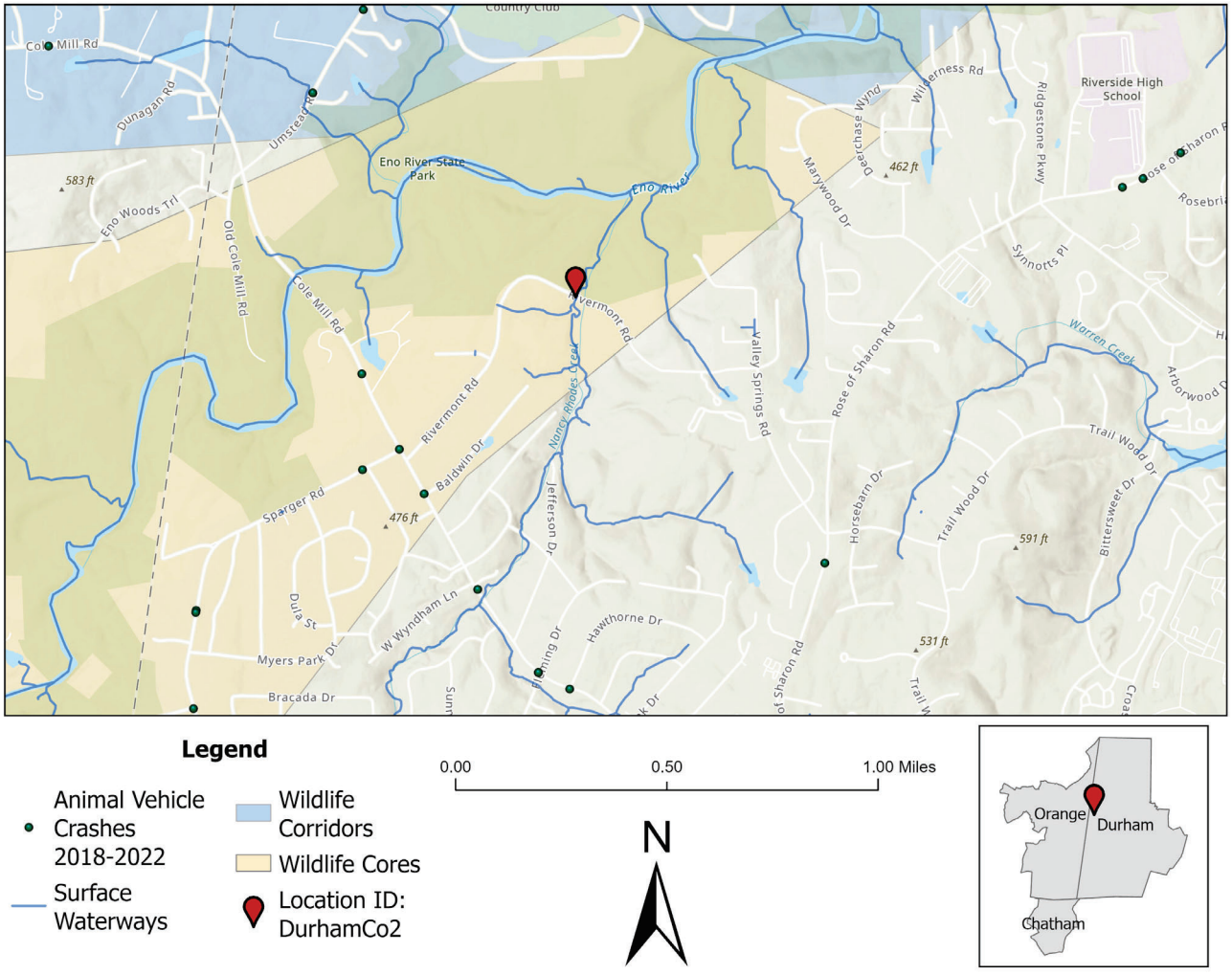
$357,000
Reported WVCs cost estimate

55
mph speed limit

Adjacent managed natural land

Preferred Scenario

Rebuild the eroded abutment slopes with retaining walls to provide a natural surface dry wildlife passage on both sides of the creek. Ensure passages connect into habitat up and downstream.



Durham County

US 501 (Roxboro Road) over Eno River

Summary and Problem Statement

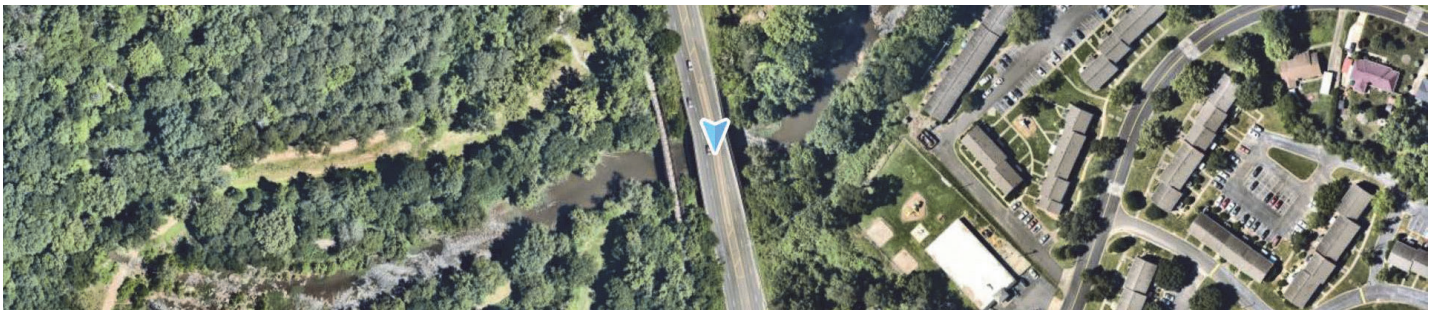
US 501 (Roxboro Road) over the Eno River has been identified as a priority wildlife crossing. This crossing is located within one mile of both a wildlife core and corridor identified by Wildlands Network, making this site important for both. There have been nineteen (19) WVCs reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities, has a posted speed limit of 45 mph, and garners 30,000 vehicles per day (2021 AADT).

This site is adjacent to several managed and natural lands. The City of Durham maintains West Point Park along the western side of the crossing. The NC DNCR Division of Parks and Recreation maintains the Mountains-to-Sea Trail, Middle Eno River Bluffs and Slope, and the Eno River Aquatic Habitat. The US Fish and Wildlife Service has identified the site as a critical habitat for the Atlantic Pigtoe, Neuse River Waterdog, Carolina Madtom, and Green Floater.

While barriers to wildlife travel under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists, the wildlife passage appears to be highly viable along this section of the river and corridor approaching and under the bridge, and the natural surface stream banks are overall excellent. No major remediation is needed except for the northeast and southeast slopes needing deep erosion/incision and voids backfilled and stabilized to prevent recurrence, and to allow full wildlife passage.

Under US 501 (Roxboro Road) bridge over Eno River, view upstream on the south bank. Pete Schubert.

Under US 501 (Roxboro Road) bridge over Eno River, view downstream from the south bank to the north bank. Pete Schubert.



Aerial photograph of US 501 (Roxboro Road) bridge over Eno River. Nearmap.

Site Facts

Location ID	DurhamCo3
Date of Site Visit	June 13, 2024
Jurisdiction	Durham County
Coordinates	36°04'19.4"N 78°54'31.0"W
NCDOT Crossing/Structure Code	310035
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	2050 MTP Highway: (MTP ID 92) Roxboro Rd (501 N) CTP Highway: US 501 (Roxboro Rd) CTP Multiuse Path: RoxboroA2 CTP Pedestrian: Hwy 501
Managed and Natural Lands	City of Durham, NC DNCR Division of Parks and Recreation, US Fish and Wildlife Service
Average Annual Daily Traffic (AADT) (2019)	31,500
Average Annual Daily Traffic (AADT) (2021)	30,000
Projected Average Weekday Traffic (AWDT)	29,766
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 18 ($450,000) Type B injury crash: 1 ($187,000) **Total crashes and cost estimate: 19 ($637,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 153 ($3,825,000) Type B injury crash: 8.5 ($1,589,500) **Total crashes and cost estimate: 161.5 ($5,414,500)**

19
Reported WVCs within 1-mile buffer (2018-2022)

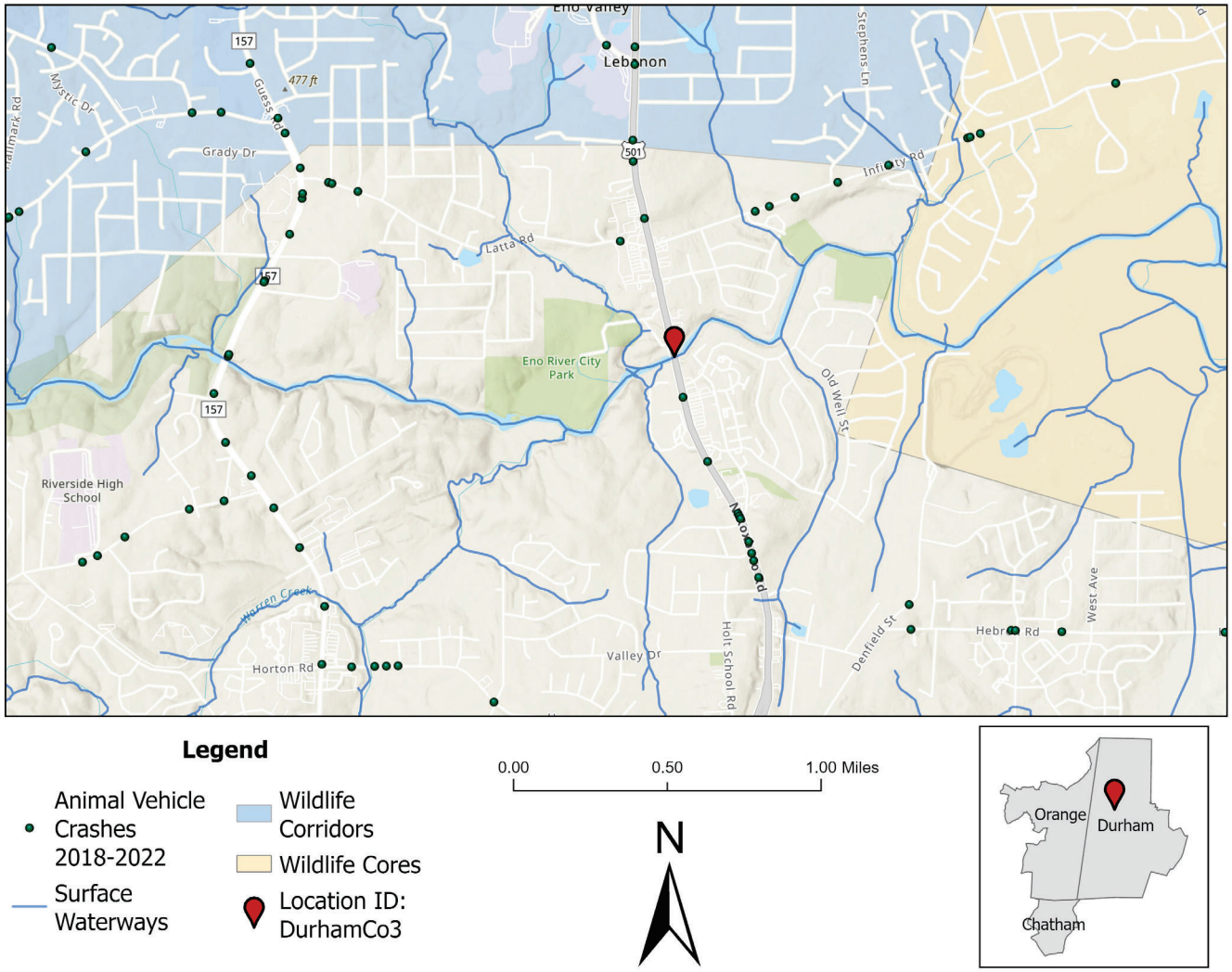
$637,000
Reported WVCs cost estimate

30,000
Annual average daily traffic (2021)

Adjacent managed natural land

Preferred Scenario

Evaluate and permanently repair deep erosion of banks due to stormwater flows coming from the roadway embankments and daylighting downstream of the bridge.



Durham County

Guess Road over Eno River

Summary and Problem Statement

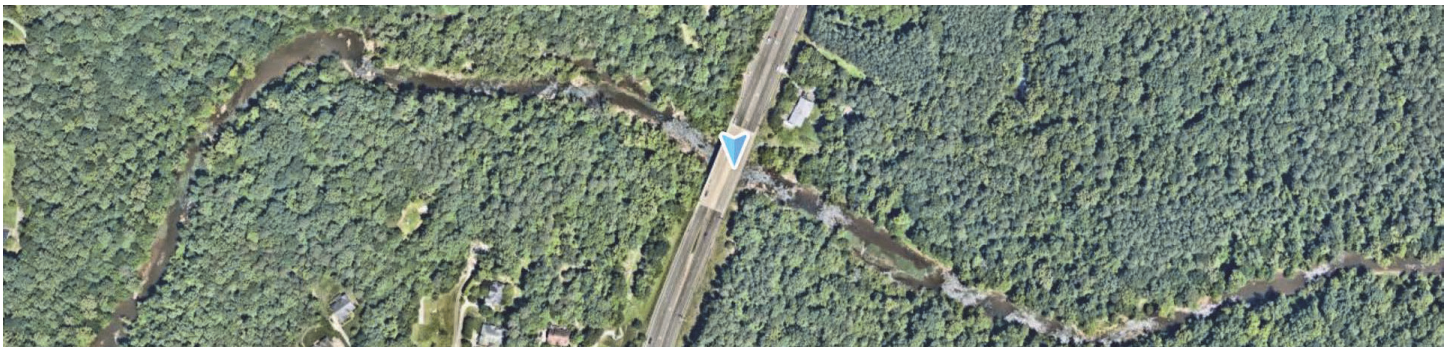
Guess Road (NC 157) over the Eno River has been identified as a priority wildlife crossing. This crossing resides just outside of the boundaries of both a wildlife corridor and core identified by the Wildlands Network, making this site an important travel connection to both. The 5-lane single-span bridge is divided by a median, with two lanes moving southbound, and three lanes moving northbound. There have been 34 WVCs have been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities, has a posted speed limit of 45 mph, and garners 20,500 vehicles per day (2021 AADT).

This site is adjacent to natural managed lands. The City of Durham maintains West Point Park, which runs along the eastern side of crossing. The NC DNCR, Division of Parks and Recreation maintains Eno River State Park along the western side of the crossings and the Mountains-to-Sea Trail. The US Fish and Wildlife Service has identified the site as a critical habitat for the Atlantic Pigtoe, Neuse River Waterdog, and Carolina Madtom.

Barriers to wildlife travel under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. The substrate is a continuous rocky bottom throughout with large stones and some exposed bedrock. A low-profile concrete weir exists under the bridge perpendicular to the river water flow which may be a remnant from a former abutment. Large riprap covers the slope on both sides, beginning at the river's edge. Both riprap slopes have a shelf that could be remediated for wildlife passage. The south side has a 5-foot wide dry passage near the top of slope but it would be difficult for wildlife to negotiate. The north side has a 50-foot-wide dry passage for the Mountains-to-Sea Trail. All entryways to the bridge appear to be clear of obstructions including any dense vegetation. Wildlife passage is not possible on the south side due to the placement of exposed, oversize riprap. Riprap on existing shelves could be relocated or removed to expose a natural surface, or it could be left in place and the voids filled with fine aggregate and alluvial materials to create a natural surface.

East side of Guess Road bridge over Eno River. Pete Schubert.

West side of Guess Road bridge over Eno River. Pete Schubert.



Aerial photograph of Guess Road bridge over Eno River. Nearmap.

Site Facts

Location ID	DurhamCo4
Date of Site Visit	June 13, 2024
Jurisdiction	Durham County
Coordinates	36°04'18.7"N 78°56'04.8"W
NCDOT Crossing/Structure Code	310050
Existing Structure Type	Bridge
Property Owner Type	Public, private
Existing Plan Alignment	CTP Pedestrian: Guess Rd (Bicycle Lane) CTP Highway: NC 157 (Guess Rd)
Managed and Natural Lands	City of Durham, NC DNCR Division of Parks and Recreation, US Fish and Wildlife Service
Average Annual Daily Traffic (AADT) (2019)	22,500
Average Annual Daily Traffic (AADT) (2021)	20,500
Projected Average Weekday Traffic (AWDT)	31,230
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 33 ($825,000) Type B injury crash: 1 ($187,000) **Total crashes and cost estimate: 34 ($1,012,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 280.5 ($7,012,500) Type B injury crash: 8.5 ($1,589,500) **Total crashes and cost estimate: 289 ($8,602,000)**

34
Reported WVCs within 1-mile buffer (2018-2022)

$1,012,000
Reported WVCs cost estimate

20,500
Annual average daily traffic (2021)

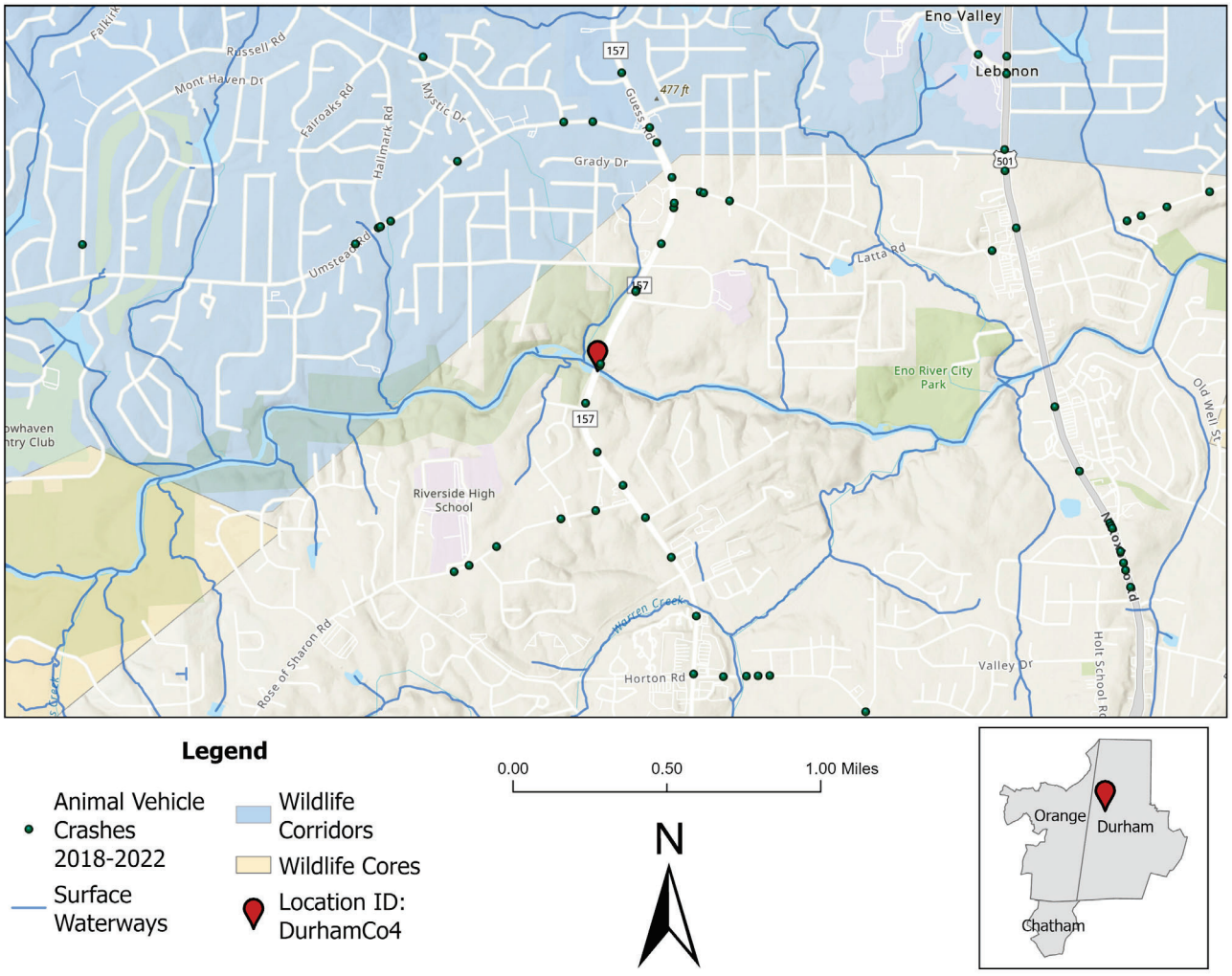
Adjacent managed natural land

Preferred Scenario

Remove some of the large riprap slope protection from existing shelves under the bridge on both sides (including entryways) to allow wildlife passage on natural surfaces.

Alternate Scenario

Use small stones to choke/fill the voids within the shelf portions of the existing riprap slope to allow for a 12-foot-wide passage on both slopes. Continue shelves for about 30 feet beyond the underside of bridge to allow for adequate approaches for wildlife.



Durham County

Old Oxford Road over Eno River

Summary and Problem Statement

Old Oxford Road over the Eno River has been identified as a priority wildlife crossing. This crossing resides within a wildlife core identified by the Wildlands Network, and five WVCs have been reported within a one-mile buffer of this site. The bridge is a 2-lane undivided with no bicycle and pedestrian facilities. This site has a posted speed limit of 45 mph, and garners 7,700 vehicles per day (2021 AADT).

This site is adjacent to several managed and natural lands. The US Army Corps of Engineers maintains Falls Lake managed area on both sides of the roadway and crossing. The NCWRC maintains Butner-Falls of Neuse Game Land on the eastern side of the crossing. The Catsburg Registered Heritage area (NHNA) covers 100 areas to the southwest side of the crossing, which is maintained by NC DNCR Natural Heritage Program, NC Department of Agriculture Plan Conservation Program, and the US Army Corps of Engineers. The US Fish and Wildlife Service has identified the site as a critical habitat for the Neuse River Waterdog, Carolina Madtom, and Green Floater. The NC DNCR Natural Heritage Program maintains the Penny's Bend/Eno River Bluffs Registered Heritage Area (NHNA) on the western side of crossing following the bank of the Eno River.

Barriers to wildlife travel within this core and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. Above the river there are steep slopes with little to no riprap. The north slope contains many stranded debris at a high bench with about 12 feet of clearance. The bench is impassible due to the debris, and the highest portion has some riprap. There is a narrow semi-dry passage (4-5 feet wide) along the river edge with some gravel substrate. The south slope above the abutment wall is dry natural substrate with concrete on portions of the upper slope. There is approximately 8-10 feet of dry upper passage. At the bottom of the slope there is 5-6 feet of semi-dry passage with 7 feet of clearance.

Old Oxford Road bridge over Eno River looking South. Pete Schubert.

Old Oxford Road bridge over Eno River looking North. Pete Schubert.

Aerial photograph of Old Oxford Road bridge over Eno River. Nearmap.

Site Facts

Location ID	DurhamCo5
Date of Site Visit	June 13, 2024
Jurisdiction	Durham County
Coordinates	36°04'21.5"N 78°51'45.9"W
NCDOT Crossing/Structure Code	310024
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	CTP Highway: Old Oxford Rd CTP Bicycle: Roxboro to US 70 CTP Pedestrian: Old Oxford Hwy
Managed and Natural Lands	US Army Corps of Engineers, NCWRC, NC DNCR Natural Heritage Program, NC Department of Agriculture Plan Conservation program, US Fish and Wildlife Service
Average Annual Daily Traffic (AADT) (2019)	6,600
Average Annual Daily Traffic (AADT) (2021)	7,700
Projected Average Weekday Traffic (AWDT)	8,971
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 4 ($100,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 5 ($207,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 34 ($850,000) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 42.5 ($1,759,500)**

5
Reported WVCs within 1-mile buffer (2018-2022)

$207,000
Reported WVCs cost estimate

45
mph speed limit

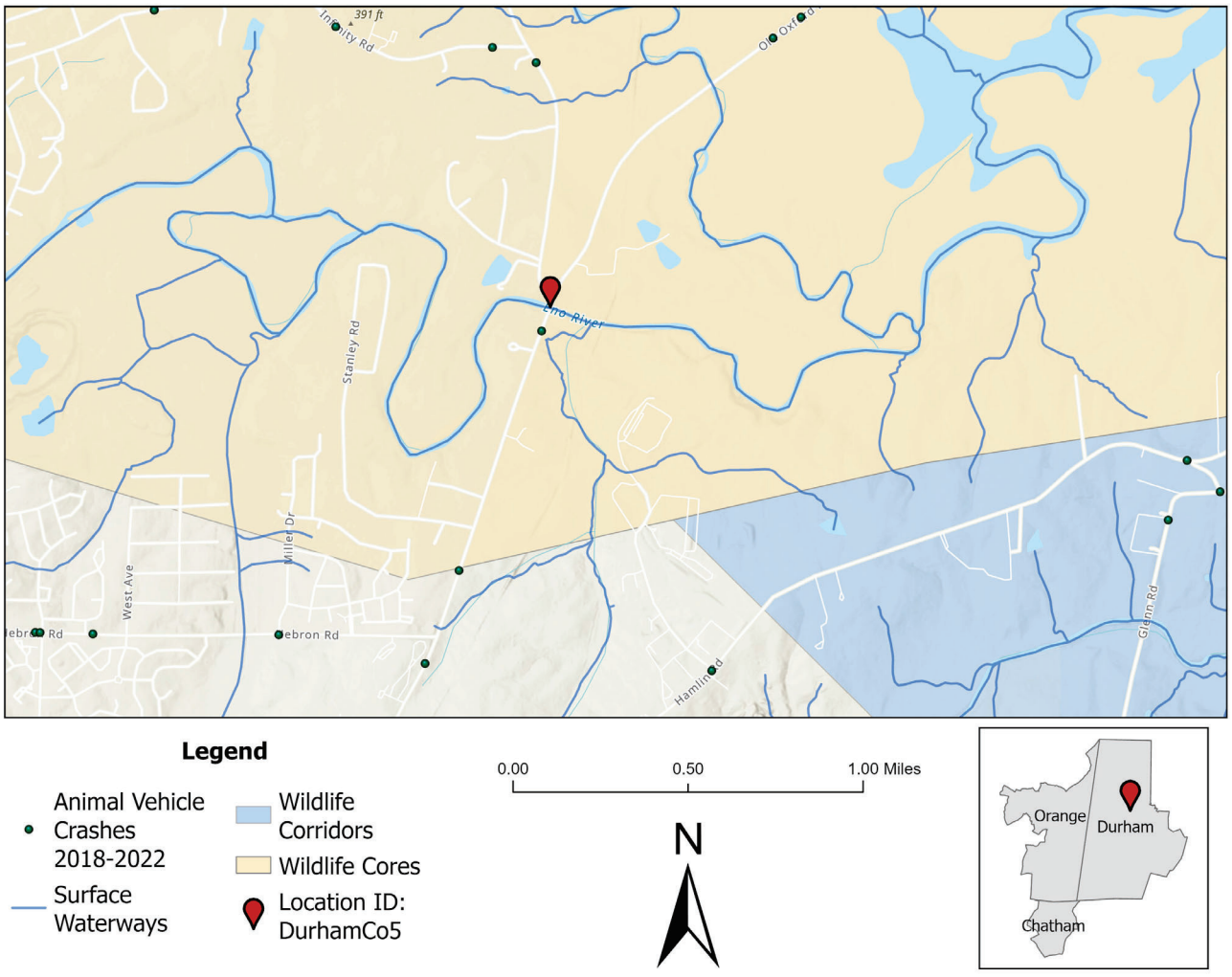
Adjacent managed natural land

Preferred Scenario

Replace the bridge and lengthen the span from the current hourglass-shaped causeway (and incised riverbank) that creates a choke point for wildlife (and fishers) and catches debris both at water's edge and up the slope.

Alternate Scenario

Remove considerable large debris from the upper northern side slope and lower southern slope to enable wildlife passage, which is currently impassible.



Durham County

NC 54 over New Hope Creek

Summary and Problem Statement

NC 54 at New Hope Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and twenty-one WVCs have been reported within a one-mile buffer of this site. This crossing recommendation encompasses two separate structures along NC 54 that are 0.25 miles apart: a culvert to the west, and a bridge to the east. This site has no bicycle and pedestrian facilities, has a posted speed limit of 45 mph, and garners 13,500 vehicles per day (2021 AADT).

This site is adjacent to several managed and natural lands. The U.S. Army Corps of Engineers manages land as part of the B. Everret Jordan Lake and Dam managed area. The U.S. Army Corps of Engineers, NC DNCR, and the Natural Heritage Program manages land as part of the Lower New Hope Creek Floodplain Forest and Slopes Registered Heritage Area- managed area covering 1,601.41 acres to the south of the crossing sites (registered heritage area). The U.S. Army Corps of Engineers, NC DNCR, and the Natural Heritage Program also manages land as part of the New Hope Creek Bottomland Forest Registered Heritage Area-managed area covering 739.85 acres to the North of the crossing sites (registered heritage area).

Barriers to wildlife travel along this corridor and under the bridge and through the culvert exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. While the bridge span does have dry passage on both sides of the channel, it does not during flood stage. Though the overhead clearance is marginal at present, it may be possible to install stepped natural soil benches against each abutment slope to provide some high-water access. Additional dry culverts (with natural soil bottoms at adjacent floodplain level with at least one bay stepped up) should be considered on both the bridge structure, and the 4-bay box culvert.

Approximately 500 feet upstream of NC 54 in the New Hope Creek floodplain is the New Hope Waterfowl Impoundment, which consists of two low (5-foot rise) earthen causeway/embankments (roughly 1,950 feet west and 250 feet east), connected by a 490-foot flat topped concrete spillway and a 2-bay stoplog control structure across the creek channel. Immediately downstream and parallel to the spillway and outlet structure is a 490-foot by 130-foot open water stilling basin, which provides a significant barrier to wildlife passage along the creek up and downstream, forcing movement away from the banks to cross the sub-impoundment structures, and then to return to the narrowed banks approaching the NC 54 bridge and causeway. Additionally, when seasonally impounded (fall/early winter), terrestrial wildlife passage is forced to the far edges of the inundated floodplain. Though the grassed, low slope sub-impoundment embankments are not significant barriers, the NC 54 embankment and motor vehicle traffic is. Additional dry culverts should be added to NC 54 at the causeway ends to allow for dry passage of wildlife when the impoundments above and/or below NC 54 are flooded.

Aerial photograph of NC 54 culvert (west) and bridge (east) over New Hope Creek. Nearmap.

NC 54 culvert over New Hope Creek. Pete Schubert.

Site Facts

Location ID	DurhamCo6 (Bridge) DurhamCo7 (Culvert)
Date of Site Visit	April 19, 2024
Jurisdiction	City of Durham
Coordinates	Bridge: 35°55'00.4"N 78°58'13.6"W Culvert: 35°54'56.8"N 78°58'28.5"W
NCDOT Crossing/Structure Code	Bridge: 310041 Culvert: 310013
Existing Structure Type	Bridge, culvert
Property Owner Type	Public
Existing Plan Alignment	2050 MTP: U-5774G CTP Highway: NC 54 CTP Bicycle & Pedestrian: W Hwy 54 CTP Bicycle & Pedestrian: Durham-Chapel Hill Greenway
Managed and Natural Lands	US Army Corps of Engineers, NC DNCR, Natural Heritage Program
Average Annual Daily Traffic (AADT) (2019)	16,500
Average Annual Daily Traffic (AADT) (2021)	13,500
Projected Average Weekday Traffic (AWDT)	27,742
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 20 ($500,000) Total C injury crash: 1 ($107,000) **Total Crashes and cost estimate: 21 ($607,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 170 ($4,250,000) Total C injury crash: 8.5 ($909,500) **Total Crashes and cost estimate: 178.5 ($5,159,000)**

21
Reported WVCs within 1-mile buffer (2018-2022)

$607,000
Reported WVCs cost estimate

13,500
Annual average daily traffic (2021)

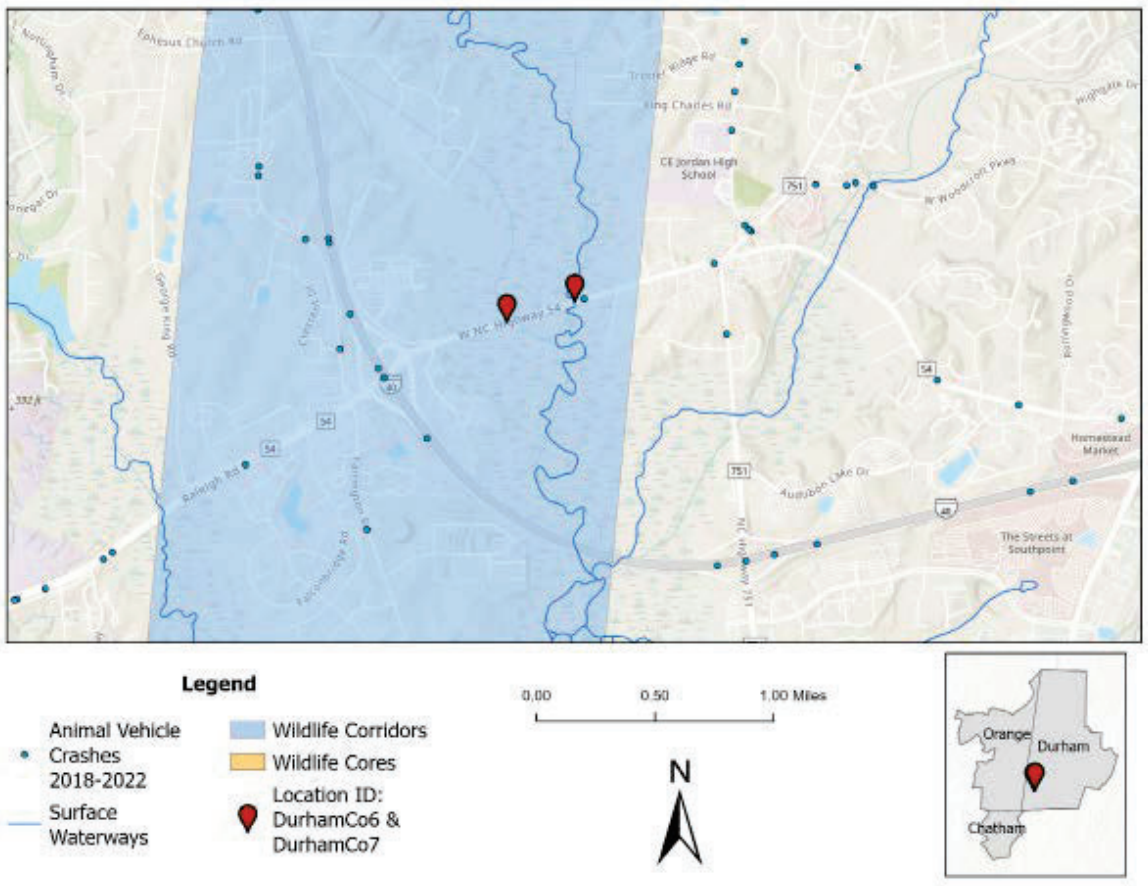
Adjacent managed natural land

Preferred Scenario

Replace the bridge with a longer and higher span to allow for the construction of dry wildlife passages above the floodplain on both sides of the creek, with at least 8 feet of vertical clearance beneath the new structure. Elsewhere along the raised and widened NC 54 causeway, construct at least two multi-bay box culverts away from the active or any abandoned channels, to provide dry passage for wildlife within the wide New Hope Creek floodplain, aligned due south (downstream) of the ends of the upstream wildlife sub-impoundment structure (spillway and control structure including stilling basin). One of the bays should be floored above the floodplain elevation to provide dry passage during flood events. Similarly, replace the existing 4-bay box culvert with a single span bridge of sufficient length and height to provide dry passage for wildlife on both sides of the high-water channel.

Alternate Scenario

Raise a section of the banks under the bridge against the abutment slopes on both sides of the creek to provide a high-water dry wildlife passage.



Durham County

I-40 Bridge over New Hope Creek

Summary and Problem Statement

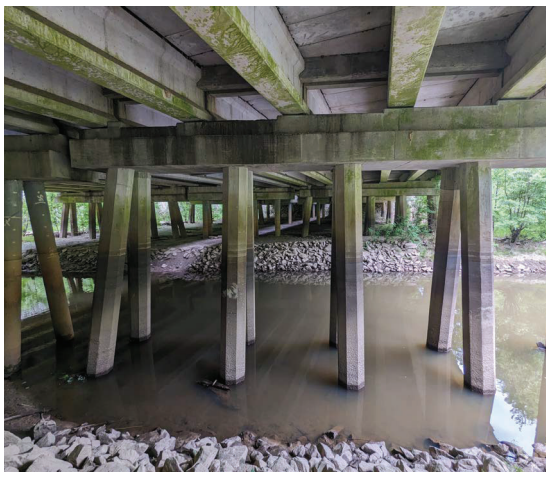
The I-40 bridge over New Hope Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, has been identified by Wildlands Network as a priority wildlife crossing site, and thirteen WVCs have been reported within a one-mile buffer of this site. This crossing recommendation encompasses two separate bridge structures along I-40, both with three lanes in each direction – making this a six-lane transportation facility. This site has no bicycle and pedestrian facilities, has a posted speed limit of 65 mph, and garners 124,000 vehicles per day (2019 AADT).

This site is adjacent to several managed and natural lands. The U.S. Army Corps of Engineers manages land as part of the B. Everret Jordan Lake and Dam managed area. The U.S. Army Corps of Engineers, NC DNCR, and the Natural Heritage Program manages land as part of the Lower New Hope Creek Floodplain Forest and Slopes Registered Heritage Area- managed area covering 1601.41 acres to the south of the crossing sites (registered heritage area).

Barriers to wildlife travel along this corridor and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. The barriers include riprap placement, a sub impoundment structure (stoplog control structure and concrete spillway), standing water in the downstream stilling basis, fencing, tributary stream crossing, and noise. Riprap covers the area under the bridge on the west side of the stream, on the steep slopes up to and down from the access road, and the sub impoundment structure on both southeast and southwest sides of bridge. On the southwest side of the bridge, fencing extends from bridge to the width of the ROW (at top of steep riprap slope). On the southeast side of the bridge, fencing extends from bridge to the width of the ROW (perpendicular to end of concrete spillway structure) and then turns parallel to the interstate highway. The steep slopes of the sub impoundment spillway structure eliminate any sightlines wildlife may use.

On the northeast side of bridge, Third Fork Creek flows into New Hope Creek. The Third Fork Creek channel extends parallel to the road about twice the bridge's length and then turns north. The channel appears to be engineered, and there is riprap along portions of the banks. At the confluence with New Hope Creek, there is currently a sediment (sand/silt) bar across the tributary (likely shifting or impermanent). As a result of all the above, there are significant "pathway" barriers for wildlife to move between habitat on the north and south sides of the bridge. The noise generated by vehicular travel on the bridge is exceptionally loud and can be an audible wildlife deterrent.

Aerial photograph of I-40 bridge over New Hope Creek. Nearmap.



Under I 40 bridge facing east over New Hope Creek. Pete Schubert.

Site Facts

Location ID	DurhamCo8 DurhamCo9
Date of Site Visit	April 19, 2024
Jurisdiction	City of Durham
Coordinates	35°54'16.5"N 78°58'13.1"W
NCDOT Crossing/Structure Code	DurhamCo8: 310304 DurhamCo9: 310303
Existing Structure Type	Bridge (2 seperate structures)
Property Owner Type	Public
Existing Plan Alignment	2024-2033 STIP: I-5993 2050 MTP: I-6006 CTP Highway: I-40 CTP Bicycle & Pedestrian: I-40 Multiuse Path
Managed and Natural Lands	US Army Corps of Engineers, NC DNCR, Natural Heritage Program
Average Annual Daily Traffic (AADT) (2019)	124,000
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	Eastbound bridge: 81,571 Westbound bridge: 82,638
Speed Limit	65 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 12 ($300,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 13 ($407,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 102 ($2,550,000) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 110.5 ($3,459,500)**

13
Reported WVCs within 1-mile buffer (2018-2022)

$407,000
Reported WVCs cost estimate

124,000
Annual average daily traffic (2019)

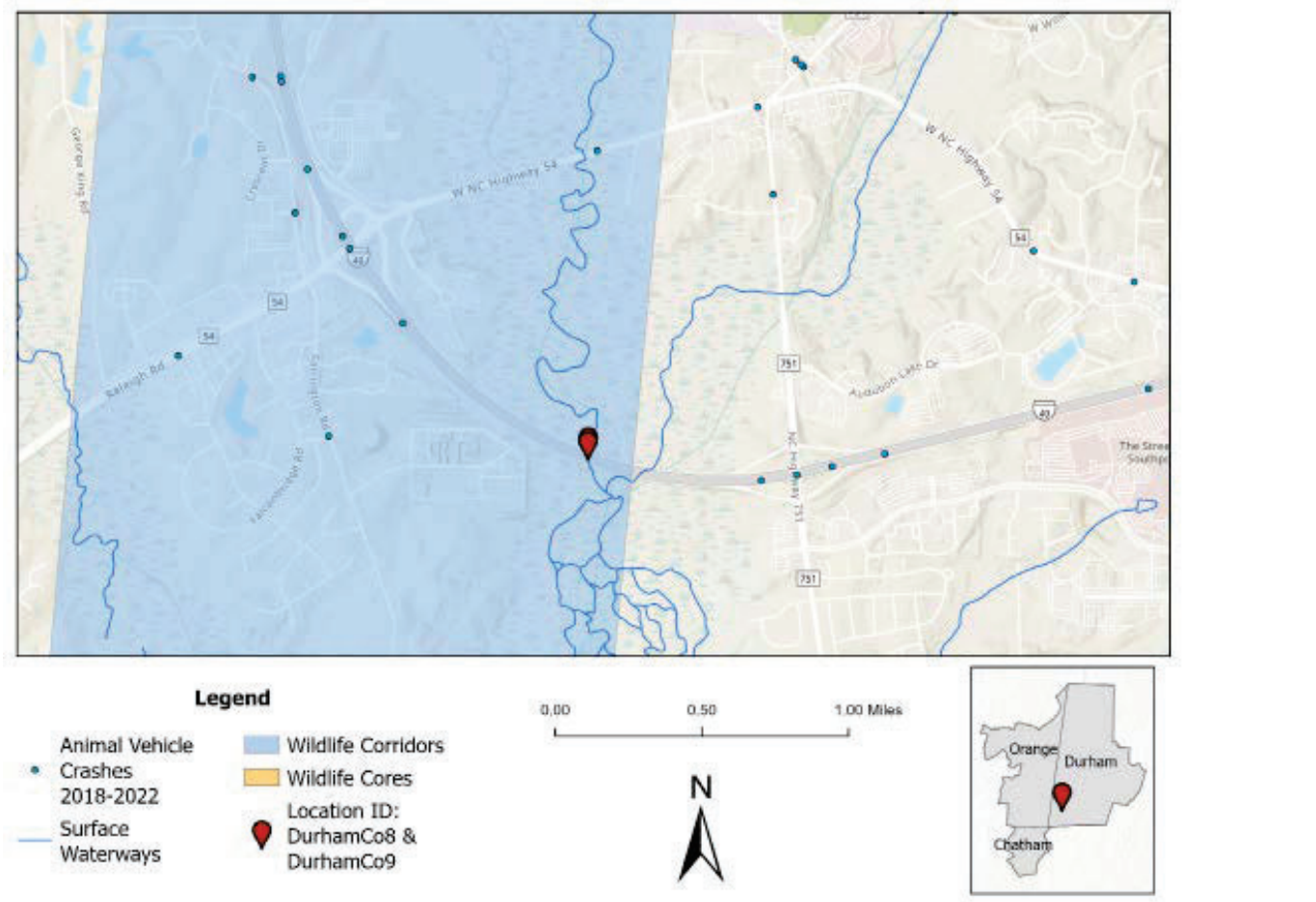
Adjacent managed natural land

Preferred Scenario

Fill the voids in the exposed riprap surfaces under the bridge spans with fine aggregate stone or alluvial fill to provide a continuous dry wildlife passage on the west side. Raise the elevation of the ground surface in the easternmost bay with appropriate material to provide a dry wildlife passage above the floodplain surface. Consult with NCWRC to explore the removal of the sub impoundment structures and significant barrier to wildlife access across the ROW with the New Hope Creek floodplain and stream under the I-40 spans.

Alternate Scenario

Fill the voids in the exposed riprap surfaces under the bridge spans with fine aggregate stone or alluvial fill to provide a continuous dry wildlife passage on the west side. Raise the elevation of the ground surface in the easternmost bay with appropriate material to provide a dry wildlife passage above the floodplain surface.



Durham County

Stagecoach Road over New Hope Creek

Summary and Problem Statement

Stagecoach Road over New Hope Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and seven WVCs have been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities, has a posted speed limit of 45 mph, and garners 8,300 vehicles per day (2021 AADT).

This site is adjacent to several managed and natural lands. The U.S. Army Corps of Engineers manages land as part of the B. Everret Jordan Lake and Dam managed area. The U.S. Army Corps of Engineers, NC DNCR, and the Natural Heritage Program manages land as part of the Lower New Hope Creek Floodplain Forest and Slopes Registered Heritage Area- managed area covering 1,601.41 acres on both sides of the crossing area (registered heritage area).

Barriers to wildlife travel along this corridor and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. While the bridge span does have dry passage on both sides of the channel, the exposed riprap is an obstacle that could be alleviated by using small stone fill the voids and create a natural surface. Even with this surface improvement, there is no dry passage during flood stage. Though the overhead clearance of the bridge is marginal at present, it may be possible to install stepped natural soil benches against each abutment slope to provide some high-water access. Additional dry culverts (with natural soil bottoms at adjacent floodplain level with at least one bay stepped up) should be added if Stagecoach Road is widened in the future.

Approximately 270 feet upstream of Stagecoach Road in the New Hope Creek floodplain is the NCWRC's "Stagecoach Road Waterfowl Impoundment", which consists of two low (5-foot rise) earthen causeway/embankments (roughly 830 feet West and 500 feet East), connected by a 590-foot flat-topped concrete spillway and a 2-bay stoplog control structure across the creek channel. Immediately downstream and parallel to the spillway and outlet structure is a 620-foot by 150-foot open water stilling basin, which provides a significant barrier to wildlife passage along the creek up and downstream, forcing movement away from the banks to cross the sub impoundment structures, and then to return to the narrowed banks approaching the Stagecoach Road bridge and causeway. Additionally, when seasonally impounded (fall/early winter), terrestrial wildlife passage is forced to the far edges of the inundated floodplain. Though the grassed, low slope sub impoundment embankments are not significant barriers, the Stagecoach Road embankment and vehicle traffic is. Additional dry culverts should be added to Stagecoach Road at the causeway ends to allow for dry passage of wildlife when the impoundments above and/or below Stagecoach Road (including when Jordan lake rises) are flooded.

Aerial photograph of Stagecoach Road bridge over New Hope Creek. Nearmap.

South side of Stagecoach Road bridge facing North over New Hope Creek. Pete Schubert.

Site Facts

Location ID	DurhamCo10
Date of Site Visit	April 19, 2024
Jurisdiction	Durham County
Coordinates	35°53'05.7"N 78°57'56.3"W
NCDOT Crossing/Structure Code	310111
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	CTP Pedestrian: Stagecoach Rd
Managed and Natural Lands	US Army Corps of Engineers, NC DNCR Natural Heritage Program
Average Annual Daily Traffic (AADT) (2019)	9,700
Average Annual Daily Traffic (AADT) (2021)	8,300
Projected Average Weekday Traffic (AWDT)	18,958
Speed Limit	45
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 7 ($175,000) **Total crashes and cost estimate: 7 ($175,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 59.5 ($1,487,500) **Total crashes and cost estimate: 59.5 ($1,487,500)**

7
Reported WVCs within 1-mile buffer (2018-2022)

$175,000
Reported WVCs cost estimate

8,300
Annual average daily traffic (2021)

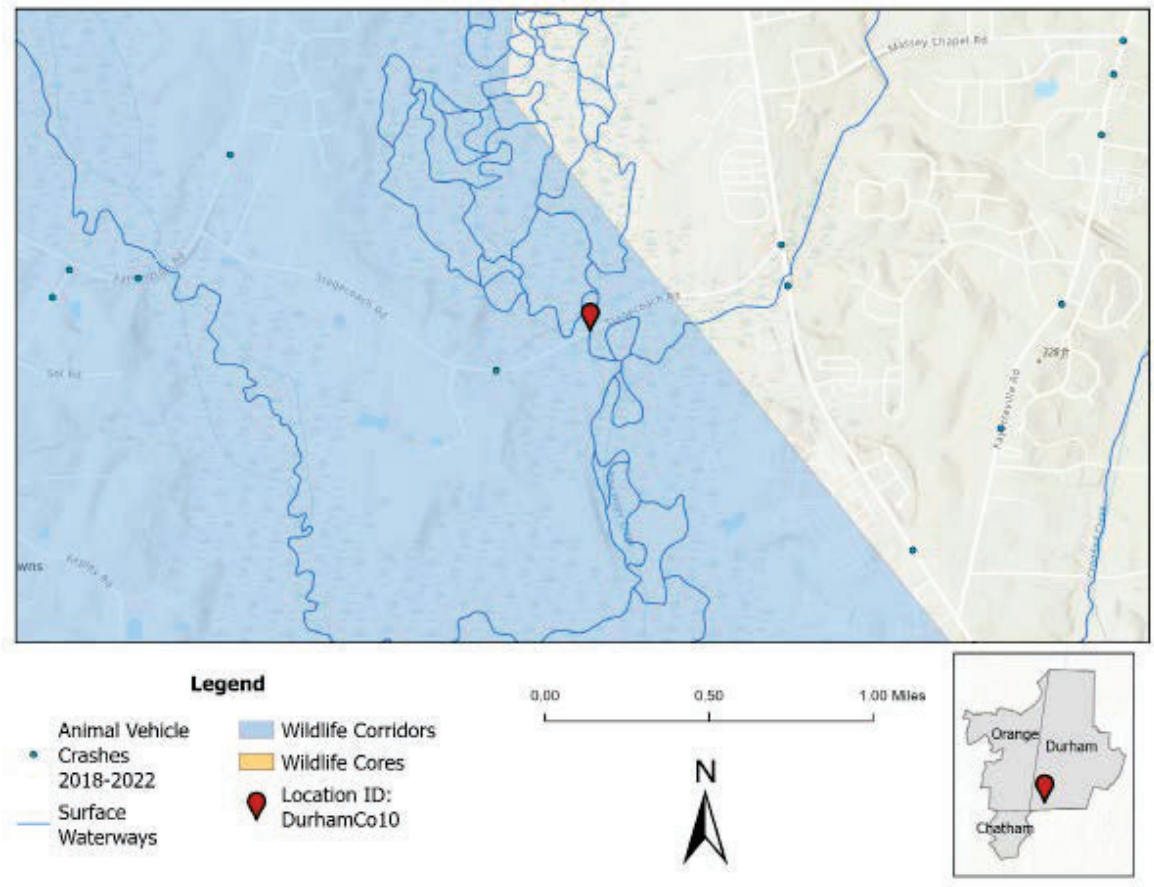
Adjacent managed natural land

Preferred Scenario

Raise the approaches of the bridge and causeway to a minimum of 8 feet vertical clearance for wildlife along dry passages on both sides of the creek. Install two supplementary minimum 2-bay box culverts at points along the causeway downstream of the ends of the upstream wildlife sub impoundment structure (spillway, outlet/control bays, and stilling basin), to allow for dry passage of wildlife within the New Hope Creek floodplain away from the creek banks. All culvert bays shall have natural surface bottoms and at least 8 feet of vertical clearance, with one bay floored above the floodplain to enhance dry passage during flooding events.

Alternate Scenario

Use fine aggregate to fill the voids among the exposed riprap under the existing bridge span to provide natural surface dry passage for wildlife. Build up the elevation of the dry passage nearer the abutments to provide dry passage during flooding events. Install additional, supplementary dry passage culverts to allow for dry passage of wildlife within the New Hope Creek floodplain away from



Durham County

Old Chapel Hill Road over New Hope Creek

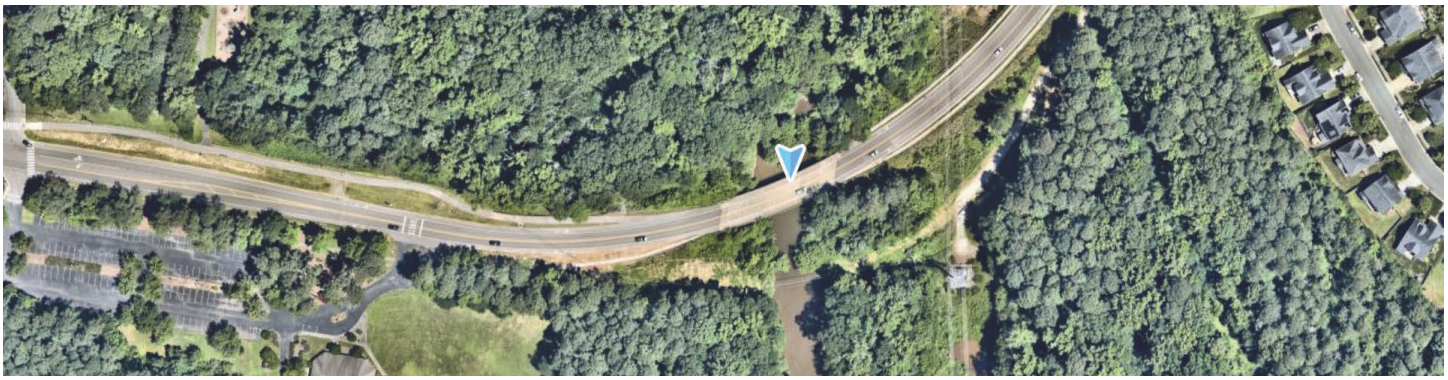
Summary and Problem Statement

The bridge at Old Chapel Hill Road at New Hope Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and there have been fourteen reported wildlife-vehicle crashes within a one-mile buffer in this identified wildlife corridor. This site is adjacent to managed lands by the NC DNCR Natural Heritage Program, and U.S. Army Corps of Engineers, which is part of the New Hope Creek Bottomland Forest Registered Heritage Area covering 739.85 acres on both sides of the crossing. The crossing site on Old Chapel Hill Road (SR 2220) has bicycle and pedestrian facilities, has a posted speed limit of 40 mph, and garners 13,500 vehicles per day (2021 AADT). This wildlife crossing site is positioned along TIP project EB-4707B: "Old Chapel Hill (SR 2220) Old Durham Rd (SR 1838)", which added bicycle and pedestrian facilities and was completed on July 3, 2019. Wildlife crossing countermeasures were not incorporated as part of this completed project.

Barriers to wildlife travel along this corridor and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. A significant obstacle to safe wildlife passage under the existing structure is the lack of bare ground between the riprap slope protection and the creek channel. While the lower portions of the riprap have trapped some interstitial sediment, there are many voids and a very uneven surface that would prevent smaller wildlife from crossing.

South side of Old Chapel Hill Road bridge over New Hope Creek looking north. DCHC MPO.

North side of Old Chapel Hill Road bridge over New Hope Creek looking south. DCHC MPO.



Aerial photograph of Old Chapel Hill Road bridge over New Hope Creek. Nearmap.

Site Facts

Location ID	DurhamCo11
Date of Site Visit	March 15, 2024
Jurisdiction	Durham County
Coordinates	35°56'34.3"N 78°58'32.6"W
NCDOT Crossing/Structure Code	310215
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	STIP # EB-4707B (completed July 3, 2019) CTP Highway: Old Chapel Hill Rd. CTP Pedestrian: Old Chapel Hill Rd CTP Multiuse Paths: Old Chapel Hill A1
Managed and Natural Lands	NC DNCR, Natural Heritage Program. New Hope Creek Bottomland Forest Registered Heritage Area
Average Annual Daily Traffic (AADT) (2019)	15,000
Average Annual Daily Traffic (AADT) (2021)	13,500
Projected Average Weekday Traffic (AWDT)	20,937
Speed Limit	40
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 13 ($325,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 14 ($432,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 110.5 ($2,762,500) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 119 ($3,672,000)**

14
Reported WVCs within 1-mile buffer (2018-2022)

$432,000
Reported WVCs cost estimate

13,500
Annual average daily traffic (2021)

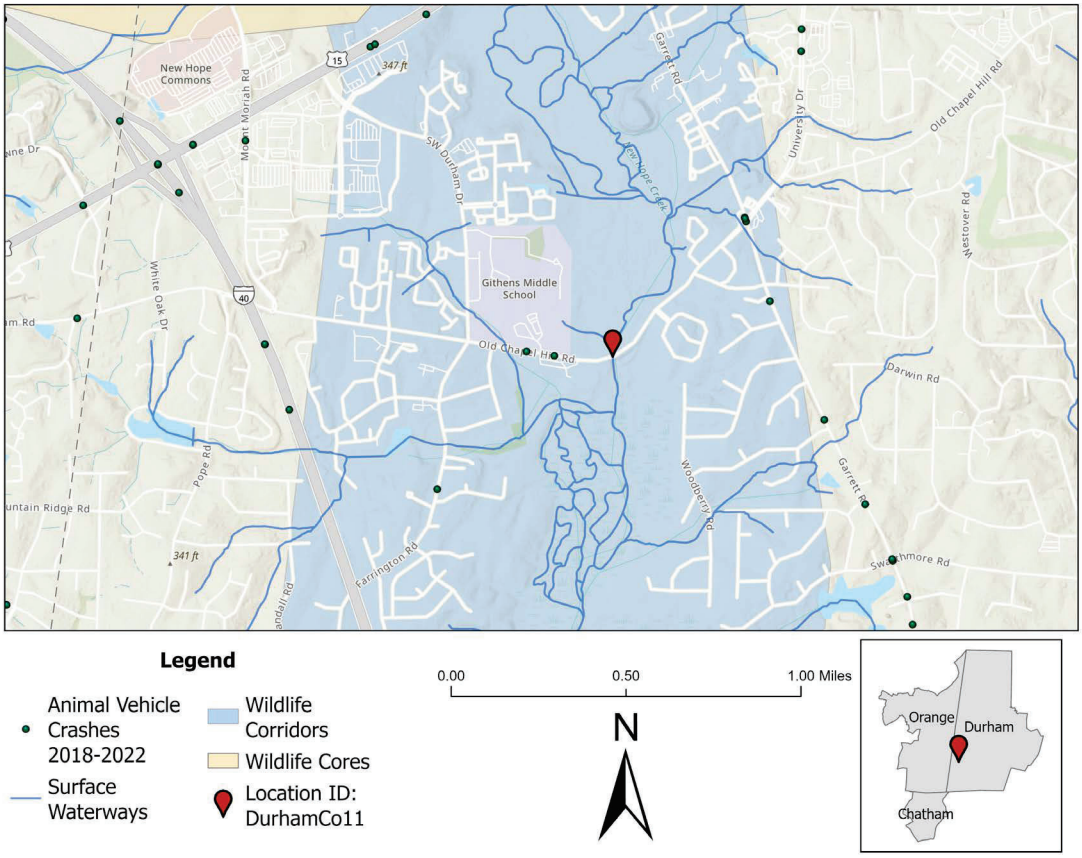
Adjacent managed natural land

Preferred Scenario

The preferred recommendation of this site includes lengthening the bridge span and removing approach embankment fills to leave room for continuous floodplain on both sides under the bridge; create benching into the riprap to provide a terrace parallel to the bank (on each side), which would then be choked and filled with gravel and rock fines; to suspend or otherwise support a shelf from the deck that wildlife could use; and then install quality fencing on both sides of the bridge to guide wildlife under the structure and off of the road. However, this crossing aligns with a TIP project (EB-4707B) completed in July 2019 – therefore, a new bridge (while preferred) may be unlikely.

Alternate Scenario

Remove considerable large debris from the upper northern side slope and lower southern slope to conduct a riprap remediation to reposition existing riprap to create a wildlife bench on both sides of the creek. Once the benches are built, install fencing of sufficient length on both sides of the bridge to guide wildlife under the structure and off the road.



Durham County

Farrington Road over Little Creek

Summary and Problem Statement

Farrington Road over Little Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and seven (7) WVCs have been reported within a one-mile buffer of this site. The single-span bridge is a 2-lane undivided with no bicycle and pedestrian facilities. This site has a posted speed limit of 45 mph and garners 13,000 vehicles per day (2021 AADT). The NCDOT is currently conducting environmental, planning, and design studies to support the future replacement of this bridge (Bridge Replacement: BP5-R117), which presents a timely opportunity to help inform this project. The current let date is October 2030.

This site is adjacent to natural managed lands. The US Army Corps of Engineers maintains the B. Everret Jordan Lake and Dam managed area. The NC DNCR Natural Heritage Program maintains Little Creek Bottomlands and Slopes Registered Heritage Area, which covers 1,088.6 acres on the south side of crossing and 160 ft north of the crossing in the Jordan Lake Managed area.

Barriers to wildlife travel along this corridor and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. Barriers include standing water, riprap placement, and the upstream sub impoundment spillway, outlet structure, and earth embankments with steep riprapped slopes. There are areas of permanent flooding upstream and downstream of the crossing – the upstream flooding is due to the sub impoundment structure and was created to support waterfowl habitat for hunting. The cause of the downstream flooding is likely to be the result of backwater from Jordan reservoir, perhaps amplified by downstream beaver damming in the extensive floodplain. An earthen causeway extends from the ends of the spillway structure. Riprap slopes extend down the road causeway at the corners of the spillway structure and along the causeway slopes. There are also riprap slopes leading to the corners of the underpass opening, blocking the approach to the underpass. The riprap slopes wrap entirely around the causeway. All riprap slope protection so described and observed extends into standing water. Dense vegetation may block visibility of approach to the underpass area for wildlife. Wildlife has no path from floodplain to or through the underpass.

On the west side of the underpass, there exists a natural earth area above the riprap slope protection, approximately 12 feet wide and 7 feet high, that could function for wildlife passage, however, because it is entirely above the riprap and there is no path down the riprap to the floodplain habitat either upstream or downstream, it is not connected. Similarly, on the east side of the underpass, the potential dry area passage is about 12 to 15 feet wide and 7 to 8 feet high, but it is inaccessible to the up and downstream habitat by the continuous riprap slope protection on both the roadway embankment/ causeway and the sub impoundment spillway and embankment. There is a 4 to 6 foot bench in the surface of the riprap near both outer bents, which could be connected to adjacent habitat if the benching was continued to the limits of the riprap and the voids were filled with small stone to provide a natural surface.

Aerial photograph of Farrington Road bridge over Little Creek. Nearmap.

Site Facts

Location ID	DurhamCo12
Date of Site Visit	June 13, 2024
Jurisdiction	Durham County
Coordinates	35°53'14.0"N 78°59'03.3"W
NCDOT Crossing/Structure Code	310110
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	Bridge Replacement: BP5-R117 CTP Multiuse Path: Farrington Rd CTP Pedestrian: Farrington Rd CTP Highway: Farrington Rd
Managed and Natural Lands	US Army Corps of Engineers, NC DNCR Natural Heritage Program, UNC Chapel Hill
Average Annual Daily Traffic (AADT) (2019)	14,500
Average Annual Daily Traffic (AADT) (2021)	13,000
Projected Average Weekday Traffic (AWDT)	20,177
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 7 ($175,000) **Total crashes and cost estimate: 7 ($175,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 59.5 ($1,487,000) **Total crashes and cost estimate: 59.5 ($1,487,000)**

7
Reported WVCs within 1-mile buffer (2018-2022)

$175,000
Reported WVCs cost estimate

Environmental, planning, and design studies underway for future bridge replacement

Adjacent managed natural land

Preferred Scenario

Bench, choke (fill voids) with small stone, and flatten the slopes of riprap to tie the benches into adjacent habitat areas to provide natural surface wildlife pathways that cross under the bridge at the current top of the riprap slope protection. This must be done on both sides of the bridge and across the full length of the riprap until it can tie into undisturbed habitat up and down stream, including making natural surface connections across the grassed sub impoundment dikes.

Alternate Scenario

In addition to the preferred recommendation, or as an alternative wildlife pathway, install dry culverts that are at least 8 feet high and 12 feet wide under the road at the floodplain elevation, on both sides of the bridge area, so that wildlife can move from non-flooded habitat directly to and through an underpass into non-flooded habitat on the other side of the road. These underpasses would then allow wildlife to bypass the now impenetrable obstacles in place along the streambanks. Fencing to guide wildlife to these passages and away from the road and riprap would be necessary.

Consider changing (flattening) the artificially steep slopes of the road berm and earthen causeway to gentler slopes, which could be a (re-)design principle that might also improve/reduce structural needs for riprap slope protection and to prevent fill collapse. Consideration should also be given to the need for the upstream sub impoundment in light of back flooding from Jordan Reservoir. The elimination/deconstruction of the frequently flooded spillway stilling basin, outlet structure channel, and removal of the no longer needed concrete spillway and embankment riprap slope protection would simplify the scope of the preferred scenario for the bridge and road causeways. Though the sub impoundment provides for seasonal waterfowl management upstream, it is a continuous wildlife passage impediment for all terrestrial species in the bottomlands.