US 74 Shelby Bypass

Cleveland County

STIP Project R-2707D/E

Merger Team Update

January 24, 2018

1.0 Introduction and Project Overview

1.1 Purpose of the Update

The purpose of this update is to provide the merger project team with information regarding changes to the human and natural environemnt resulting from design revisions to Sections D and E of the Shelby Bypass Project (R-2707).

1.2 Project Description

The North Carolina Department of Transportation (NCDOT) is constructing a four-lane, new location freeway from east of Mooresboro to west of Stony Point Road at US 74 Business in Kings Mountain. The project is approximately 18.5 miles long and is included in the 2018 – 2027 NCDOT State Transportation Improvement Program. This update specifically refers to R-2707 Sections D and E as described below (Figure 1).

- Section D: 4.1-mile long section from west of NC 150 to US 74 west of SR 2238 (Long Branch Road)
- Section E: 2.6-mile long section from US 74 west of Long Branch Road to west of Stony Point Road (SR 1001) at US 74 Business in Kings Mountain.

Both sections are scheduled for Right of Way Acquisition in FY 2019 and Construction in FY 2020.

1.3 Project History

October 1998	Draft Environmental Impact Statement Approved
March 1999	Section 404 Permit Application
May 1999	Concurrence Point 3 (LEDPA) – Alternative 21
May 2001	Concurrence Point 4A (Avoidance and Minimization)
January 2008	Final Environmental Impact Statement Approved
December 2008	Record of Decision Approved
July 2012	Section 404 Permit Application
July 2014	Construction Begins (Section AB and B)
July 2016	Construction Begins (Section AA)
January 2017	Construction Begins (Section C)

1.4 Current Schedule and Project Status

February 7, 2018	Concurrence Point 4B (Section D/E)
February 8, 2018	Public Meeting (Section D/E)
June 2018	Concurrence Point 4C (Section D/E)
FY 2019	Right of Way (Section D/E)
FY 2021	Construction (Section D/E)

Final design is currently underway for Sections D and E. A series of design changes have occurred since the issuance of the ROD in October 2008 and the 404 permit application in 2012. Design changes are summarized in Section 2.0. Impacts associated with these design changes are summarized in Section 3.0.

2.0 Design Update

2.1 Section D

Original Design:

Main Line
For Section D, improvements include the construction of a 4.1-mile long section of the Shelby Bypass from just west of NC 150 to US 74, just west of SR 2238 (Long Branch Road). The roadway consists of a four-lane freeway with two, 12-foot lanes in each direction, 10-foot wide paved outside shoulders, 4-foot wide paved inside shoulders, and a 46-foot wide grass median. Dual, 320-foot long, 4-lane bridges are proposed over Buffalo Creek (Figure 2A).

Interchanges
- A trumpet interchange is proposed at the intersection of the existing US 74 and the proposed Shelby Bypass.

Y-Lines
- SR 2067 (Fairview Road): 1,940-foot long realignment. Includes 208-foot bridge over Shelby Bypass.
- SR 2052 (Elizabeth Avenue): 1,220-foot long realignment. Includes 192-foot long bridge over Shelby Bypass.
- SR 2047 (Borders Road): 2,200-foot long realignment. Includes a 220-foot long bridge over Shelby Bypass.

Service Roads
- Service Road 1: 1,692-foot long, 2-lane roadway extending from Fairview Road to the disconnected section of SR 2125 (Lowman Road)

2017 Design Revisions:

Service Roads
New service roads were added to provide access to properties that are being isolated due to the construction of the Shelby Bypass as follows:

- Service Road 4: 1,020-foot long, 2-lane roadway connecting isolated parcels south of proposed Shelby Bypass to SR 2128 (Johnson Road).

- Service Road 5: 1,300-foot long, 2-lane roadway connecting to the disconnected section of Johnson Road. Dual 105-foot long, 2-lane bridges will carry the Shelby Bypass over Service Road 5.

- Service Road 5A: 350-foot long, 2-lane roadway connecting isolated parcels to Service Road 5.

2.2 Section E

Original Design:

Main Line
For Section E, improvements include construction of a 2.6-mile section of the Shelby Bypass from US 74, just west of SR 2238 (Long Branch Road) to west of Stony Point Road (SR 1001) at US 74 Business in Kings Mountain. The roadway consists of a four-lane freeway with two, 12-foot lanes in each direction, 10-foot wide paved outside shoulders, 4-foot wide paved inside shoulders, and a 46-foot wide grass median (Figure 2B).

Interchanges
- A diamond interchange is proposed at SR 2245 (Bethlehem Road).

Y-Lines
- Bethlehem Road: Roadway realignment to intersect US 74 at a proposed diamond interchange. Includes 3,860-foot long extension north of US 74 to connect to SR 2042 (Autumn Woods Drive).

Service Roads
- Service Road 6: 3,330-foot long, 2-lane roadway connecting SR 2168 (Anthony Farm Road) to Bethlehem Road Extension/US 74 Interchange.

- Service Road 7: 6,000-foot long, 2-lane roadway connecting SR 2603 (Baptist Church Road) to the Bethlehem Road Extension/US 74 interchange.

- Service Road 8: 2,630-foot long, 2-lane roadway connecting isolated parcels south of US 74 to SR 2244 (Harmon Road).

- Service Road 10: 2,890-foot long, 2-lane roadway connecting SR 2288 (Anthony Road) to Bethlehem Road.

2017 Design Revisions:

Interchanges

- A modified diamond interchange with roundabouts is proposed west of the current US 74/Bethlehem Road intersection. The revised interchange is located approximately 1,100-feet west of the original interchange. The original interchange was moved due to the presence of a high transmission power line. Construction under the power line is not feasible and movement of the line would be extremely costly and would require significant construction time since the power line would have to be completed prior to construction of the bypass. The decision to move the interchange west resulted in a reduction in wetland and stream impacts.

Service Roads

Service road designs have been updated to accommodate the new interchange location and configuration.

- Service Road 6: 2,120-foot long, 2-lane roadway connecting Anthony Farm Road and Midway Lake Road to the proposed US 74/Bethlehem Road interchange.

- Service Road 7: 6,950-foot long, 2-lane roadway connecting Baptist Church Road to the proposed US 74/Bethlehem Road interchange.

- Service Road 8: 2,580-foot long, 2-lane roadway connecting isolated parcels south of US 74 to SR 2244 (Harmon Road).

- Service Road 9 (formerly part of service road 10): 1,160-foot long, 2-lane roadway connecting Anthony Road and Midway Lake Road to the proposed US 74 interchange.

- Service Road 9A: paving and widening an existing 1,900-foot gravel section of Anthony Road from Long Branch Road to Service Road 9.

- Service Road 10: 1,850-foot long realignment of Bethlehem Road is proposed to tie in to the proposed relocated interchange. The Bethlehem Road extension is no longer proposed.

3.0 Impact Revision Summary

3.1 Jurisdictional Resources

Wetlands – Section D

Design as presented at CP4: **0.24 acres**
Design as shown in the 2012 Permit Application: **0.3 acres**
Current Design: **0.31 acres***

(*Section D wetland impacts have increased by 0.01 acres, however, this change is attributed to calculation of area using current files not an increase in wetland acreage).

Wetlands – Section E

Design as presented at CP4: **0.68 acres**
Design as shown in the 2012 Permit Application: **0.66 acres**
Current Design: **0.19 acres***

(* Wetland impacts have decreased 0.47 acres due to the change in location and design of the interchange with Bethlehem Road).

Overall, there is a net decrease in the quantity of mitigable wetland acreage. The permit application included 0.96 acres while the current design includes 0.50 acres. Detailed wetland impacts are provided in Table 1 at the end of this document.

Streams – Section D

Design as presented at CP4: **661 linear feet**
Design as shown in the 2012 Permit Application: **459 linear feet**
Current Design: **960 linear feet**

Stream impacts have increased by 501 linear feet. This is due to the following:

- A stream located south of Fairview Rd was included in the CP4 calculations. It was dropped from the jurisdictional determination after the 2009 JD verification and not included in the 2012 404 permit application. At a recent field visit, the USACE representative determined that this channel was not only jurisdictional but that the stream origin was further upstream resulting in an additional 404 linear feet of impact.

- The addition of Service Roads 4 and 5 results in 2 additional crossings and associated structures.

R2707D Additional Proposed Structures

	Service Road 4	Service Road 5
Stream ID	7-21	7-22
Classification	Perennial	Perennial
Stream Name	UT Buffalo Creek	UT Buffalo Creek
Existing Drainage Structure	-	-
Recommended Structure Type and Dimensions	66" RCP	72" RCP
NCDWQ Best Usage Classiciation	C	C
USACE Rating	58	54
NCDWQ Stream Rating	31.5	29.5
Drainage Area (sq mi)	41 acres	61 acres

Streams – Section E

Design as presented at CP4: **2,313 linear feet**
Design as shown in the 2012 Permit Application: **2,590 linear feet**
Current Design: **1,348 linear feet**

Stream impacts have decreased significantly due to the change in location and design of the interchange with Bethlehem Road. Impacts to 8-6 and 8-8 from Service Road 7 and the westbound off-ramp have been completely avoided as their alignments have been shifted to the south.

The length and number of stream crossings have been reduced as a result of the new interchange design. The double box culvert on stream 8-9 has been eliminated. Additional changes to stream crossings are described below:

R2707E Changes to 2012 Proposed Structures

Stream ID	8-2, 8-3, 8-4, 8-5, 8-7, 8-8 (stream complex)	8-9
Classification	Intermittent (except 8-8 Perennial)	Perennial
Stream Name	UT Potts Creek	UT Potts Creek
Existing Drainage Structure	-	-
Recommended Structure Type and Dimensions 2012	42" RCP, 280' 2 2x2 box culverts 705'	2 6x6 box culverts
Recommended Structure Type and Dimensions 2017/18	42" RCP, 110' 42" RCP, 232'	None – crossing eliminated
NCDWQ Best Usage Classiciation	C	C
USACE Rating	(8-2) 50; (8-3) 35; (8-4) 50; (8-5) 36; (8-7) 47; (8-8) 56	56
NCDWQ Stream Rating	(8-2) 26.5; (8-3) 27.5; (8-4) 26.5; (8-5) 25; (8-7) 26.5; (8-8) 35.5	32.5
Drainage Area (sq mi)	29 acres	205 acres

Detailed stream impacts are provided in Table 2 at the end of this document.

3.2 Federally Protected Species

Dwarf-flowered heartleaf (Hexastylis naniiflora) (DFHL) and North long-eared bat (Myotis septentrionalis) continue to be the only plants and animals with a federal classification of endangered (E), threatened (T), or proposed threatened (PT). The following details changes to adverse effects resulting from the design changes described in previous sections. These changes are based on preliminary 30% drainage design for Section D only. Thirty percent drainage design for Section E is in the process of being complete.

The addition of the three service roads in Section D did not change the direct, indirect, or cumulative impacts summarized in the 2012 Biological Assessment. However, the property on which Site 24 is located has been subdivided. Approximately 75% of the plants on Site 24 remain on the parcel that will be acquired as part of right-of-way (Table 3).

The 30% drainage design for Section D includes a ditch at Site 31 along with a pipe at Site 28 that were not anticipated during preparation of the amended BA/BO. These features would incur additional direct adverse effects and lead to a reduction in the number of plants preserved. These designs are not yet finalized; however an estimate of changes is included in Table 3.

As a result of design changes in Section E, the direct, indirect, and cumulative effects on dwarf-flowered heartleaf have changed at Sites 32 and 33, 34, and 49. The direct and indirect effects for Site 32 have been eliminated and cumulative effects have been reduced. Cumulative effects have been eliminated for Sites 33 and 34. Indirect effects at Site 34 remain the same. The quantity of adverse effects have not changed for Site 49. However, the small preservation area does not appear to be viable and has been subtracted from the overall preservation totals (Table 3).

Design changes have eliminated the ability to preserve Site 32 within the ROW. Finally, the interchange redesign necessitates an additional survey for DFHL along a portion of the new interchange to determine the potential indirect and cumulative effects of the redesign (Figure 3).

In summary, the overall adverse effects to DHFL populations have decreased; however the amount of preservation area has also decreased. NCDOT is evaluating the feasibility of protecting a portion of Site 32 and Site 43. The acquisition of these areas would result in the preservation of approximately 800 additional DFHL plants.

DFHL – Section D and E

Design as shown in the 2012 Biological Opinion: Total adverse effects associated with direct, indirect, and cumulative effects of 17.03 acres of occupied DFHL habitat containing 9,785. Onsite preservation of 9.28 acres of occupied DFHL habitat containing 4,104 DFHL plants.

Current Design: Total adverse effects associated with direct, indirect, and cumulative effects of 12.26 acres of occupied DFHL habitat containing 6,972. Onsite preservation of 6.63 acres of occupied DFHL habitat containing 2,844 DFHL plants.

3.3 Right-of-Way

ROW – Section D
ROW in Section D is 6.2 acres more as compared to the design shown in the 2012 Permit Application. This is due to the addition of the service roads. There are no additional relocations.

ROW – Section E
ROW in Section E is 1.66 acres less than the design shown in the 2012 Permit Application. There are six additional residential relocations and no additional commercial relocations.

3.4 Avoidance and Minimization

All avoidance and minimization measures presented in the FEIS, ROD, and phase permit application still apply.

4.0 Environmental Commitment Update

Updates to the Project Commitments as shown in ***bold italicized text.***

Project Commitments

US 74 Shelby Bypass

Federal-Aid No. NHF-0074(152)
WBS Number 34497.3.6

TIP Project No. R-2707 D&E
Cleveland County, North Carolina

In addition to the Section 404 Conditions, Regional Conditions, State Consistency, NCDOT's guidance for *Best Management Practices for the Protection of Surface Waters*, General Certification Conditions, and Section 401 Conditions of Certification, NCDOT has agreed to the following special commitments:

Project Development and Environmental Analysis Unit

1. Stream Relocations and Modifications. Stream relocations or modifications will be coordinated with the US Fish and Wildlife Service (USFWS), US Army Corps of Engineers (COE), the North Carolina Department of Environment and Natural Resources, Division of Water Quality (DWQ) and the North Carolina Wildlife Resources Commission (WRC) in accordance with the Fish and Wildlife Coordination Act [72 Stat. 563, as amended; 16 USC 661 et seq. (1976)]. An on-site stream mitigation review will be held with the COE, the USFWS, the WRC, and the DWQ. The assessment will determine where on-site stream mitigation is possible. Bioengineering techniques will be applied to relocated streams. These techniques will result in meandering streams with riffles and pools. Native vegetation will be used to stabilize banks and root wads will be used instead of rip-rap as appropriate. A 2:1 off-site compensatory mitigation ratio will be required unless an on-site stream is being relocated via natural stream design techniques; the latter will be at a 1:1 stream mitigation ratio. Stream mitigation (i.e., enhancement, preservation) adjacent to the project must still be completed at a 2:1 mitigation ratio if the mitigation is not an on-site natural stream design relocation. Based on the preliminary design for this project, two stream relocations will be required:

   - A stream relocation will be required for the tributary of Buffalo Creek between SR 2063 and the Light Oak community. An approximately 950-foot segment of this stream will require relocation, most likely to the east of its existing location.

     Action: Stream relocation for the tributary of Buffalo Creek is in the preliminary design phase.

- A stream relocation will be required just to the west of Lithia Springs Road for a tributary of the First Broad River. This relocation is approximately 1,100 feet in length, and will be to the north of the existing stream bed.

  Action: This proposed stream relocation applies to R-2707C, which is under construction.

2. Stream and Wetland Mitigation Plans. A comprehensive mitigation plan will be coordinated with the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, North Carolina Department of Environment and Natural Resources, Division of Water Quality, and North Carolina Wildlife Resources Commission.

   Action: See reply to Commitment 1 above.

3. Sensitive Waters. Sedimentation Pollution Control Act Design Standards in Sensitive Waters will be employed on WS-III stream crossings upstream of Moss Lake and on WS-IV First Broad River and its upstream tributaries crossed by the Preferred Alternative.

   Action: Special design standards for Moss Lake (Kings Mountain Reservoir) and its tributaries will be evaluated under R-2707D.

4. Future Air Quality. Any future air quality analysis for this project will include a review of vehicle-mix percentages, given the industrial nature of portions of the project area.

   Action: An Addendum to the Air Quality Impacts can be found in the 2008 Record of Decision. No additional air quality studies are required or warranted.

   April 7, 2017 update: The prior finding on air quality remains valid. No additional air quality studies are needed.

5. Transplant of Dwarf-Flowered Heartleaf Plants. ~~The North Carolina Plant Conservation Program (NCPCP) will be notified if or when dwarf-flowered heartleaf (DFHL) plants will be lost to construction. A qualified botanist from that organization or a designated representative will be allowed to transplant, if desired, any of the plants that would be lost to a different area of protection.~~

   Action: This commitment has been dropped as a Conservation Measure in the Amendment to the Biological Opinion (BO) issued by the USFWS on November 9, 2012 (attached).

6. Dwarf-Flowered Heartleaf Monitoring. ~~The dwarf-flowered heartleaf sites in the right-of- way will be monitored annually for five years to determine their stability and to detect any construction effects (positive or negative) which have not been anticipated (increased light, hydrology changes, etc.) and efforts will be made to control exotics.~~

   Action: Conservation Measure 5 from the Amendment to the BO replaces this commitment. See page 14 of this packet.

7. Dwarf-Flowered Heartleaf Report. ~~A written report on dwarf-flowered heartleaf monitoring and management efforts will be provided yearly until the project is completed~~

   Action: Conservation Measure 5 from the Amendment to the BO replaces this commitment. See page 14 of this packet.

8. Dwarf-Flowered Heartleaf Conservation Easements. ~~Written documentation will be provided to the US Fish and Wildlife Service and to the North Carolina Natural Heritage Program regarding any successful efforts to obtain conservation easements on dwarf flowered heartleaf sites 8, 9, 12, 13, 24, 25, 26, 30, 32, 33, 34, 35, and 43.~~

   Action: Conservation Measure 4 from the Amendment to the BO replaces this commitment. See page 14 of this packet.

9. Wetlands and Streams Re-Verification. Wetlands and stream information will be re-verified during the Section 404 permit application process.

   Action: Wetlands and stream information were re- verified during a field visit on November 13 and 14, 2017.

10. Indirect and Cumulative Effects Analysis. A supplemental Indirect and Cumulative Effects analysis will be performed prior to construction.

    Action: An Indirect and Cumulative Effects and Land Use Scenario Assessment was completed on October 2, 2009. The 2009 ICE and LUSA are sufficient for the USACE Section 404 permit application, which NCDOT submitted on 1-11-17.

Project Development and Environmental Analysis Unit, Roadway Design Unit, Structures Management Unit, Hydraulics Unit, Division 12

1. Brushy Creek. The following measures will be implemented at the Brushy Creek crossing to minimize both short-term construction impacts and long-term impacts:
   - Trees will be cut at the base to create root wads to help stabilize the banks.
   - During final design, the bridges will be designed with sufficient length to allow for wildlife passage. This will be coordinated with USFWS.
   - Deck drainage will not be released directly into the waterway.

   Action: This commitment does not apply to R-2707 D & E.

2. First Broad River. The following measures will be implemented at the First Broad River crossing to minimize both short-term construction impacts and long-term impacts:

- A temporary causeway or work bridge will be constructed.
- A drainage system will be utilized on the bridge for stormwater runoff.
- Coordination will be conducted with the local water supply administrator.
- Hazardous spill basins will be utilized.
- Vegetation will be left in place as much as is practicable.
- Deck drainage will not be released directly into the waterway.

Action: This commitment does not apply to R-2707 D & E.

3. Stream 4-13 and DFHL Sites 10, 11 and 12. During culvert design and construction, consideration will be given to minimizing disturbance of Stream 4-13 and dwarf-flowered heartleaf sites #10, 11, and 12 - including minimizing clearing, minimizing rip rap on the stream banks, and using native vegetation to revegetate the stream banks.

   Action: This commitment does not apply to R-2707 D & E.

4. Cemeteries. Impacts to cemeteries will be avoided and/or minimized to the extent practicable during the final design phase of the project. If required, graves will be relocated according to state guidelines.

   Action: No cemeteries are anticipated to be impacted by R-2707D or R-2707E. If such impacts occur, any required relocations will be relocated according to state guidelines.

5. Hamilton-McBrayer Farm. Along the existing section of US 74 at the Hamilton-McBrayer Farm, widening will be to the north (away from the property). A service road will be added, extending from Broadway Road, all within existing right-of-way, to service the trailers in the mobile home park to the north and west of the Hamilton-McBrayer Farm. This will comply with the conditions set forth in the NC State Historic Preservation Office effects concurrence form for this historic property, and will ensure that the effect to the Hamilton-McBrayer Farm will not be adverse.

   Action: This commitment does not apply to R-2707 D & E.

6. Wildlife Passage. During final design, the bridges over Brushy Creek will be designed with sufficient length to allow for wildlife passage. This will be coordinated with USFWS during design.

   Action: This commitment does not apply to R-2707 D & E.

7. Geodetic Markers. The North Carolina Geodetic Survey will be notified prior to construction to allow ample time for relocation of any affected geodetic markers.

   Action: Coordination with the NCGS regarding the relocation of geodetic markers affected by this project is in progress.

Project Development and Environmental Analysis Unit, Division 12, Right-of-Way Unit

1. Dwarf-Flowered Heartleaf (DFHL) Mitigation Plan. ~~A plan to mitigate impacts to the dwarf- flowered heartleaf will be developed in consultation with USFWS and WRC. Mitigation efforts will be performed by qualified persons and could include transplanting the vegetative portions of plants from existing sites to preselected, approved alternate sites, dispersing seed, and/or acquiring existing sites for preservation.~~

   Action: Conservation Measures 3, 4, 5, 6, and 8 from the Amendment to the BO replace this commitment. See pages 13-14 of this packet.

Division 12

1. Street Closings. Any street closings will be coordinated with fire, police, and EMS personnel.

   Action: NCDOT will contact local agencies prior to any street closings.

Project Development and Environmental Analysis Branch, Roadway Design Unit, Division 12, Geotechnical Engineering Unit, Hydraulics Unit

1. Noise Barriers. In areas of impacted noise receptors where abatement measures have been considered and found not to be reasonable, a vegetative barrier will be considered for psychological and aesthetic screening.

   Action: Noise Studies will be conducted in 2018 for R-2707D&E.

2. Farmland. Efforts will be made to minimize impacts to farmlands during final design, including crossing of farm fields along property boundaries wherever possible to avoid bisecting farm operations.

   Action: Impacts to farmlands have been avoided and/or reduced to the extent practicable.

3. Lithia Springs. Impacts to Lithia Springs will be avoided and/or minimized to the extent practicable during the final design phase of the project. A study of the impacts to the underground water table due to road grading operations at Lithia Springs will be undertaken during final design.

   Action: This commitment does not apply to R-2707 D & E.

Geotechnical Engineering Unit, Right-of-Way Unit

1. Hazardous Materials Sites. Should the Selected Alternative impact any hazardous material site or UST, a Preliminary Site Assessment will be performed prior to right-of-way acquisition to determine the existence and/or extent of any contamination. These assessments will also be used by NCDOT to estimate the associated clean-up costs.

   Action: Hazardous Materials Site Survey will be addressed in 2018 for R-2707D&E.

Project Development and Environmental Analysis Unit, Roadway Design Unit, Division 12, Right-of-Way Branch

1. Protection of Dwarf-Flowered Heartleaf Sites. ~~Dwarf-flowered heartleaf sites outside of the construction limits of the project in areas where NCDOT owns the property or has a construction easement will be protected and will not be disturbed during construction. Those sites will be left forested and will be protected in perpetuity. The sites will remain on the design plans and will be labeled as sensitive areas.~~

   Action: Conservation Measures 2,3,4,6 and 8 from the Amendment to the BO replace this commitment. See pages 13-14 of this packet.

Project Development and Environmental Analysis Unit, Roadway Design Unit, Division 12, Right-of-Way Unit

1. 2012 Amended BO Conservation Measures. The Conservation Measures for the Dwarf-flowered heartleaf (DFHL) as stated in the Amended BO issued by USFWS on 11-9-12 (attached) are as follows:

   1) Pre-construction meeting - A [USFWS] biologist will attend the preconstruction meeting to discuss (a) the importance of avoiding [DFHL] plants and (b) other environmental commitments that are a part of the project.

      Action: NCDOT will invite the appropriate USFWS biologist to the preconstruction meeting, which will be scheduled after the construction contract is awarded.

   2) [DFHL] protective barriers - Before construction activities begin at [DFHL] Sites 7, 10, 11, 15, 16, 20, 22, 24, 25, 28, 31, 32, and 49, the portion of occupied [DFHL] habitat remaining intact from construction activities (i.e., adverse direct effects and indirect effects from drainage activities) will be protected by placing orange safety fencing or otherwise hardened barriers with appropriate signage along the construction limits. The signed fencing or barriers will protect the remaining plants from accidental disturbance

      during construction. The portions of [DFHL] sites that are protected will remain on the project's design plans throughout construction activities and will be labeled on the plans as "sensitive areas."

      Action: DFHL protective barriers for DFHL Sites are being investigated at this time.

   3) On-site protection - The portions of [DFHL] Sites 7, 10, 11, 15, 16, 20, 22, 24, 25, 28, 31, 32, and 49 not lost from project construction will be protected in perpetuity. A protective buffer of up to 400 feet out from the limits of preserved occupied [DFHL] habitat will be placed around these plant sites and also preserved in perpetuity. Final buffer widths will vary for each site. Design Plan Sheet Nos. 16-26 of 26 in the amended [BA] depict the area of occupied [DFHL] habitat to be protected and the approximate limits of the protective buffers. Final site configurations, including buffer limits, will be mapped and submitted to the [USFWS] when ROW acquisitions are complete.

Action: On-site protection for DFHL Sites are being investigated at this time.

4) Conservation easements - The NCDOT will attempt to enter into conservation easements with access points, where appropriate, for all or portions of [DFHL] Sites 1, 8, 12, 13, 14, 26, 29, 33, 34, 35, 43, and 48. The portions of Sites 25 and 32 remaining intact upon project construction and not already protected by ROW extensions will also be pursued for potential conservation easements. Written documentation will be provided to the [USFWS] and the [NCNHP] once easements are successfully obtained at any of these sites.

Action: Conservation easements for DFHL Sites are being investigated at this time.

5) On-site monitoring - For on-site conservation sites entered into a secured protective ownership, either through ROW extension via settlement/condemnation or through a conservation easement with a landowner, the NCDOT will quantitatively and qualitatively monitor occupied [DFHL] habitat preserved in perpetuity. Monitoring efforts will begin with the acquisition of pre-construction/easement acquisition environmental baseline data. The preserved sites will then be monitored post- construction/easement acquisition once every 2 years over a 6-year period to ensure the protection, and detect trends in numbers, of [DFHL] plants that may or may not be due to project construction. Monitoring reports detailing the monitoring results and any appropriate management activities undertaken will be submitted to the [USFWS] at the end of each monitoring period.

Action: On-site monitoring for DFHL Sites are being investigated at this time.

6) Management of nonnative, invasive species - For on-site conservation sites entered into secured protective ownership, either through ROW extension via settlement/condemnation or through a conservation easement, adverse effects from biological pollution can be avoided and/or minimized on a case- by-case basis through effective efforts to manage the growth of nonnative, invasive species within the areas of occupied [DFHL] habitat that is preserved.

Action: Nonnative, invasive species are to be assessed at dwarf-flowered heartleaf Sites found within the limits of R-2707D&E on a case-by-case basis during each of the sites' monitoring efforts of the plant species.

7) Future anticipated adverse effects - The NCDOT has designated an expected 50-foot wide greenway corridor through [DFHL] sites 12, 14, 22, 23, 25, and 26. Future anticipated adverse effects (not counting biological pollution) associated with the planned greenway's footprint must remain excluded from the area of occupied [DFHL] habitat that the NCDOT can protect at these sites.

8) Broad River Greenway Conservation Area - The NCDOT entered into a conservation easement on July 18, 2008, with the Broad River Greenway, Inc., of approximately 1,000 acres of land referred to as the Broad River Greenway Conservation Area (BRGCA). In accordance with the stated measures of the BRGCA's Conservation Plan, as well as additional monitoring

requirements and guidelines provided by the [USFWS], the NCDOT will quantitatively and qualitatively monitor occupied [DFHL] habitat within the BRGCA. Monitoring efforts began with the acquisition of environmental baseline data prior to obtaining the conservation easement. The BRGCA is then to be monitored once every 3 years over a 9-year period to ensure the protection, and detect trends in numbers, of [DFHL] plants over time. Monitoring reports detailing the monitoring results and any appropriate management activities undertaken will be submitted to the [USFWS] at the end of each monitoring period.

Project Development and Environmental Analysis Unit

1. The Northern long-eared bat (NLEB) was added to the USFWS Cleveland County list on April 2, 2015. The entire project (R-2707A–E) was reviewed for effects on NLEB in a report issued June 15, 2016 by NCDOT's Biological Surveys Group. The report determined that the nearest NLEB hibernacula record is 31 miles west of the project, and no known NLEB roost trees occur within 150 feet of the project area. NCDOT has determined that the proposed action does not require separate consultation on the grounds that the proposed action is consistent with the final Section 4(d) rule, codified at 50 C.F.R. § 17.40(o) and effective February 16, 2016. NCDOT may presume its determination is informed by best available information and consider Section 7 responsibilities fulfilled for NLEB.

Table 1: Jurisdictional Wetland Impacts

Site Number	Project Section	Riparian Wetland (Y/N)	Wetland Type	Wetland Size (acres)	Wetland Quality Rating	Impacts (acres)			
						CP 4A (May 2004)[1]	Section 404/401 Permit July 2012 *(Permit Site Number)*[2]	Jan 2017[2]	Net Change (July 2012 Permit to Jan 2017)
51A-B	D	N	PFO1	0.18	24	0.03	0.06 *(Site 10)*	0.07	0.01
53	D	Y	PEM1	0.24	38	0.21	0.24 *(Site 11)*	0.24	0
56A-B	E	Y	PSS1	0.01	29	0.01	0.01 *(Site 2)*	0.01	0
57A-B	E	Y	PFO1	0.04	28	0.04	0.63 *(Site 3)*[3]	0.02	-0.46
58A	E	Y	PSS1	0.62	28	0.62		0.10	
58B	E	Y	PSS1		28			0.05	
59	E	Y	PFO1	0.01	28	0.01	0[4]	0[4]	0
60	E	Y	PEM1	0.03	28	0	0.02 *(Site 4)*[5]	0.01	-0.01
Total Wetland Impacts						**0.92**	**0.96**	**0.50**	**-0.46**

NOTES:

1. As recorded in the January 2008 Final Environmnetal Impact Statement (FEIS).
2. Impacts based on slope stakes plus 25 feet.
3. Quantity includes impacts to wetlands 57A-B, 58A, and 58B.
4. Wetland was changed to a stream (8-14) after 2009 Jursidictional Determination (JD) verification.
5. Increase in impacts due to design changes after FEIS was published.

Table 2: Jurisdictional Stream Impacts

Stream ID	Stream Name	Project Section	Channel Length in Corridor (Linear Feet)	Perennial (P) Intermittent (I) (July 2012)	DWR Score	USACE Score	Compensatory Mitigation Required (Y/N)	Stream Impact (Linear Feet)			
								CP4[1]	Section 404/401 Permit July 2012 *(Permit Site Number)*[2]	Jan 2017[2]	Net Change (July 2012 Permit to Jan 2017)
6-16	UT to KMR	D	174	P	17		Y	182	0[3]	404[3]	404
7-19a	UT to 7-16	D	973	I	26.5	49	Y	152	211 *(Site 10)*[4]	0[5]	-211
7-19b	UT to 7-16	D		P	31.5	59	Y				
7-20	UT to 7-19	D	76	I	28	57	Y	76			
7-21	Upper Segment to 7-22	D	761	P	31.5	58	Y	251	248 *(Site 11)*	450[6]	202
7-22	UT to 7-27	D	11	P	29.5	54	Y	0	0	106[7]	106
7-30	Upper Segment to 7-31	E	2,063	P	27	40	Y	482	831 *(Sites 1 and 2)*[8]	558	-273
8-2	Upper Segment to 8-4	E	440	I	26.5	50	Y	440	1,565 *(Site 3)*[9]	214	-1,000
8-3	UT to 8-5	E	43	I	27.5	35	Y	43		61	
8-4	UT to 8-5	E	43	I	26.5	50	Y	43		34	
8-5	Upper Segment to 8-7	E	301	I	26	36	Y	301		244	
8-6	UT to 8-8	E	204	P	33	46	Y	204		0	
8-7	UT to 8-8	E	69	I	26.5	47	Y	69		0	
8-8	UT to 8-9	E	1,266	P	35.5	56	Y	573		12	
8-10a	Upper Segment to 8-10b	E	2,442	I	27.5	42	Y	158	194	225[10]	31
8-14	UT to 8-8	E		I	28	54	Y	0	-[11]	0	0
							Total Stream Impact	**2,974**	**3,049**	**2,308**	**-741**

NOTES:

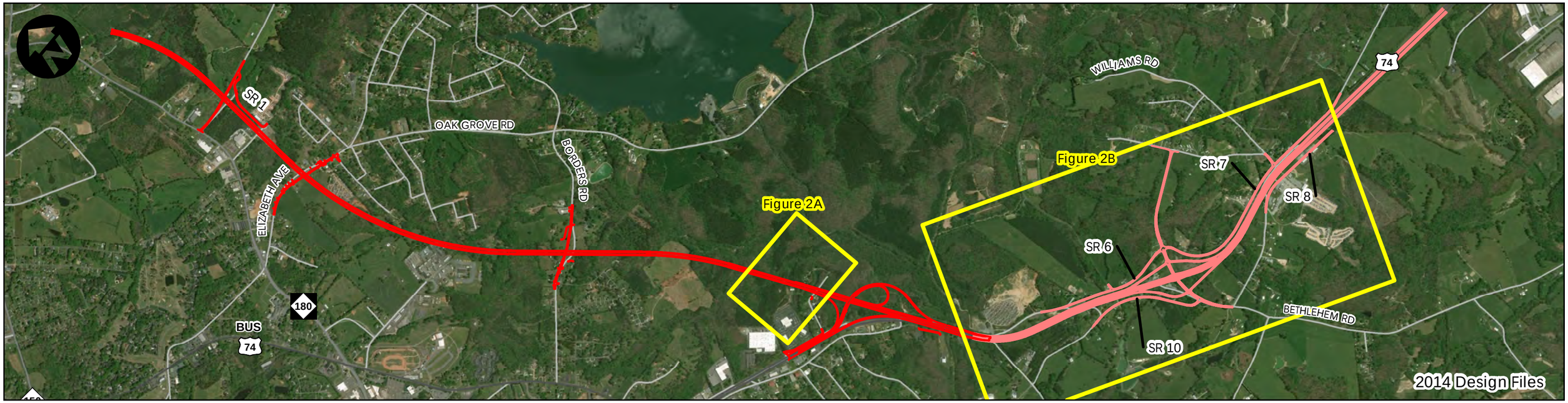
1. As recorded in the January 2008 Final Environmnetal Impact Statement (FEIS).
2. Impacts based on slope stakes plus 25 feet.
3. Stream was removed after 2009 Jursidictional Determination (JD) verification. Stream was subsequently added back after 2017 JD verification with an origin further upstream (channel length in corridor increased).
4. Quantity includes impacts to stream 7-19A, 7-19B, and 7-20.
5. No impact due to change in stream origin to a location further downstream during 2017 JD verification.
6. Increase due to addition of Service Road 4. Service Roads were not included in the CP4A preliminary roadway design or 2012 permit application.
7. Increase due to addition of Service Road 5. Service Roads were not included in the CP4A preliminary roadway design or 2012 permit application.
8. Correct 2012 permit impact for Site 2 is 558. 273 feet of channel was incorrectly included in permit calculations due to an error in the final survey.
9. Quantity includes impacts to Streams 8-2, 8-3, 8-4, 8-5, 8-6, 8-7, 8-8, and 8-14.
10. Increase due to change in stream to a location further upstream during 2017 JD verification as well as minor change in slope stakes.
11. Impact included in Site 3 permit calculation.

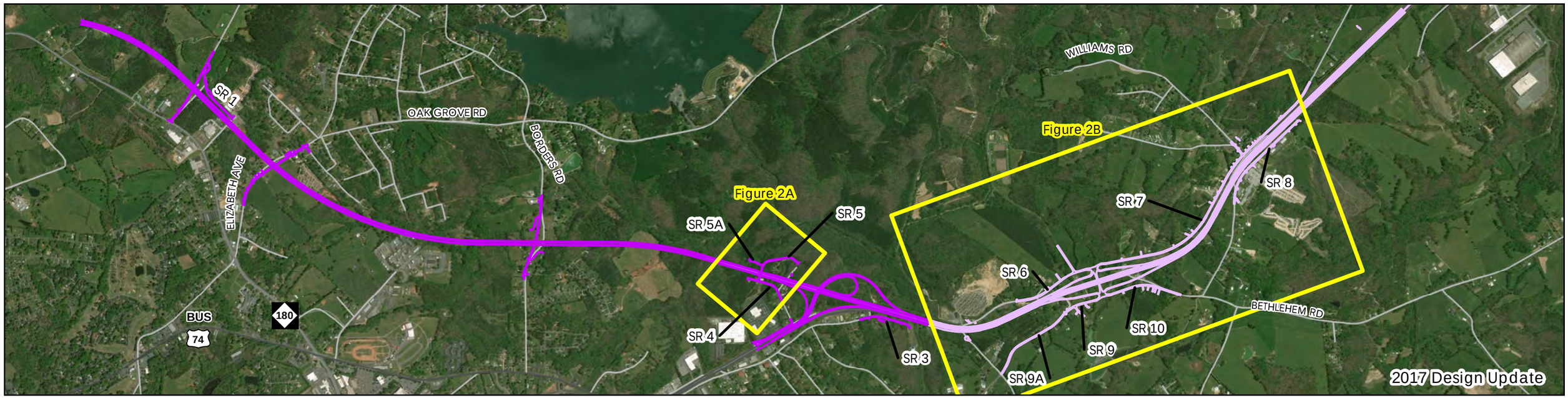
Table 3: Dwarf-flowered heartlead Adverse Effects and Preserved Habitat

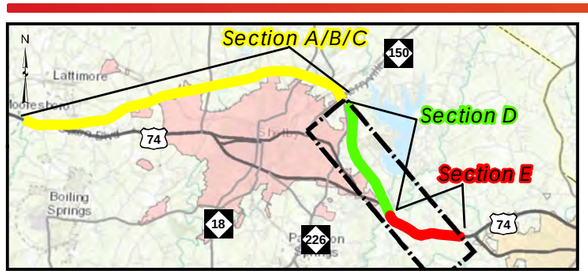
Site No	Year	DFHL Plants in Site	Site Area (ac)	Existing Exotic Invasive Species Threat	DFHL Plants Incurring Direct Effects	Area of Direct Effects (ac)	DFHL Plants Incurring Indirect Effects	Area of Indirect Effects	DFHL Plants Incurring Cumulative Effects	Area of Cumulative Effects (ac)	Total DFHL Plants Incurring Adverse Effects	Total Area of Adverse Effects (ac)	DFHL Plants Preserved Onsite	Occupied Habitat Preserved (ac)
24[1]	2012	1641	3.6	L	20	0.0434	5	0.0202	0	0	25	0.0536	1616	3.5464
	2018				20	0.0434	5	0.0202	0	0	25	0.0536	1206	2.6464
28	2012	206	1.11	L	109	0.59	0	0	0		109	0.59	97	0.52
	2018				119	0.640	0	0	0		119	0.640	87	0.47
31	2012	2562	1.94	L	2248	1.7023	0	0	0	0	2248	1.7023	314	0.2377
	2018				2353	1.7815	0	0	0	0	2353	1.7815	209	0.15847
32	2012	1682	3.6468	L	99	0.2144	34	0.074	1549	3.3584	1682	3.6468	724	1.5708
	2018				0	0	0	0	157	0.34	157	0.34	0[2]	0
33	2012	48	0.044	L	0	0	0	0	48	0.044	48	0.044	0	0
	2018				0	0	0	0	0	0	0	0	0	0
34	2012	1752	2.00	H	0	0	398	0.4549	1354	1.5451	1752	2	0	0
	2018				0	0	398	0.4549	0	0	398	0.4549	0	0
49	2012	40	0.201	H	29	0.1466	11	0.0544	0	0	40	0.201	11	0.0544
	2018				40	0.201	0	0	0	0	40	0.201	0	0
TOTAL	2012	18177	34		3060	4.13	2267	3.65	4458	9.24	9785	17.03	4104	9.28
	2018				3086	4.10	2222	3.52	1664	4.63	6972	12.26	2844	6.63
NET CHANGE					26	-0.03	-45	-0.13	-2794	-4.61	-2813	-4.77	-1260	-2.65

NOTES:

1. Adverse effects at Site 24 have not changed, preservation has decreased due to a subdivision of the parcel.
2. NCDOT is working with two landowners to preserve 313 DFHL plants / 068 acres







Legend

- 2014 R-2707D
- 2014 R-2707E
- 2017 R-2707D
- 2017 R-2707E
- NC Highway
- US Highway
- Secondary Road

Notes

1. Coordinate System: NAD 1983 2011 StatePlane North Carolina FIPS 3200 Ft US
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
3. Orthoimagery © First Base Solutions, 20xx.

0 1,100 2,200 3,300 4,400 Feet

Project Location
Cleveland County

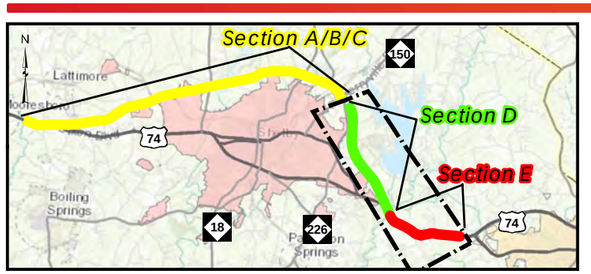
Client/Project
NCDOT Division 12
STIP Project R-2707D/E
2017 Merger Team Update

Figure No.
1

Title
Project Location Map

Figure 2A

Site 28
Site 29
Site 30
Site 43
Pond 8
7-17
7-18
7-19A
7-19B
7-20
7-21
7-22
50
51A-B
52
53
74



Legend

2014 Design Files
- 2014 R-2707D Prop EOT

2017 Design Update/Additions
- 2017 R-2707D Additional Service Roads

- Wetland
- SurfaceWater
- Jurisdictional Stream
- Dwarf-flowered Heartleaf Site

- US Highway
- Secondary Road

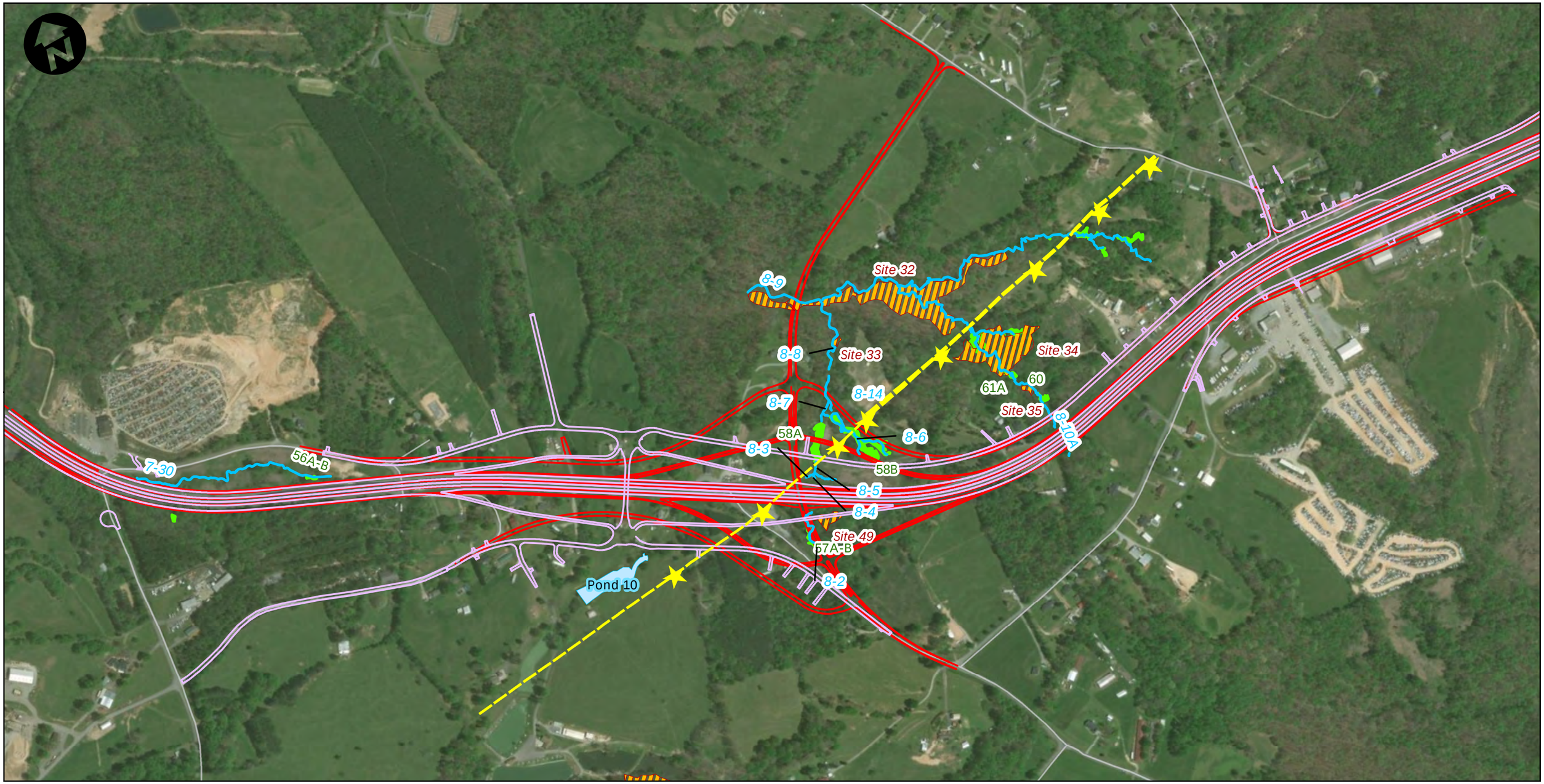
0 300 600 900 1,200 Feet

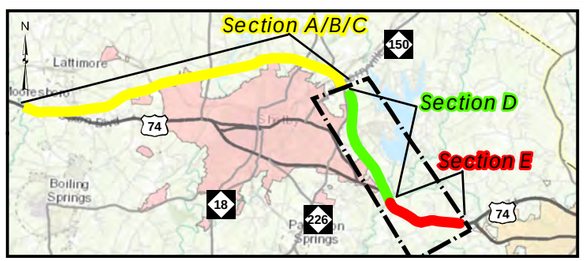
Project Location
Cleveland County

Client/Project
NCDOT Division 12
STIP Project R-2707D/E
2017 Merger Team Update

Figure No.
2A

Title
Intersection Inset





Legend

2014 Original Files
2014 R-2707E Prop EOT
2017 Design Update
2017 R-2707E Prop EOT

US Highway
Secondary Road
Jurisdictional Stream
Dwarf-flowered Heartleaf Site
Wetland
Surface Water

Transmission Tower
Transmission Line

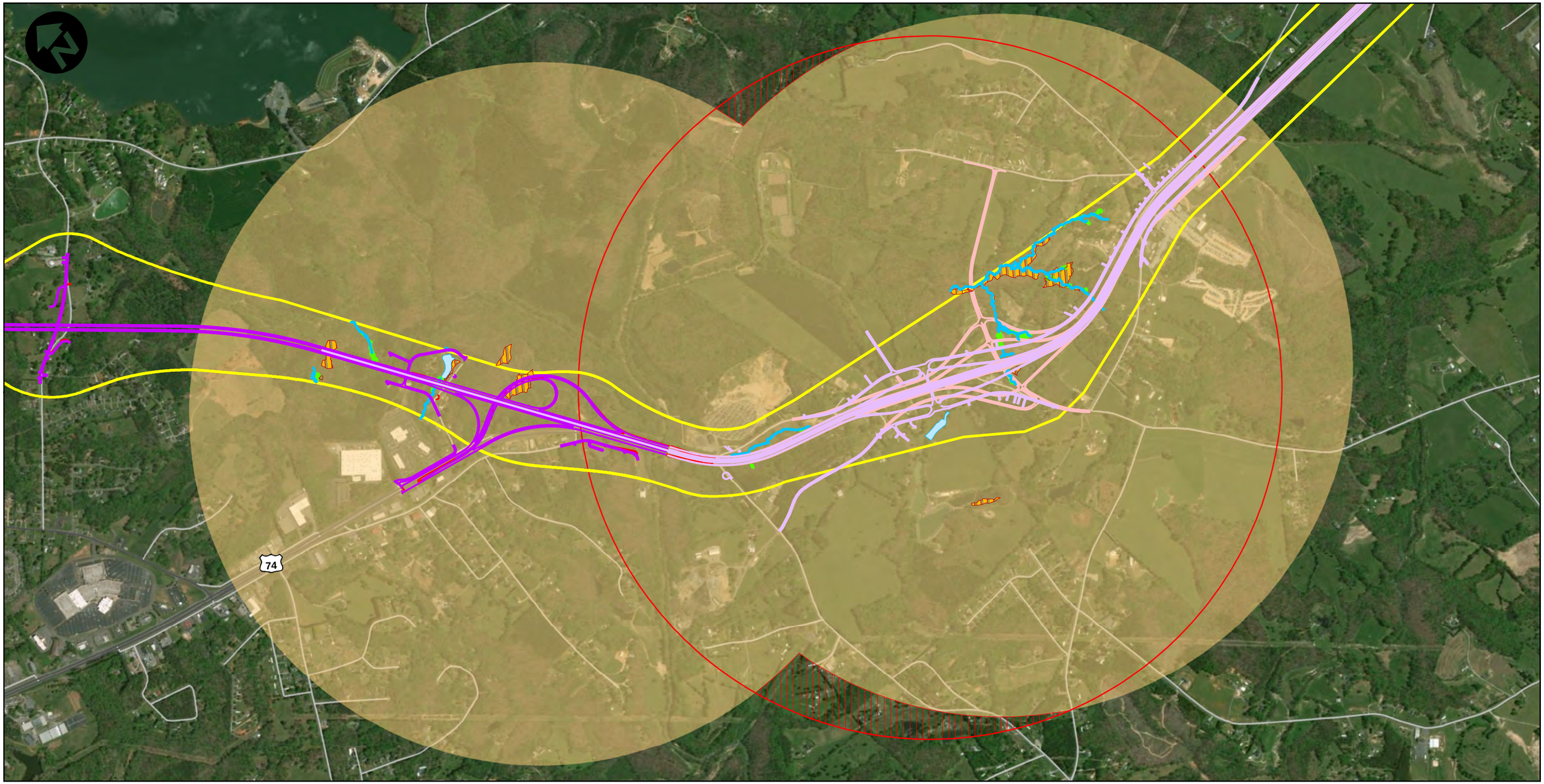
0 600 1,200 1,800 2,400 Feet

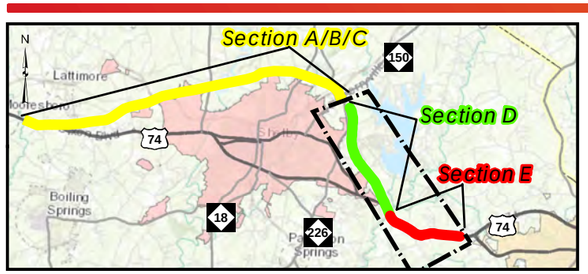
Project Location
Cleveland County

Client/Project
NCDOT Division 12
STIP Project R-2707D/E
2017 Merger Team Update

Figure No.
2B

Title
Intersection Inset





Legend

2014 Original Files

2014 R-2707E Prop EOT

2017 Design Update

2017 R-2707E Prop EOT

Study Corridor

BA Interchange DFHL Study Area

Design Update Interchange DFHL Study Area

Unsurveyed Areas (to be surveyed for DFHL in 2018)

US Highway

Secondary Road

Stream

Dwarf-flowered Heartleaf Site

Wetland

SurfaceWater

0 1,400 2,800 4,200 5,600 Feet

Project Location

Cleveland County

Client/Project

NCDOT Division 12
STIP Project R-2707D/E
2017 Merger Team Update

Figure No.

3

Title

DFHL Survey Areas