Applicant-Prepared Biological Assessment

Lowman Pipeline Project

Prepared for

LOWMAN Pipeline

Lowman Energy Pipeline Holdings

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LIST OF ACRONYMS

ATWS	Additional temporary workspace
BA	Biological Assessment
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
CBMPP	Construction Best Management Practices Plan
CFR	Code of Federal Regulations
DOT	U.S. Department of Transportation
EDGE	Edge Engineering and Science, LLC
EI	Environmental Inspector
ES	Endangered Species
ESA	Endangered Species Act
FWS	U.S. Fish and Wildlife Service
HDD	Horizontal directional drill
IPAC	Information, Planning, and Conservation System
Lowman	Lowman Energy Pipeline Holdings
MBTA	Migratory Bird Treaty Act
MLV	Mainline valve
NHPA	National Historic Preservation Act
PEM	Palustrine Emergent Wetland
PFO	Palustrine Forested Wetland
PJW	Potential jurisdictional waters
Project	Lowman Pipeline Project
PSS	Palustrine Scrub-Shrub Wetland
SPCC Plan	Spill Prevention, Containment and Countermeasure Plan
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WVMSP	West Virginia Mussel Survey Protocol

1.0 INTRODUCTION

1.1 Project Summary

Lowman Energy Pipeline Holdings (Lowman), proposes to construct a new pipeline in Choctaw and Washington Counties, Alabama. The Lowman Pipeline Project (Project) will consist of approximately 53.75 miles of 16-inch-diameter intrastate natural gas pipeline (see maps and figures in Appendix A). The purpose of the Project is to allow for natural gas conversion of the existing coal-fired PowerSouth Lowman Power Plant in Washington County, Alabama.

1.2 Purpose of Document

1.2.1 Endangered Species Act

Construction of the Project will result in temporary impacts on wetlands and waterbodies that are considered potential jurisdictional waters (PJWs) of the U.S. The PJWs impacted by the Project are subject to regulation by the U.S. Army Corps of Engineers (USACE), Mobile District, under Section 404 of the Clean Water Act. For this reason, the USACE would serve as lead federal agency for the Project. The USACE would ensure that the applicant strictly and fully complies with the final Biological Assessment's (BA) proposed action, and the U.S. Fish and Wildlife Service (FWS) Concurrence Letter or Biological Opinion including the FWS Incidental Take Statement (if applicable). In addition, the Project poses the potential to affect historic properties and protected species within areas considered to be USACE-jurisdictional and therefore warrants federal review pursuant to Section 106 of the National Historic Preservation Act (NHPA), Appendix C of 33 Code of Federal Regulations [CFR] Part 325, and Section 7 of the Endangered Species Act (ESA). As such, the Project is subject to review under the National Environmental Policy Act and the ESA. Section 7(a) of the ESA requires federal agencies to ensure that their actions do not jeopardize the existence of federally protected species and critical habitat. To meet this requirement under the ESA, federal agencies need to consult with the FWS on actions that they regulate, authorize, fund, or carry out.

Lowman is the Project Applicant and has retained EDGE Engineering and Science, LLC (EDGE) to assist with aspects of the proposed Project, including consultations under the ESA. Correspondence between EDGE and the FWS is included in Appendix B.

All conservation measures in the BA would be enforced by Lowman's Environmental Inspectors (EIs) during construction. The Project would be authorized pending conditions that require compliance with the BA's proposed action, the FWS Biological Opinion, and the FWS Incidental Take Statement (if applicable), and the pipeline would not be capable of being made operational if these conditions are not satisfied.

This BA is a component of the informal consultation that has taken place between the USACE and FWS for the Project under the ESA. Lowman has communicated with the FWS as another component of informal consultation and in preparation for BA development. This BA provides information on the Project to justify the following possible determinations made for federally listed species:

- no effect;
- may affect, but is not likely to adversely affect;
- may affect, and is likely to adversely affect;

- may affect, but is not likely to jeopardize a proposed species or adversely modify critical habitat; or
- may affect, and is likely to jeopardize a proposed species or adversely modify critical habitat.

Specifically, this document contains a description of the action, action area, and listed species within the action area; an analysis and justification of Project effects for species with a *may affect, but is not likely to adversely affect* determination; and relevant reports and studies. Lowman and EDGE have included the best available scientific and commercial information in this BA.

1.3 Proposed Action

Lowman proposes to construct, operate, and maintain a new 16-inch-diameter, 53.75-mile-long natural gas pipeline in Choctaw and Washington Counties, Alabama (see Appendix A). In addition to the pipeline, the Project will include the construction of one (1) new compressor station, three (3) meter stations, and a launcher/receiver facility. The purpose of the Lowman Pipeline Project will be to receive natural gas at interconnects with Mid-continent Express and Gulf South pipelines, and deliver gas to the PowerSouth Lowman Power Plant. The Project will support the natural gas conversion of the existing coal-fired PowerSouth Lowman Power Plant.

Lowman proposes to utilize an 85-foot-wide temporary construction right-of-way with some additional temporary workspace (ATWS) at road crossings, stream crossings, and other areas where needed. Following construction, Lowman will maintain a 30-foot-wide permanent easement. Construction is currently scheduled to begin on March 1, 2021 with an anticipated in-service date of December 2021.

The pipeline would be buried underground and would follow existing pipeline, utility, or roadway easements, where practicable, to minimize the development of new rights-of-way/utility corridors. Currently, Lowman proposes to install the pipeline through environmentally sensitive areas (e.g., streams/wetlands, potential habitat for sensitive species, etc.) by narrowing the construction right-of-way and/or using horizontal directional drilling (HDD) techniques to minimize impacts to such resources. Additionally, pipeline route adjustments may be adopted to further minimize impacts to environmental resources, as determined through environmental field survey, landowner coordination, and resource agency consultations.

Table 1.3-1 summarizes the Project's land requirements.

TABLE 1.3-1
Lowman Pipeline Project
Temporary and Permanent Land Requirements

Facility	Temporary Workspace	Operational Easement	Additional Temporary Workspace
Pipeline	524.8 [1]	195.5 [2]	56.4
Compressor Station	3.5	3.5	N/A
Access Roads	8.2	4.0	N/A
Pipe Yard #1	12.0	0.0	N/A
Pipe Yard #2	15.0	0.0	N/A
Contractor Yard	18.0	0.0	N/A
Total	**581.5**	**203.0**	**56.4**

[1] Temporary work for pipeline construction includes the operational easement as well.

[2] Meter Stations and Mainline Values are contained within the operational pipeline easement.

2.0 PROJECT DESCRIPTION

2.1 Pipeline Facilities

Lowman proposes to construct, operate, and maintain an approximately 53.75-mile, 16-inch outside diameter natural gas pipeline in Choctaw and Washington Counties, Alabama. Appendix A provides the typical pipeline construction right-of-way and permanent easement cross sections for upland and wetland and waterbody portions of the pipeline route. Lowman's breakdown of workspace within the construction right-of-way (e.g., spoil storage areas, equipment travel lanes) would vary depending on site-specific conditions. Workspace configuration is generally comprised of three major elements: spoil storage, trenchline, and work area.

Spoil Storage – Construction of buried utilities including pipelines requires management of spoils. Several factors including soil type, depth of cover requirements, and soil segregation requirements must be accounted for when evaluating how much workspace would be reserved for spoil management. Where it is segregated as required, topsoil would generally be stored in a separate pile adjacent to the trench spoil along the boundary of the construction workspace. Subsoil spoils originating from trenchline excavation would generally be stored between the topsoil and the excavated trench.

Trenchline – Construction of buried utilities must also dedicate workspace to the trenchline. Several factors ranging from pipeline diameter, depth of cover requirements, and soil types would influence the amount of space required to accommodate the trenchline. The top of the trench for pipelines is typically wider, with the balance of the remaining space to remain vacant (without the weight of pipe or spoil in proximity) and undisturbed to minimize trench wall failure. In sandy, unstable soils, the top of the trench could be considerably wider because the walls could cave or slough during trenching.

Work Area – The work area is the largest portion of the construction workspace. This space must accommodate equipment and various construction activities. A portion of this space is dedicated to pipeline fabrication activities associated with field layout, welding, bending, coating, and occasionally testing. In addition to the space allocated to pipeline fabrication, this space is sized to allow one piece of heavy equipment to operate. The work area must also typically provide for a travel lane for heavy equipment to pass safely and unimpeded, although a travel lane may be omitted for limited distances (e.g., while working through sensitive features such as wetlands).

Additional Temporary Workspace – In addition to the construction right-of-way, Lowman would use about 56.43 acres of Additional Temporary Work Space (ATWS) for construction at various locations with special features. ATWS outside of the various temporary pipeline construction rights-of-way (see Table 1.3-1) would typically be required at the following locations:

- wetland and waterbody crossings;
- public road crossings;
- railroad crossings;
- areas where special construction techniques would be used (e.g., HDD);
- areas with steep side slopes;
- tie-ins with existing pipeline facilities;

- foreign utility crossings;
- spread mobilization/demobilization and staging areas;
- truck turnarounds; and
- areas where additional storage of stripped topsoil is needed.

ATWS would be restored and allowed to revert to pre-existing conditions following construction activities and would not create permanent impacts on those areas. Except as otherwise requested, or where topographic or other factors impose setback constraints, ATWS would be set back approximately 50 feet from the edges of waterbodies and wetlands except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. Lowman's actual breakdown of ATWS within the construction right-of-way (e.g., spoil storage areas, equipment travel lanes) would vary depending on site-specific conditions.

2.2 Aboveground Facilities

In addition to the proposed mainline pipeline, the Project would include installation of one compressor station, three (3) meter stations, a launcher/receiver facility, and two (2) interconnect sites. The placement of aboveground facilities associated with any pipeline project is dependent upon several engineering and environmental factors. In addition, some aboveground facilities must be placed at locations specified by federal regulations, while other aboveground facility sites are chosen to maximize the pipeline's potential carrying capacity and flow. The compressor station would be located at the north end of the Project, just south of the Mid-continent Express and Gulf South receiving stations. Each meter station, interconnect, and the launcher/receiver facility would be constructed and operated within the construction right-of-way widths and permanent easement widths or within the area associated with another aboveground facility site (e.g. pig launcher/receiver) and would not require any additional land for construction. However, these areas would be graveled and maintained during the operation of the pipeline.

2.2.1 Compressor Station

A compressor station would be constructed just south of the Mid-continent Express and Gulf South pipelines where the station will receive pipeline quality natural gas. The compressor station would entail a fenced and graveled, approximately 10-acre site that would house the following:

- Two compressor engines;
- One standby generator;
- One natural gas-fired fuel heater;
- One truck loading operation; and
- One set of piping and pipe fittings in condensate and natural gas service.

2.3 Access Roads

Lowman would predominantly use existing roads to provide access to the construction right-of-way. Lowman would use 35 existing roads to transport personnel, equipment, vehicles including high clearance vehicles and heavy trucks, and materials to the proposed Project work areas. 7 of these existing temporary access roads would require improvements outside their current footprints to safely

and effectively accommodate Project equipment and vehicles. Currently, Lowman anticipates requiring no new temporary access roads for constructing the Project. Two (2) existing roads would be used as permanent access roads.

For proposed access roads where there is no evidence of previous grading or surfacing or where the road would require widening, road improvements would be allowed only after completing cultural resources and biological surveys and completing the appropriate State Historic Preservation Office and FWS consultations. In all cases, roads would be used and improved only with permission of the landowner.

2.4 Pipe Storage and Contractor Yards

The construction contractor would need off-right-of-way yards for office trailers, parking, and the storage of pipe and equipment needed for construction of the Project. Activities at contractor yards would include safety and environmental training, pipe storage, weld testing, some fabrication work, hydrostatic testing of fabrication work, and coating of fabrication work. Pipe storage and contractor yards range in size, depending upon the amount of material to be stored at each location. These yards are located at various locations along the Project area and were selected based on their proximity to the pipeline route and access to the Project sites during construction activities. Lowman attempted to identify and select yards that have been previously disturbed by human activity but do not have an ongoing land use that would preclude the storage of construction-related materials. Where yards are not located on previously used sites, efforts have been made to select sites on level terrain in order to minimize the need for grading or filling. Generally, yard preparation would be limited to a small amount of grading and leveling, and possibly importing some fill.

The yards would be affected temporarily during construction, but there would be no permanent impacts on these sites. After completion of pipeline construction, the land within these yards would revert to preconstruction use and conditions. Restoration and mitigation measures associated with the contractor/pipe yards would be similar to those described for construction of the pipeline facilities.

Lowman has conducted field surveys to determine whether use of the proposed pipe storage and contractor yards would affect or have potential impacts on federally endangered and threatened species and species of concern.

2.5 Project Schedule

Construction of the Project is currently scheduled to be completed over an approximate 10-month period; beginning around March 1, 2021, with an anticipated in-service in December 2021. Actions involved in the construction and operation of the Project are described below.

3.0 PROJECT ACTIONS

The following section describes the actions involved in pipeline construction. The effects of these actions on listed resources in Project action area are analyzed later in this document.

3.1 Survey and Staking

The first step of pipeline construction would involve staking the centerline, marking the limits of the approved work area (i.e., the construction right-of-way boundaries, ATWS areas), and flagging the location of approved access roads and foreign utility lines. Wetland boundaries, archaeological sites, and other environmentally sensitive areas would also be marked or fenced for protection at this time. Before the trench is excavated, a survey crew would stake the centerline of the proposed trench.

3.2 Clearing, Grading, and Topsoil Removal/Storage

Before clearing and grading are conducted, landowner fences would be braced and cut, and temporary gates and fences would be installed to contain livestock if present. A clearing crew would then clear the work area of vegetation and obstacles (e.g., trees, stumps, logs, brush, rocks). The clearing crew would follow the fence crew and skim surface vegetation in areas of high fire danger to minimize the potential for wildfires.

Lowman proposes to use multiple topsoil stripping methods. Topsoil stripping practices would include use of a backhoe or bulldozer to remove the topsoil. It is currently anticipated that topsoil would be segregated from subsoil in the construction right-of-way in most areas to avoid pulverization or rutting during wet periods, and in some instances, to mitigate heavy weed infestations. Topsoil segregation benefits revegetation success as most plant-essential nutrients are found at or near the surface.

The depth of topsoil removed would depend upon the soil conditions and landowner or land management agency requirements. The soils from each of the excavations would be placed in separate piles to allow for proper restoration of the soil during the backfilling process. Gaps would be left between the spoil piles to prevent stormwater runoff from backing up or flooding and to allow wildlife to escape entrapment. Topsoil would be carefully removed and stored in a separate pile, and then the subsoil would be excavated from the trench and stored separately from the topsoil pile. Topsoil would be returned to its original horizon after subsoil is backfilled in the trench.

Grading would be conducted where necessary to provide a reasonably level work surface. Where the ground is relatively flat and does not require grading, rootstock would be left in the ground. More extensive grading would be required in steep side slope or vertical areas and where necessary to prevent excessive bending of the pipeline. Where applicable, topsoil would be graded to the edge of the right-of-way and stored separate from subsoil. Once backfilling has been completed, decompaction would occur. Both top- and subsoils may be decompacted. Decompaction testing would occur at approximately 0.25-mile intervals on the working side of the right-of-way.

3.3 Trenching

After grading, a trench would be dug in sequence with a wheel ditcher or trencher where feasible. In rocky areas, a backhoe may be used to dig each trench. The pipeline would be buried in an approximately 5- to 10-foot-wide and 7-foot-deep trench, depending on the specific location. At

stream and wash crossings, the trench would be a minimum of 4 feet below the streambed or, if not viable, at a depth deep enough to minimize environmental impacts to the streambed and a depth that is also satisfactory to those charged with construction and regulatory oversight.

Additional cover may be provided at road and waterbody crossings or where installed by HDD. In sandy, unstable soils, the trench could be considerably wider because the walls could cave or slough during trenching. If trench dewatering is required within or off of the construction right-of-way, the dewatering would be conducted in a manner that does not cause erosion and would not result in sediment-laden water flowing into any waterbody.

3.4 Blasting

No blasting is anticipated during construction of the Project. In areas of loose rock, a large bulldozer equipped with a single-shank ripper would precede backhoes, and trenching would be performed by mechanical rock breaking or drilling. In the unlikely event that blasting is necessary to excavate the trench, Lowman would conduct blasting in accordance with pertinent regulations.

3.5 Pipe Stringing, Bending, and Welding

The pipeline would be installed sequentially. Steel pipe would be hauled to the construction site by truck and stored along the right-of-way. Pipe would be strung along the trench within the right-of-way. Stringing, bending, welding, and lowering-in of the pipeline would typically occur on the working side of the trench. In rocky areas, the trench would be padded by screening trench spoil to create finer bedding material or using a layer of rock-free soil that would be imported from a borrow pit; topsoil would not be used for ditch padding. A pipe-bending machine or equivalent technique would be used to bend the pipe to fit the trench. Sections of the steel pipe would be aligned with the trench and welded. A certified contractor would utilize visual, radiographic, sonic, or other approved-equivalent inspection methods of welds. Any defects would be repaired or removed as required by U.S. Department of Transportation (DOT) regulations. After welding, field joints would be coated with either a tape wrap or shrinkable sleeve wrap, and the pipeline coating would be visually and/or electronically inspected (jeeped), and any faults, scratches, or other coating defects would be repaired before the pipeline is lowered in. The trench would be backfilled after the pipeline has been lowered in the trench.

3.6 Lowering-in and Backfilling

Before the pipeline is lowered in, the trench would be inspected to be sure it is free of wildlife that may be trapped in the trench as well as rocks and other debris that could damage the pipe or protective coating. Dewatering may be necessary to inspect the bottom of the trench in areas where water has accumulated. Where dewatering is required, Lowman would pump water from the trench into stable upland areas or into sediment filtration/energy dissipation devices if stable upland areas are not available. In areas of rock, padding material such as finer grained sand, soil, or gravel would be placed in the bottom of the trench to protect the pipe. No topsoil would be used as padding material. The pipeline would be lowered into the trench, and trench breakers (stacked sand bags or foam) would be installed in the trench on slopes at specified intervals to prevent subsurface water movement along the pipeline. The trench would then be backfilled using the excavated material. If the excavated material is rocky, the pipeline would be protected with a rock shield (fabric or screen that is wrapped around the pipe to protect the pipe and coating from damage by rocks, stones, roots, and other debris)

or would be covered with a more suitable fill (soil or sand) obtained by separating suitable material from the existing trench material or from a commercial source.

3.7 Hydrostatic Testing

After backfilling, the pipeline would be pressure tested with water (hydrostatic) to ensure the system is capable of withstanding the operating pressure for which it was designed. Sections of pipeline to be tested as a single segment would be determined by water availability and terrain conditions. Water for pressure testing would be obtained from municipal or commercial sources and in accordance with federal, state, and local regulations. Internal test pressures and durations would be in accordance with 49 CFR Part 192. The pipeline would be tested after backfilling and all construction work that would directly affect the pipe has been completed. If leaks are found, the leaks would be repaired and the section of pipe retested until specifications are met.

Environmental impacts from withdrawal and discharge of hydrostatic test water would be minimized by applying the measures in Lowman's Hydrostatic Test Plan (see Appendix C). The use of specific construction practices would further prevent water quality impacts on these waterbodies from the discharge of hydrostatic test water. Specific practices to be used to avoid or minimize impacts include:

- locating pressure test manifolds outside of wetlands as practical;
- discharging to upland areas or water sources in compliance with appropriate agency requirements;
- anchoring the discharge pipe for safety;
- discharging test water against a splash plate or other energy-dissipating device to prevent erosion, streambed scour, suspension of sediments, and excessive streamflow;
- controlling the overall rate of discharge in order to prevent flooding and erosion; and
- using temporary straw bales or other structures to contain discharges to dissipate energy, reduce velocities, and spread water flow to avoid erosion and promote ground penetration.

Lowman's Hydrostatic Test Plan provides additional details regarding pressure and hydrostatic testing, including test water intake and discharge locations. Hydrostatic test water discharges would be in accordance with applicable federal, state, and local agency requirements. After completion of construction and pressure testing, the pipeline would be cleaned and dried using mechanical tools (pigs) that are moved through the pipeline with pressurized, dry air.

3.8 Final Tie-In

Following successful pressure testing, test manifolds would be removed and the final pipeline tie-ins would be made.

3.9 Wetland Crossings

Based on a combination of field delineated wetland data and supplemental National Wetland Inventory map data, the proposed pipeline route and associated access roads would cross 107 palustrine emergent wetlands (PEM), 32 palustrine scrub-shrub wetlands (PSS), and 138 palustrine forested wetlands (PFO). To construct the pipeline across wetlands, Lowman would use HDD methods or

methods similar to typical conventional upland cross-country construction procedures, with several modifications and limitations to reduce the potential for pipeline construction to affect wetland hydrology and soil structure (see Appendix D). Lowman would cross wetlands using methods outlined in its Construction Best Management Practices Plan (CBMPP) (see Appendix E).

To precisely identify the wetlands that would be affected by the proposed Project, Lowman conducted a field delineation of wetlands along the centerline, including the proposed construction right-of-way, staging areas, other temporary extra work areas, and associated facilities (e.g., compressor station). Wetland delineation fieldwork and reporting was conducted in accordance with the USACE's 1987 *Wetlands Delineation Manual* (USACE 1987), *Regulatory Guidance Letter: Ordinary High Water Mark Identification* (USACE 2005), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain* (Version 2.0) (USACE 2010).

ATWS would generally be required on both sides of wetlands to stage construction, fabricate the pipeline, and store materials. ATWS would generally be located in upland areas a minimum of 50 feet from the wetland edge except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. Construction equipment working in wetlands would be limited to what is essential for right-of-way clearing, excavating the trench, fabricating and installing the pipeline, backfilling the trench, and restoring the right-of-way. In areas where there is no reasonable access to the right-of-way except through wetlands, non-essential equipment would be allowed to travel through wetlands only if the ground is firm enough or has been stabilized (i.e., with timber mats) to avoid rutting. If the ground is not firm and stabilized, equipment would be allowed to travel through wetlands only once.

Clearing of vegetation in wetlands would be limited to trees and shrubs, which would be cut flush with the surface of the ground and removed from the wetland. During clearing, sediment barriers, such as silt fence and staked straw bales, would be installed and maintained adjacent to wetlands and within ATWS areas as necessary to minimize the potential for sediment runoff. Sediment barriers would be installed across the full width of the construction right-of-way at the base of slopes adjacent to wetland boundaries. Silt fence and/or straw bales installed across the working side of the right-of-way would be removed during the day when vehicle traffic is present and would be replaced each night. Alternatively, drivable berms may be installed and maintained across the right-of-way in lieu of silt fence or straw bales. Sediment barriers would also be installed within wetlands along the edge of the right-of-way, where necessary, to minimize the potential for sediment to run off the construction right-of-way and into wetland areas outside the work area. If trench dewatering is necessary in wetlands, silt-laden trench water would be discharged into an energy dissipation/sediment filtration device, such as a geotextile filter bag or straw bale structure, to minimize the potential for erosion and sedimentation.

The method of pipeline construction used in wetlands would depend largely on site-specific weather conditions, soil saturation, and soil stability at the time of construction. If wetland soils are not excessively saturated at the time of construction and can support construction equipment on timber equipment mats, or equivalent protective measures, they would be crossed using conventional open-ditch construction. Conventional open-ditch construction would occur in a manner similar to conventional upland cross-country construction techniques. In unsaturated wetlands, topsoil from the trenchline would be stripped and stored separately from subsoil.

Where wetland soils are saturated or in inundated lowlands where the soils cannot support conventional pipe-laying equipment, the pipeline may be installed using the push-pull technique. The

push-pull technique would involve stringing and welding the pipeline outside of the wetland and excavating and backfilling the trench using a backhoe supported by equipment mats or timber riprap. The prefabricated pipeline would be installed in the wetland by equipping it with buoys and pushing or pulling it across the water-filled trench. After the pipeline is floated into place, the floats would be removed and the pipeline would sink into the trench. Most pipe installed in saturated wetlands would be coated with concrete or equipped with set-on weights to provide negative buoyancy. The trench would then be backfilled. The push-pull construction method minimizes the number of equipment passes, reducing wetland impacts and soil compaction in the lowland areas.

Because little or no grading would occur in wetlands, restoration of contours would be accomplished during backfilling. Prior to backfilling, trench breakers would be installed where necessary to prevent the subsurface drainage of water from wetlands. Where topsoil has been segregated from subsoil, the subsoil would be backfilled prior to the topsoil. Topsoil would be replaced to the original ground level leaving no crown over the trenchline. In some areas where wetlands overlie rocky soils, the pipe would be padded with rock-free soil or sand before backfilling with native bedrock and soil. Equipment mats, timber riprap, gravel fill, geotextile fabric, and/or straw mats would be removed from wetlands following backfilling.

Where wetlands are located at the base of slopes, permanent slope breakers would be constructed across the right-of-way in upland areas adjacent to the wetland boundary. Temporary sediment barriers would be installed where necessary until revegetation of adjacent upland areas is successful. Once revegetation is successful, sediment barriers would be removed from the right-of-way and disposed of properly.

3.10 Waterbody Crossings

Perennial waterbodies would be crossed at 170 locations by the proposed Project, including associated access roads (See Appendix D). Individual waterbodies are often crossed multiple times by the proposed pipeline route. Lowman proposes to cross the waterbodies using either open-cut (wet crossing) or HDD crossing methods, as described in detail below (see Appendix D). In crossing waterbodies, Lowman would adhere to the guidelines outlined in its Construction Best Management Practices Plan (see Appendix E) and the requirements of its waterbody crossing permits. One primary objective of mitigation for construction activities around waterbodies and wetlands is to minimize the amount of bare ground that is exposed.

The pipeline and associated access roads would also cross intermittent waterbodies at 106 locations and ephemeral waterbodies at 85 locations (some waterbodies are crossed multiple times). In addition, 6 ponds would be crossed by the Project. (see Appendix D). If these waterbodies are dry when crossed, Lowman proposes to use conventional upland cross-country construction techniques. If the waterbodies are flowing when crossed, Lowman proposes to use the standard open-cut method or the HDD method.

3.10.1 General Construction Sequence

Temporary construction bridges would then be installed across waterbodies in all construction areas prior to right-of-way grading. Bridges may include clean rock fill over culverts, timber mats supported by flumes, railcar flatbeds, flexi-float apparatus, and other types of spans. Construction equipment would be required to use the bridges, except the clearing crew who would be allowed one pass through

the waterbodies before the bridges are installed. These temporary bridges would be removed when construction and restoration are completed for the proposed Project.

Clearing adjacent to waterbodies would involve the removal of trees and brush from the construction right-of-way and ATWS areas. The construction right-of-way adjacent to certain sensitive waterbodies would be limited to a width no greater than 75 feet. Woody vegetation within the construction right-of-way would be cleared to the edge of the waterbodies. Sediment barriers may be installed at the top of the streambank if no herbaceous strip exists. Initial grading of the herbaceous strip would be limited to the extent needed to create a safe approach to the waterbody and to install travel lane bridges.

During clearing, sediment barriers would be installed and maintained across the right-of-way adjacent to waterbodies and within ATWS areas to minimize the potential for sediment runoff. Silt fence and/or straw bales located across the working side of the right-of-way would be removed during the day when vehicle traffic is present and would be replaced each night. Alternatively, drivable berms may be installed and maintained across the right-of-way in lieu of silt fence and/or straw bales.

In general, equipment refueling and lubricating at waterbodies typically would take place in upland areas that are 100 feet or more from the edges of the water. However, there could be certain instances where equipment refueling and lubricating may be necessary in or near waterbodies. For example, stationary equipment, such as water pumps for pressure test water, may need to be operated continuously on the banks of waterbodies and may require refueling in place. Lowman has prepared a Spill Prevention, Containment, and Control Plan (SPCC Plan) to address the handling of fuel and other materials associated with the Project (see Appendix F). After the pipe has been installed in a waterbody using one of the methods described below, the trench would be backfilled with the native material that was excavated from the trench.

ATWS areas may be required on both sides of waterbodies to stage construction, fabricate the pipeline, and store materials. If required, these ATWS would be located at least 50 feet away from the water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land.

3.10.2 Restoration

Lowman is committed to the restoration of each waterbody crossed. Restoration actions include the following. For open-cut crossings, banks would be stabilized and temporary sediment barriers would be installed within 24 hours of completing in-stream construction activities. The streambed profile would be restored to pre-existing contours and grade conditions to prevent scouring. Once the streambed is restored, the stream banks would be restored as near as possible to pre-existing conditions and slope, stabilized and seeded. If required, riprap would be limited to areas where flow conditions preclude effective vegetative stabilization techniques such as seeding and erosion control fabric. Temporary erosion controls would be installed immediately following bank restoration and the waterbody crossing area would be inspected and maintained until vegetation restoration is complete. Disturbed riparian areas would be revegetated as described in the Construction Best Management Practices Plan (see Appendix E).

3.10.3 Standard Open-Cut Crossing Method

The standard open-cut or wet trench crossing method would involve excavating within the waterbody while water continues to flow across the trenching area. Prior to initiating construction across the waterbody, the crossing section of pipeline would be fabricated (i.e., welded, bent, coated) in adjacent,

approved ATWS areas. Track hoe-type excavators would then excavate a trench in the flowing waterbody from one or both of the waterbody banks. Where the waterbody is too wide to excavate the trench from the banks, equipment may operate from within the waterbody with approval from appropriate regulatory agencies. Equipment operating within the waterbody would be limited to that needed to construct the crossing.

Lowman would attempt to place spoil excavated from the trench a minimum of 10 feet from the edge of the waterbody for temporary storage. Some locations may require that ditch spoil be stored less than 10 feet from the edge or within the waterbody. Sediment barriers would be installed where necessary to prevent sediment and excavated spoil from entering the water. As needed, earthen trench plugs (hard plugs) would be left in place in the adjacent upland section of the pipeline trench on both banks of the waterbody until after installation of the pipeline crossing section. This would separate the waterbody trench from the upland trench to prevent water from being diverted into the upland portions of the pipeline trench and to keep any muddy water that may have accumulated in the upland trench from flowing into the waterbody. Once the trench is excavated, the prefabricated segment of pipe would be installed in the trench. The trench would then be backfilled with the native streambed spoil that was excavated from the trench. After the pipeline crossing section is installed and the trench is backfilled, the banks would be stabilized. Any excavated material not required for backfill would be used on the construction right-of-way in an upland area and stabilized during right-of-way restoration.

3.10.4 Horizontal Directional Drill Method

The HDD method is another process that allows for trenchless construction across an area. With this method, a borehole is drilled under the waterbody and a prefabricated segment of pipe is installed through the borehole, thereby avoiding disturbance to the surface of the right-of-way and to the waterbody proper. HDDs are most commonly used to cross underneath sensitive or difficult to construct waterbodies or combination wetlands and waterbodies and can provide certain advantages (e.g., avoidance of surface disturbance, riparian tree clearing, or in-stream construction) over typical pipeline construction and installation methods. This method of pipeline installation does not restrict fish passage.

After setting up the drill pad extra workspace and the exit hole location, the first step in HDD is to hand lay electrical guidance wires on top of the ground. These wires set up an underground connectivity field (sensor grid) to allow the operator to accurately steer the drill head while drilling. The sensor grid would be fabricated by installing several stakes along the drill path and wrapping them with an insulated coil wire. The coil wire would then be energized with a portable generator, which creates a magnetic field to track the drill bit. No ground or surface disturbance is required for these wires. Next, a small-diameter (4-inch) pilot hole from one side of the crossing (entry side) would be drilled to the other (exit side). Drilling would be achieved using a powered drill bit. The drilling fluid, commonly referred to as mud, would be a slurry mixture of water and bentonite (a naturally occurring clay mineral), which would be pumped into the drill hole throughout the drilling process. Additional certified non-hazardous additives may be required, and be approved by Lowman prior use. The pressure of the drilling mud would transmit hydraulic power to turn the drill bit, stabilize the drill hole, transport cuttings to the surface, and lubricate the drill bit. Small pits would be dug at or near the entry and exit holes to temporarily store the mud and cuttings. The mud and cuttings would be pumped from the temporary storage pits to an on-site recycling unit where the mud would be processed for reuse.

As drilling of the pilot hole progresses, segments of drill pipe would be inserted into the pilot hole to extend the length of the drill. The drill bit would be steered and monitored throughout the process to maintain the designated path of the pilot hole. Once the pilot hole is complete, the sensor grid would be removed and the hole would be enlarged to accept the pipeline. To enlarge the pilot hole, a larger reaming tool would be attached to the end of the drill on the exit side of the hole. The reamer would then be drawn back through the pilot hole to the drill rig (entry side). Drill pipe sections would be added to the rear of the reamer as it progresses toward the rig, thereby allowing a string of drill pipe to remain in the hole at all times. Typically, several passes of consecutively larger reaming tools are required before the hole would be of sufficient size. The final hole would be approximately 1.5 to 2 times the diameter of the pipeline to be installed.

The pipeline segment (i.e., pull section) to be installed beneath the waterbody would be fabricated on the right-of-way on the exit side of the crossing while the drill hole is being reamed to size. A steel bullhead is welded onto the front end of the pull section to aid in pulling the pipe through the drill hole. After the hole is completed, the pipeline segment would be attached to the drill string on the exit side of the hole and pulled back through the drill hole toward the drill rig. The pipe segment would be inspected and hydrostatically tested prior to installation.

As the pipeline is being installed, excess drilling mud would be collected and incorporated into the soil in an upland area or disposed of at an appropriate facility. If water is left over from the drilling process, it would be discharged into a well-vegetated upland area or into an energy dissipation/sediment filtration device, such as a geotextile filter bag or straw bale dewatering structure at the site.

Lowman has developed a Horizontal Directional Drill Inadvertent Release Plan describing the prevention, detection, monitoring, notification, and corrective action procedures in the event of an inadvertent release of drilling fluid when the HDD method is used (see Appendix G).

3.11 Construction of Aboveground Facilities

Construction of the aboveground facilities associated with the Project would occur concurrently with construction of the pipeline facilities. Construction would begin with clearing and grading the sites to establish level grades for the facilities. Subsequent construction activities would include preparing foundations, installing underground piping, erecting and installing buildings, installing aboveground piping and equipment, testing the piping, testing the control equipment, cleaning up the work area, and paving or graveling access roads and parking areas. Roads and parking areas would be constructed using gravel fill. Once construction is completed, any disturbed areas that are not covered with foundations or gravel would be finish-graded and seeded. The areas would generally be fenced or barred for security. Safety and control devices would be installed and tested prior to operation.

3.12 Operation, Maintenance, and Safety Control

Lowman's pipeline facilities would be operated and maintained in accordance with applicable federal and state requirements. Lowman anticipates that operation of the pipeline would require 2 permanent employees.

Operational activity on the pipeline would be limited primarily to maintenance of the right-of-way and inspection, repair, and cleaning of the pipeline facilities. Periodic aerial and ground inspections by pipeline personnel would identify soil erosion that may expose the pipe, conditions of the vegetative cover and erosion control measures, unauthorized encroachment on the permanent easement such as

buildings and other substantial structures, and other conditions that could present a safety hazard or require preventative maintenance or repairs. The pipeline cathodic protection system would also be monitored and inspected periodically to ensure adequate corrosion protection. Appropriate responses to conditions observed during inspection would be taken, as necessary.

The pipeline facilities would be clearly marked at crossings of roads, railroads, and other key points. The markers would clearly indicate the presence of the pipeline facilities and provide a telephone number and address where a company representative could be reached in the event of an emergency or prior to any excavation in the area by a third party. Lowman is a member of the One-Call and related pre-excavation notification organizations in the states in which it operates.

In order to maintain accessibility of the rights-of-way, to accommodate pipeline integrity surveys, and to maintain visibility of pipeline markers, vegetation along the permanent 30-foot-wide pipeline easement would be periodically maintained. The goal of such vegetation maintenance activities would be to establish and retain a low-growing, herbaceous vegetative ground cover. As conditions require, it would be necessary to periodically remove woody vegetation (shrubs and trees) from the permanent pipeline easement. However, no maintenance clearing of woody vegetation would generally be required in wetland and riparian areas within the permanent pipeline easement corresponding to segments of pipeline installed via HDD.

Pipeline integrity surveys and vegetative maintenance may identify areas on the right-of-way where permanent erosion control devices need to be repaired or additional erosion control devices may be needed. If problem areas are evident, erosion control devices would be repaired or installed as necessary and the right-of-way would be stabilized to prevent future degradation.

Operation and maintenance procedures, including record keeping, would be performed in accordance with DOT requirements. Operation and maintenance of MLVs and valve operators would be performed in accordance with information provided by the MLV and operator manufacturers.

3.13 Conservation Measures Incorporated into the Project

Throughout the development of the Project, Lowman has analyzed and evaluated numerous avoidance and conservation measures to develop a project that avoids or minimizes environmental impacts while still meeting the Project's objective. The results of these analyses, including extensive work during the feasibility stage of the Project to develop a route that avoids, to the extent possible, sensitive environmental areas, have been built-in or incorporated into the proposed Project. The routing process started from a macro-scale to identify a general 'corridor' for transporting natural gas from the nearest interconnect to the Lowman Plant. After this macro-scale analysis was done, a more specific analysis was conducted to refine the route. After the route was developed, Lowman undertook a detailed review of its right-of-way configuration to identify areas where alternative configurations of its nominal 100-foot-wide construction right-of-way were needed to further avoid or minimize certain features on a site-specific basis. Lowman also optimized ATWS areas to both reduce the size of these areas and place them outside of sensitive habitats. Careful analysis of waterbody crossing methods and techniques to design crossings that minimize environmental impacts was also completed. Once these measures were analyzed and evaluated, for areas where avoidance was not possible, Lowman developed several species-specific conservation measures to minimize impacts on individual species. Lowman's overall evaluation process is described in more detail below.

3.13.1 Routing

During development of the proposed route, Lowman has evaluated route alternatives to optimally design and locate the proposed facilities in a manner that minimizes its environmental footprint while meeting the purpose and need of the Project. The criteria implemented by Lowman during evaluation and selection or rejection of alternate route configurations included review of technical and economic feasibility and constructability; quantitative evaluation of environmental constraints comprised of sensitive areas; and coordination with key stakeholders such as state and federal resource agencies, local planning departments, Tribal entities, and landowners. Existing data and available information from the FWS were obtained and reviewed to identify locations where sensitive species and habitats potentially occur along the proposed pipeline corridor. These data were mapped and incorporated into the various routing scenarios and quantitative route selection process. In addition, results of the general biological and wetland surveys conducted in spring 2020 were used to further inform and refine the routing process. As new survey results became available, further adjustments to the route were made, as necessary.

After considering agency input and prior to completing its sensitive species surveys, Lowman implemented conservation measures in the form of route modifications and right-of-way configurations to avoid or minimize impacts on many species, including listed species and migratory birds.

3.13.2 Right-of-Way Collocation

One specific measure that would reduce impacts on sensitive resources would be collocation with other rights-of-way. In total, about 12.5 miles (23.3 percent) of the Project would be collocated with existing utilities (i.e., pipeline, railroad, or road rights-of-way). Collocation reduces impacts to previously undisturbed areas on the landscape. In segments where Lowman was unable to collocate, Lowman would minimize impacts in sensitive environmental areas such as wetlands and riparian zones by reducing the construction right-of-way width and placing ATWS outside of these areas as practicable. These areas were identified through agency review, general biological surveys, and existing data.

3.13.3 Waterbody Crossing Design

Because of the wide variety of waterbodies that are encountered along the proposed pipeline route, optimization of stream crossing techniques, from both an engineering and environmental perspective, was carefully considered throughout the development phase of the Project. Prior to selecting the proposed crossing methods identified in the Construction Best Management Practices Plan, waterbodies along the proposed pipeline route were assessed to determine the most appropriate crossing method based on site-specific conditions. Typical waterbody criteria considered for determining the most appropriate construction technique included, but are not limited to: approaches and alignment of the pipeline route to the area being crossed; site-specific space requirements and/or obstacles for temporary workspaces; width of crossing; typical and seasonal flow rates, depth, water quality, regulatory status, recreation or other designated land uses; riparian vegetation; and other biological constraints.

The comparative analysis of alternative construction methods at waterbody crossings was based on review of aerial photography; U.S. Geological Survey (USGS) topographic maps; field visits; civil and environmental surveys; geotechnical assessments; and input by key stakeholders such as federal resource agencies. Descriptions for each of the stream crossing methods at each waterbody (i.e., open-cut or HDD) can be found in Appendix D.

4.0 SPECIAL STATUS SPECIES AND CRITICAL HABITAT CONSIDERED

4.1 Effects Determination Analysis Overview

This section addresses the potential impacts to federally listed species that were identified by using the Information, Planning, and Conservation System (IPAC) on the FWS website, and consultations with the FWS, as potentially occurring in the Project area. Table 4.1-1 summarizes the federally listed species covered in this BA and the impact determinations, based on: 1) correspondence with the FWS and state wildlife agencies, 2) habitat requirements and known distribution of these species within the Project area, and 3) analysis of potential habitat for each species along the Project route. A determination was made concerning direct and cumulative effects of the proposed activities on each species.

Determinations made for ESA threatened or endangered species are:

- no effect;
- may affect, but is not likely to adversely affect; and
- may affect, and is likely to adversely affect.

TABLE 4.1-1
Lowman Pipeline Project
Summary of Federally Endangered and Threatened Species Included in Analysis and Findings

Species	Scientific Name	Status	Included in Analysis	Findings Summary
Birds				
Wood Stork	*Mycteria americana*	Federally Threatened (FT)	Yes	No effect
Reptiles				
Gopher tortoise	*Gopherus polyphemus*	FT	Yes	May affect, but not likely to adversely affect
Black pine snake	*Pituophis melanoleucus lodingi*	FT	Yes	May affect, but not likely to adversely affect
Fish				
Atlantic sturgeon	*Acipenser oxyrhynchus oxyrhynchus*	Federally Endangered (FE)	Yes	No effect
Mollusks				
Inflated heelsplitter	*Potamilus inflatus*	FT	Yes	May affect, but not likely to adversely affect
Southern clubshell	*Pleurobema decisum*	FE	Yes	May affect, but not likely to adversely affect

An overview of the ecology, species status range-wide and within the Project area, potential impacts, and conservation measures for each of the identified federally listed species known to occur within the Project area is provided below.

4.2 Impacts Evaluation by Species – Federally Endangered and Threatened

4.2.1 Wood Stork

4.2.1.1 Ecology and Species Status

Wood storks (*Mycteria americana*) are large, long-legged wading birds, about 45 inches tall, with a wingspan of 60 to 65 inches. Their plumage is white except for black primary and secondary feathers and a short black tail. The head and neck are largely unfeathered and dark gray in color. The bill is black, thick at the base, and slightly decurved (FWS, 2019).

Wood storks feed mainly on small fish from 1 to 6 inches long; therefore, the storks' habitat usually consists of freshwater and estuarine wetlands. They nest primarily in cypress or mangrove swamps, and feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools (FWS, 2019). Particularly attractive feeding sites are depressions in marshes or swamps where fish become concentrated during periods of falling water levels. Wood storks have a unique feeding technique, and require higher prey concentrations than other wading birds. Optimal water regimes for the wood stork involve periods of flooding, during which fish populations increase, alternating with dryer periods; during which receding water levels concentrate fish at higher densities coinciding with the stork's nesting season. The generally accepted explanation for the decline of the wood stork is the reduction in food base necessary to support breeding colonies (FWS, 2019). This reduction is attributed to loss of wetland habitat, as well as to changes in water hydroperiods from draining wetlands and changing regimes by constructing levees, canals, and floodgates. The wood stork is currently listed as **Threatened** under the ESA within the Project area.

4.2.1.2 Status within the Project Area

Lowman conducted a field survey/habitat assessment for wood storks in January through July 2020. While the Project crosses numerous wetlands, which could provide foraging habitat for the species, no cypress or mangrove swamps or other similar habitats used for nesting would be crossed by the Project. Given the mobility of the species, it is anticipated that any wood stork in the area would be considered transient.

4.2.1.3 Mitigation

No mitigation is necessary as the proposed action will have no impacts to the wood stork.

4.2.1.4 Determination

Effect on Critical Habitat. No critical habitat has been identified for wood storks along the Project construction corridor; therefore, the Project would have **no effect** on critical habitat for the wood stork.

Effect on the species. The proposed action will have **no effect** on the wood stork, due to the lack of any available stopover sites and the temporary nature of the action.

4.2.2 Gopher Tortoise

4.2.2.1 Ecology and Species Status

The gopher tortoise (*Gopherus polyphemus*) is a dry-land species that usually lives in relatively well-drained, sandy soils generally associated with longleaf pine and dry oak sandhills. They can also live in scrub, dry hammock, pine flatwoods, dry prairie, coastal grasslands and dunes, mixed hardwood-pine communities, and a variety of habitats that have been disturbed or altered by man, such as power line rights-of-way and along roadbanks (FWS, 2019a). Gopher tortoises require well-drained, sandy soils for burrowing and nest construction, and abundance of herbaceous ground cover for food, and a generally open canopy that allows sunlight to reach the forest floor. Historic gopher tortoise habitats were open pine forests, savannahs, and xeric grasslands that covered the coastal plain from Mexico and Texas to Florida. The current range for the eastern (candidate) population of the gopher aligns with the historic range which includes Alabama (east of the Tombigbee and Mobile Rivers), Florida, Georgia, and South Carolina. The core of the current distribution of the gopher tortoise in the eastern portion of the range includes central and north Florida and eastern and southern Georgia (FWS, 2019b).

The burrows of the gopher tortoise are the center of normal feeding, breeding, and sheltering activity. Gopher tortoises excavate and use more than one burrow for shelter beneath the ground surface. Burrows may extend for more than 30 feet and provide shelter from canine predators, fire, winter cold, and summer heat. Dogs and large canids are the most common predator of adult tortoises (Causey and Cude, 1978). Habitat destruction is a significant threat to gopher tortoises. Gopher tortoises need large parcels of undeveloped land not fragmented by roads, buildings, parking lots, and other structures. Such barriers in natural habitat limit food availability and burrow space for tortoises and expose them to closer contact with humans and their vehicles (FWS, 2019b). The gopher tortoise is currently listed as **Threatened** under the ESA within the Project area.

4.2.2.2 Status within the Project Area

Lowman conducted a field survey/habitat assessment for the gopher tortoise in January through May 2020. Gopher tortoise surveys were completed across a 300-foot-wide corridor along the entire Project route. Lowman identified sixteen (16) gopher tortoise burrows during surveys: seven (7) of which were potentially occupied – inactive; one (1) that was potentially occupied – active; three (3) that were occupied; and five (5) that were abandoned. Nine (9) of the non-abandoned burrows were located within the proposed workspace, or within 25 feet of the workspace. A copy of the *Gopher Tortoise Burrow Survey and Scoping* report is provided in Appendix H.

4.2.2.3 Mitigation

To avoid impact to gopher tortoises, Lowman proposes to mechanically excavate seven (7) occupied and potentially occupied burrows (active and inactive) located in the Project right-of-way or within 25 feet of the workspace. Specifically, burrows labeled as GT-Burrow-2, GT-Burrow-4, GT-Burrow-5, GT-Burrow-6, GT-Burrow-7, GT-Burrow-8, and GT-Burrow-12 in the survey report are recommended for excavation (see Appendix H). Excavated gopher tortoises would be relocated to pre-determined areas in suitable habitat with appropriate soil types outside of, and at least 25 feet from, the Project right-of-way. To mitigate potential effects on two (2) burrows located approximately 20 feet from the edge of the Project right-of-way and under transmission line poles (i.e., GT-Burrow-13 and GT-Burrow-14; see Appendix H), the workspace will be re-configured to create a 25-foot buffer between construction activities and each burrow. Prior to any relocation efforts commencing, Lowman will request and receive approval from FWS. Gopher tortoises will be relocated following the FWS *Gopher Tortoise Trapping and Translocation Guidelines.* Additionally, to prevent gopher tortoises from entering the

right-of-way during active construction, silt fence will be installed along the edge of the right-of-way at each of the nine (9) occupied or potentially occupied (active and inactive) locations identified above. If any new burrows are located prior to construction, the burrows will be scoped and, if occupied or active, appropriate mitigation measures will be implemented after consultation with the USACE and USFWS.

In addition, prior to coming onto the job site, all personnel involved in the construction of the proposed facilities will be trained for awareness of the potential for protected species in the area. Training will be conducted by the Contractor Superintendent or his designee and the Lowman Environmental Inspector on the job site.

4.2.2.4 Determination

Effect on Critical Habitat. No critical habitat has been identified for gopher tortoises along the Project construction corridor; therefore, the Project would have **no effect** on critical habitat for the gopher tortoise.

Effect on the species. The proposed action **may affect, but is not likely to adversely affect** the gopher tortoise. This determination is based on the above analysis and proposed mitigation measures.

4.2.3 Black Pine Snake

4.2.3.1 Ecology and Species Status

Pine snakes (genus *Pituophis*) are large, short-tailed, powerful constricting snakes with keeled scales and disproportionately small heads (Conant and Collins, 1991). Black pine snakes (*Pituophis melanoleucus lodingi*) are distinguished from other pine snakes by dark brown to black coloration on, both, the upper and lower surfaces of their bodies. Black pine snakes are active during the day, but only rarely at night. With a pointed snout and enlarged rostral scale, pine snakes are accomplished burrowers for digging nests and excavating rodents for food (Ernst and Barbour, 1989).

Black pine snakes are endemic to the upland longleaf pine forests of the southeastern United States. Habitat consist of sandy, well-drained soils with an overstory of longleaf pine, a fire suppressed mid-story, and dense herbaceous ground cover (Duran, 1998). Black pine snakes move seasonally between warm weather active areas and winter hibernacula located in inactive areas. The snakes emerge from hibernacula in mid-February, making short movements within the inactive area before moving to their active area in late March. They occupy the active areas until late September before moving back to the inactive areas). There are currently known populations in Clarke, Mobile, and Washington Counties, Alabama, and the black pine snake is currently listed as **Threatened** under the ESA within the Project area.

4.2.3.2 Status within the Project Area

Black pine snakes primarily occupy the same habitat as the gopher tortoise burrows for denning and egg laying. Therefore, any harm to gopher tortoise burrows could affect the snakes. Lowman conducted a field survey/habitat assessment for the gopher tortoise in May 2020 (see Section 4.2.2). Lowman identified sixteen (16) gopher tortoise burrows during surveys: seven (7) of which were potentially occupied – inactive; one (1) that was potentially occupied – active; three (3) that were occupied; and five (5) that were abandoned.

4.2.3.3 Mitigation

Lowman proposes to implement protective measures for identified gopher tortoise burrows, as discussed in Section 4.2.2. Implementation of these protective measures would also mitigate any adverse effects on the black pine snake. In addition, any black pine snake found within in the Project right-of-way would be given time to leave of its own accord or would be captured and released into surrounding habitat outside of the construction work area. To prevent snakes from re-entering the right-of-way during active construction, silt fence will be installed along any areas where black pine snakes were observed and/or relocated.

In addition, prior to coming onto the job site all personnel involved in the construction of the proposed facilities will be trained for awareness of the potential for protected species in the area. Training will be conducted by the Contractor Superintendent or his designee and the Lowman EI on the job site.

4.2.3.4 Determination

Effect on Critical Habitat. No critical habitat has been identified for black pine snakes along the Project construction corridor; therefore, the Project would have **no effect** on critical habitat for the black pine snake.

Effect on the species. The proposed action **may affect, but not likely to adversely affect** the black pine snake. This determination is based on proposed mitigation measures for gopher tortoise burrows and proposed monitoring efforts during construction.

4.2.4 Atlantic Sturgeon

4.2.4.1 Ecology and Species Status

The Atlantic sturgeon (*Acipenser oxyrhynchus oxyrhynchus)* lives in rivers and coastal waters from Canada to Florida. Atlantic sturgeons are slow-growing and late-maturing, and have been recorded to reach up to 14 feet of length and up to 60 years of age. While still found throughout their historical range, Atlantic sturgeon spawning is known to occur in only 22 of 38 historical spawning rivers. Hatched in the freshwater of rivers, the sturgeons head out to seas as juveniles, and return to their birthplace to spawn, or lay eggs, when they reach adulthood (NOAA, 2019). Atlantic sturgeons were listed under the ESA in 2012 as five distinct population segments. A distinct population segment is the smallest division of a species permitted to be protected under the ESA. Sturgeon that hatch out of U.S. rivers near the Project area are listed as **Endangered** under the ESA.

4.2.4.2 Status within the Project Area

The Project route does not cross any waterbodies where the Atlantic sturgeon is known to occur.

4.2.4.3 Mitigation

No mitigation is necessary as the proposed action will have no impacts to Atlantic sturgeon.

4.2.4.4 Determination

Effect on Critical Habitat. No critical habitat has been identified for Atlantic sturgeon along the Project construction corridor; therefore, the Project would have **no effect** on critical habitat for the Atlantic sturgeon.

Effect on the species. The proposed action will have **no effect** on the Atlantic sturgeon, due to the lack of any available, known habitat.

4.2.5 Inflated Heelsplitter and Southern Clubshell

4.2.5.1 Ecology and Species Status

Inflated Heelspliter

The inflated heelspliter (*Potamilus inflatus*) is a freshwater mussel, or bivalve mollusk, which reaches a maximum adult shell size of about 140 millimeters (mm) or 5.5 inches (in.) in length. The shell is brown to black, and may have green rays in young adults (NatureServe, 2019). Inflated heelsplitters is most similar to *Potamilus ohiensis*, but is clearly distinguishable by shell morphology. The shell and teeth of the *Potamilus inflatus* are more delicate and the shell is darker and more pointed posteriorly than the *Potamilus ohiensis*. Inflated heelsplitters are found in sand, mud, silt, and sandy-gravel substrates in slow to moderate currents and are usually collected on the protected side of basin water as deep as 20 feet. The species has not been found in large gravel. The inflated heelsplitter's preferred habitat is soft, stable substrates in slow to moderate currents (NatureServe 2019). The inflated heelsplitter is currently listed as **Threatened** under the ESA within the Project area.

Southern Clubshell

The southern clubshell (*Pleurobema decisum*) is a freshwater mussel, or bivalve mollusk, which attains an average adult size of 70 mm (2.8 in.) in length. The outer shell is yellow to yellowish-brown with occasional green rays or spots on the umbo of young specimens (NatureServe, 2019a). The southern clubshell is distinguished from a closely related species, *Pleurobema curtum* by its elongated shape, lighter color, and presence of a well-defined sulcus in the latter. Southern clubshells are usually found in highly oxygenated streams with sand and gravel substrate in shoals of large rivers to small streams, and may be found in sand and gravel in the center of the stream or in sand along the margins of the stream (NatureServe, 2019a). The southern clubshell is currently listed as **Endangered** under the ESA within the Project area.

4.2.5.2 Status within the Project Area

Lowman conducted a field survey/habitat assessment for the inflated heelsplitter and southern clubshell in January through July of 2020 where 15 different stream crossing locations were identified as potential for habitat for mussel species (see Table 4.2-1).

TABLE 4.2-1
Lowman Pipeline Project
Summary of Stream Crossings Potentially Containing Freshwater Mussels Along the Proposed Lowman Pipeline Project

Stream Name	County
Bogueloosa Creek	Choctaw
Buck Creek	Choctaw
Okatuppa Creek	Choctaw
Souwilpa Creek	Choctaw
Black Creek	Choctaw
Turkey Creek	Choctaw
Santa Bogue Creek	Washington
Elias Creek	Washington
Elias Creek	Washington
Tauler Creek	Washington
Folsoms Creek	Washington
Folsoms Creek	Washington
UNT to Folsoms Creek	Washington
UNT to Tombigbee River	Washington
UNT to Tombigbee River	Washington

Lowman conducted species-specific surveys in the May, June, and July 2020. Because Alabama has not adopted or recognized an official mussel survey protocol, mussel surveys follow the 2018 West Virginia Mussel Survey Protocol (WVMSP) (Clayton et al., 2018). Following the WVMSP (Clayton et al. 2018), streams are classified into Groups (1-4) based on county, stream size, and potential for a federally endangered species (ES) to occur. Because streams proximate the Project have potential to contain ES, WVMSP guidelines for Group 2 streams were followed. No inflated heelspliter or southern clubshell mussels were identified during survey. A copy of the Freshwater Mussel Survey report is provided in Appendix I.

4.2.5.3 Mitigation

Although no protected mussel species were identified in these streams, Lowman proposed to minimize impacts to aquatic resources by crossing larger waterbody crossings via HDD and has developed an HDD Contingency Plan (see Appendix G) in case of a frac out in or near a waterbody. In addition, if streams are used as a source for hydrostatic test waters, withdrawal devices would utilize appropriate sized mesh screening to protect against entrainment of any small aquatic species.

4.2.5.4 Determination

Effect on Critical Habitat. No critical habitat has been identified for inflated heelsplitter or southern clubshell along the Project construction corridor; therefore, the Project would have **no effect** on critical habitat for the inflated heelsplitter or southern clubshell.

Effect on the species. The proposed action **may affect, but is not likely to adversely affect** inflated heelsplitter or southern clubshell. This determination is based on the above effects analysis and proposed mitigation measures.

5.0 MIGRATORY BIRDS

Migratory birds include species that nest in the United States and Canada during the summer and migrate south to warmer regions of the United States, Mexico, Central and South America, and the Caribbean for the winter. The Migratory Bird Treaty Act (MBTA) protects migratory birds and most resident birds within the United States. With a few exceptions, all bird species that are native to the United States are protected by the MBTA. Under the MBTA, it is illegal to pursue; hunt; take; capture; kill; attempt to take, capture, or kill; possess; offer for sale; and export, import, or transport birds, their parts (e.g., feathers), and active nests (and the eggs or young within). Unlike the federal ESA, the MBTA does not include harassment or destruction of habitat in its list of prohibitions or within its definition of take. Also, the MBTA does not include disturbance within its definition of take.

In addition to the MBTA, the Bald and Golden Eagle Protection Act (BGEPA) is applicable to the Project. This law prohibits intentional take of an eagle, egg, or nest, including inactive and alternate nests. The BGEPA definition of take includes disturbance of eagles, whereas the MBTA definition of take does not include disturbance. BGEPA disturbance is defined as that which results in a biologically significant impact; it may include interference with breeding, feeding, sheltering behavior (roosting), or nest abandonment, which can contribute to or cause the agitation of an eagle to the degree that it causes injury or death.

5.1 Birds of Conservation Concern

Lowman used IPAC to generate a list of species that are listed as FWS Birds of Conservation Concern (BCC) that may occur in the Project area. The IPAC results for BCC species are included in Table 5.1-1, below.

TABLE 5.1-1
Lowman Pipeline Project
Migratory Birds of Conservation Concern Potentially Encountered by the Project

Species	Scientific Name	Highest Presence Probability (month)
Common Ground-dove	*Columbina paserina exigua*	June and October
Prairie Warbler	*Dendroica discolor*	April
Prothonotary Warbler	*Protonotaria citrea*	May and July
Red-headed Woodpecker	*Melanerpes erythrocephalus*	April, May, June, July, and November
Rusty Blackbird	*Euphagus carolinus*	February
Swallow-tailed Kite	*Elanoides forficatus*	March, May, June, July, and August
Wood Thrush	*Hylocichla mustelina*	April and May

In addition to the BCCs listed above, IPAC listed the Bald Eagle (*Haliaeetus leucocephalus)* as potentially occurring within the Project area with the highest probability of presence in April and November.

5.2 Habitat Avoidance and Minimization Measures

In an effort to be consistent with the MBTA, Lowman has reduced migratory bird impacts in several ways. Lowman has made right-of-way width reductions and right-of-way construction configuration changes to reduce and avoid impacts on other priority habitats such as forested areas and riparian wetlands. Lowman has committed to restoration efforts to ensure that environmental impacts have been reduced or minimized after construction.

5.2.1 Routing

During development of the proposed route, Lowman has evaluated multiple alternatives to optimally design and locate the proposed facilities in a manner that minimizes its environmental footprint while meeting the purpose and need of the Project. Although this effort was not conducted specifically for migratory birds, a route with the least environmental impacts will, in turn, have the least impact on migratory birds. The criteria implemented by Lowman during evaluation and selection or rejection of alternate route configurations included review of technical and economic feasibility and constructability and quantitative evaluation of environmental constraints comprised of sensitive areas. Results of the general biological and wetland surveys conducted in 2020 as well as the species-specific threatened and ES surveys were used to further inform and refine the routing process. As new survey results became available, further adjustments to the route were made if necessary. This process identified the shortest route possible with modifications for constructability and considerations to avoid and minimize impacts to sensitive areas.

5.2.2 Horizontal Directional Drill

HDDs provide a number of advantages over typical pipeline construction and installation methods, such as avoidance of surface disturbance, riparian tree clearing, and in-stream construction. If an HDD crossing is successful, there are little to no negative impacts on the sensitive area crossed. Lowman plans to use the HDD crossing method in eight (8) waterbodies locations, which will reduce overall Project impact to potential migratory bird habitats.

5.2.3 Right-of-Way Configuration and Optimization

In addition to routing, Lowman will use various right-of-way configurations and optimizations to avoid and reduce impacts on migratory birds. In particular, many of these measures may benefit and at a minimum reduce or avoid impacts on migratory bird species of concern.

One specific measure that will reduce impacts on migratory birds will be collocation with other rights-of-way. To the extent practicable, Lowman has collocated the Project with existing utility (e.g., other pipelines, power lines, etc.), railroad, or road rights-of-way. In segments where Lowman was unable to collocate, Lowman will minimize impacts in sensitive environmental areas and high priority habitats to migratory birds such as wetlands and riparian zones by reducing the construction right-of-way, and placing ATWS at least 50-feet outside of these areas as practicable. In areas where an HDD cannot be used, Lowman will minimize construction width in riparian areas to reduce the extent of disturbance.

5.2.4 Nest Avoidance and Mitigation

If nesting activities for any of the BCC species listed in Table 5.1-1 or Bald Eagles are documented within the Project area during construction clearing, Lowman will establish buffer zones for these species and construction will be allowed to commence only when the chicks are fully fledged and able to fly.

5.3 Restoration

Lowman has developed restoration and enhancement measures that will reduce impacts on or benefit migratory bird species of concern. Following construction of the pipeline, restoration and reclamation of the disturbed work areas will occur following methods outlined in Lowman's CBMPP (see Appendix E). During Project construction Lowman proposes to remove and store topsoil for reuse during reclamation, where necessary. Topsoil segregation benefits revegetation success as most plant-essential nutrients are found at or near the surface. Disturbed areas will be de-compacted as needed and would be subject to final grading.

6.0 LITERATURE CITED

Causey, M.K. and C.A. Cude. 1978. "Feral dog predation of the gopher tortoise, *Gopherus Polyphemus*, in southeast Alabama." Herpetological Review 9:94-95

Clayton, J. L., B. Douglas, and P. Morrison. 2018. West Virginia mussel survey protocols. West Virginia Division of Natural Resources. Elkins, West Virginia. 24pp.

Conant, T. and J.T. Collins. 1991. A field guide to the reptiles and amphibians of Eastern and Central North America. Houghton Mifflin Co., Boston, Massachusetts.

Duran, C.M. 1998a. Radio-telemetric study of the black pine snake (*Pituophis melanoleucus lodingi*) on the Camp Shelby Training site. Report to the Mississippi Natural Heritage Program and the Mississippi National Guard.

Ernst, C.H. and R.W. Barbour. 1989. Snakes of eastern North America. George Mason University Press, Fairfax, Virginia.

National Oceanic and Atmospheric Administration (NOAA). 2019. Atlantic Sturgeon Species Profile. Available online at: https://www.fisheries.noaa.gov/species/atlantic-sturgeon Accessed: February 2019.

NatureServe. 2019. Nature Serve Explorer: An online encyclopedia of life. Version 7.1 Nature Serve, Arlington, Virginia. Available online at: http://explorer.natureserve.org/servlet/NatureServe?searchName=Potamilus%20inflatus. Accessed: February 2019.

NatureServe. 2019a. Nature Serve Explorer: An online encyclopedia of life. Version 7.1 Nature Serve, Arlington, Virginia. Available online at: http://explorer.natureserve.org/servlet/NatureServe?searchName=Pleurobema%20decisum. Accessed: February 2019.

U.S. Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetland Delineation Manual. Tulsa District, Public Affairs Office.

U.S. Army Corps of Engineers (USACE). 2005. Corps of Engineers Regulatory Guidance Letter: Ordinary High Water Mark Identification.

U.S. Army Corps of Engineers (USACE). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0). USACE Research and Development Center, Vicksburg, MS.

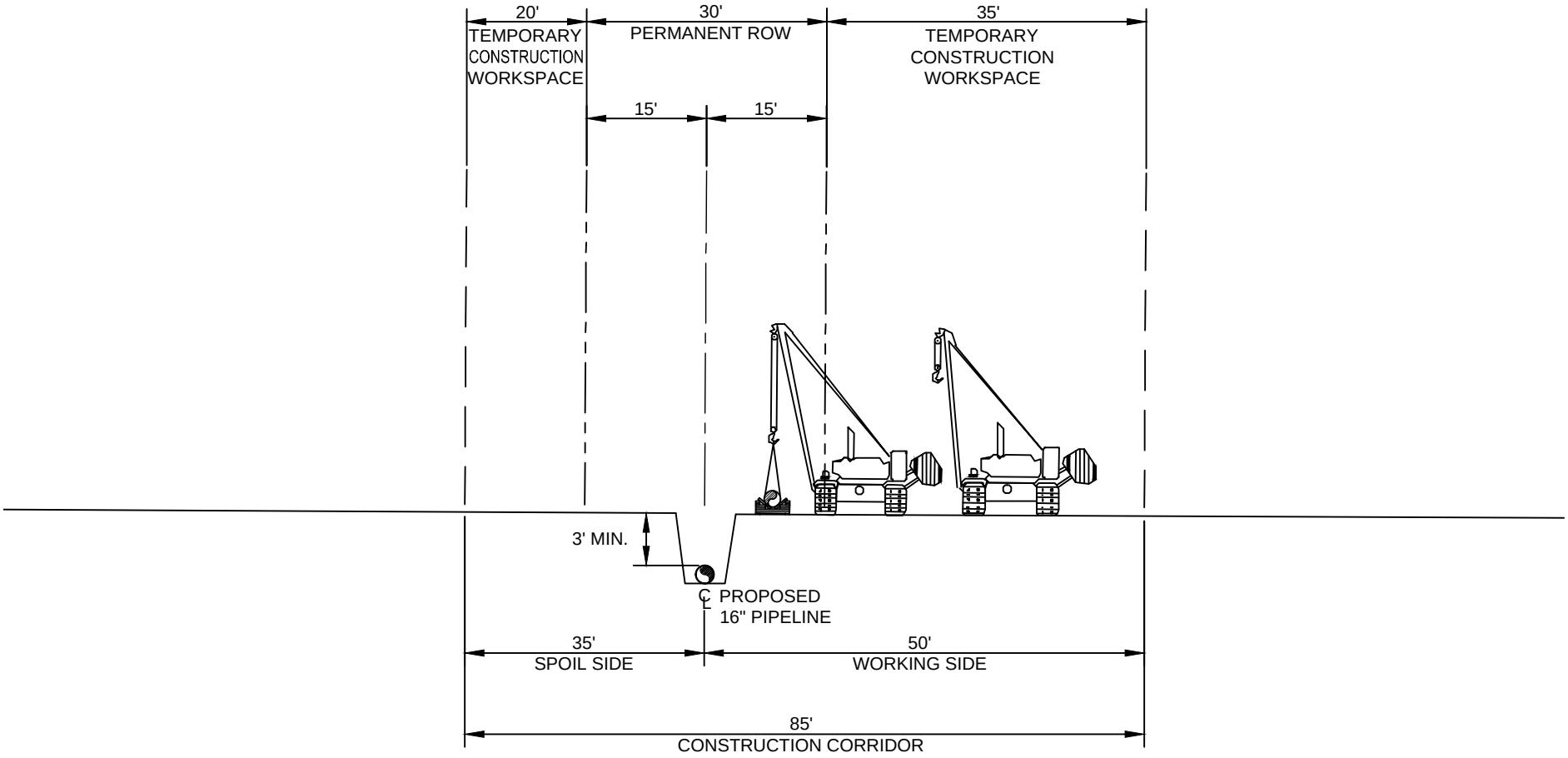
U.S. Fish and Wildlife Service (FWS). 2019. North Florida Ecological Services Office. Wood Stork Species Account/Biologize. Available online at: https://www.fws.gov/northflorida/Species-Accounts/Wood-stork-2005.htm. Accessed: February 2019

U.S. Fish and Wildlife Service (FWS). 2019a. North Florida Ecological Services Office. Gopher Tortoise Fact Sheet. Available online at: https://www.fws.gov/northflorida/gophertortoise/gopher_tortoise_fact_sheet.html. Accessed: January 2019.

U.S. Fish and Wildlife Service (FWS). 2019b. *Gopherus Polyphemus* 2019 Candidate Assessment. Available online at: https://ecos.fws.gov/docs/candidate/assessments/2019/r4/C044_V02.pdf. Accessed: February 2019.

Appendix A

PROJECT MAPS AND FIGURES



TYPICAL CONSTRUCTION RIGHT-OF-WAY

STANDARD WORK CORRIDOR

ISSUED 30%

DATE: 04/24/2020

- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
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A	ISSUED FOR 30% REVIEW	RJB	04/09/20	MAL	04/09/20

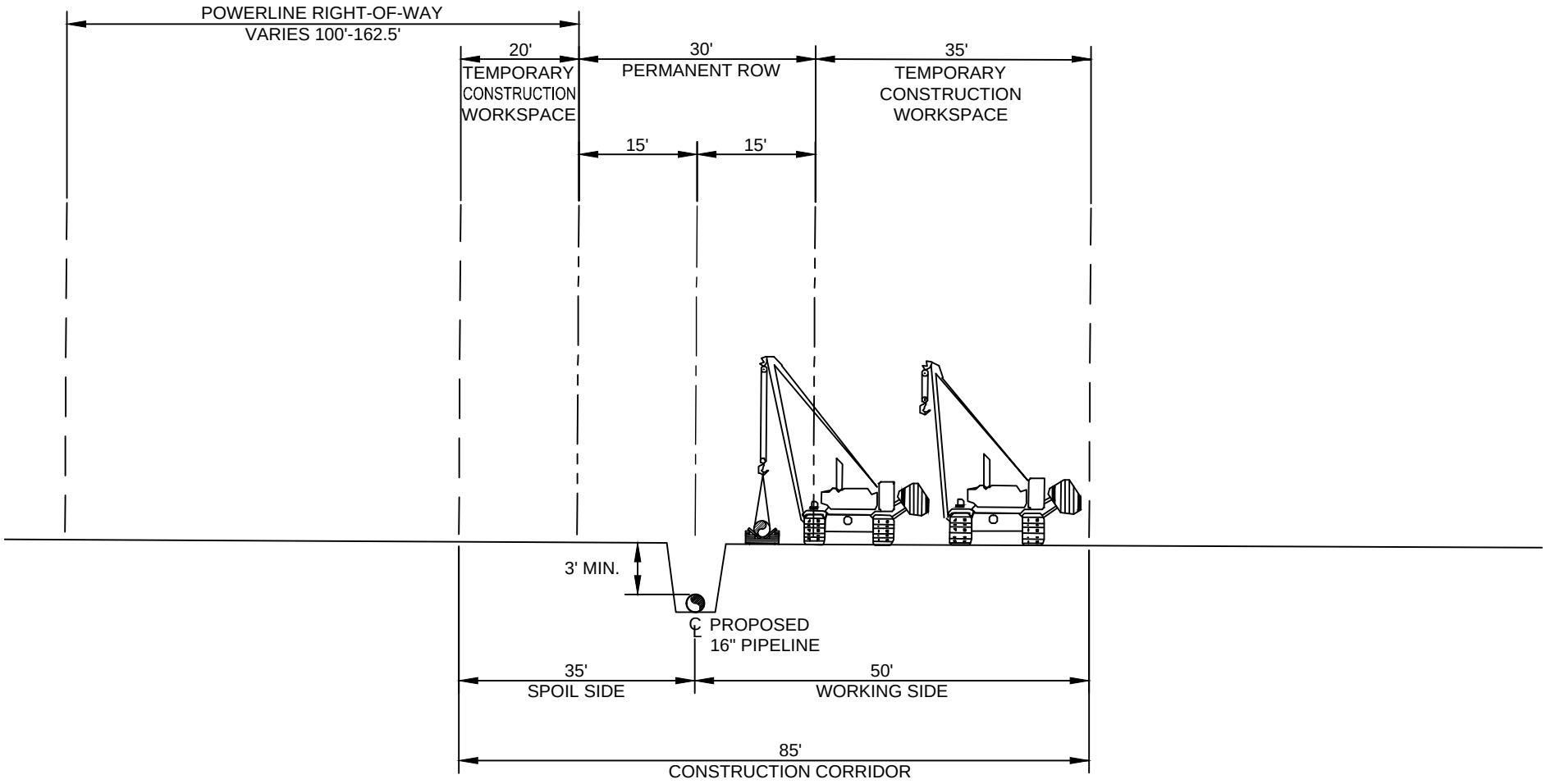
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CHECKED BY	HGA	04/03/20
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NEXTERA ENERGY
TYPICAL ROW CONFIGURATION
LOWMAN PIPELINE PROJECT
WASHINGTON AND
CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
NTS	4719-G-TYP WC-1	B

4/22/2020 3:48 PM
PRESTON, JON



TYPICAL CONSTRUCTION RIGHT-OF-WAY

STANDARD WORK CORRIDOR
CO-LOCATED WITH POWERLINES

ISSUED 30%
DATE: 04/24/2020
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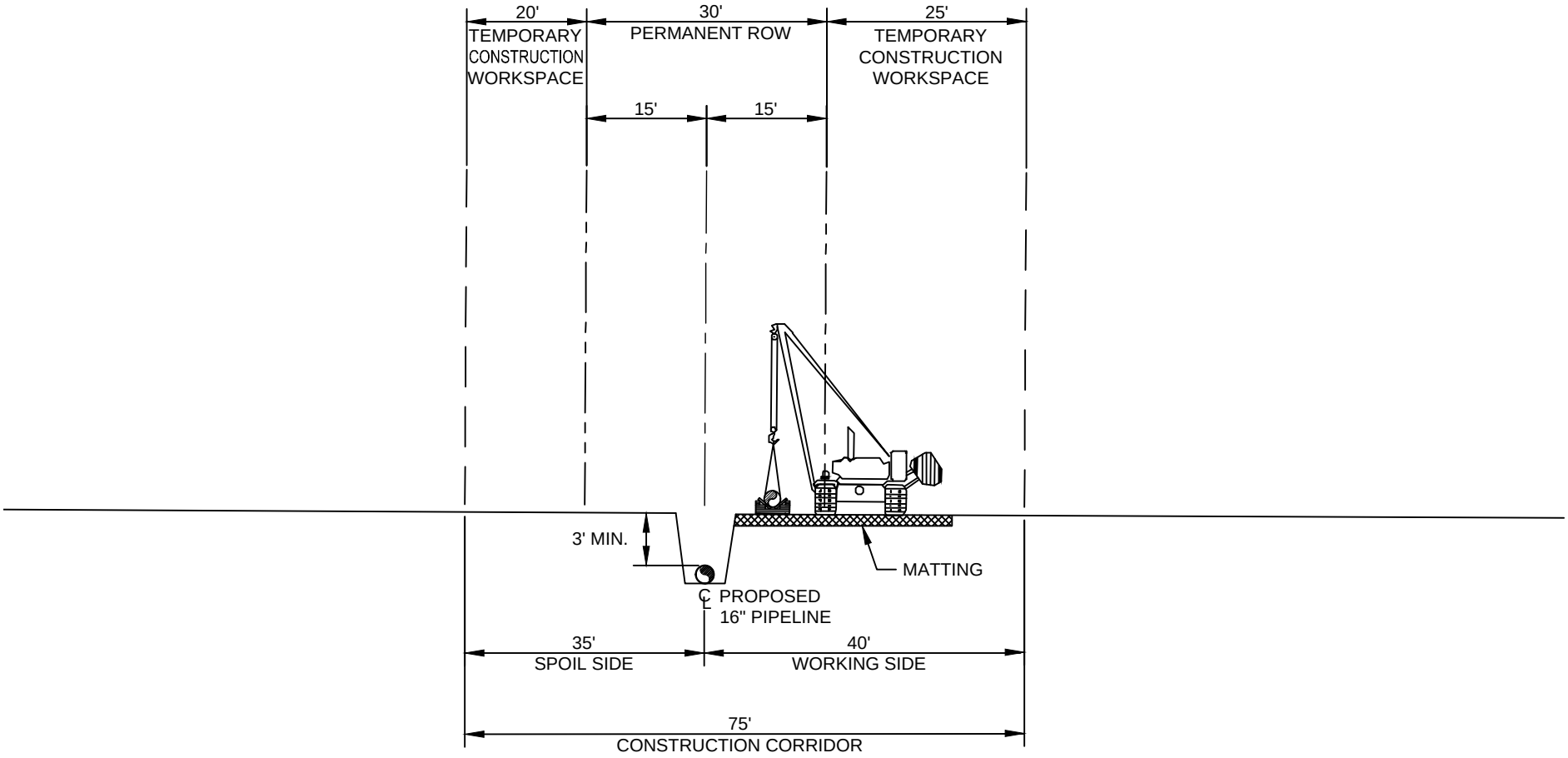
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SCALE	DRAWING NUMBER	REV
NTS	4719-G-TYP WC-2	B

4/22/2020 3:50 PM
PRESTON, JON



TYPICAL CONSTRUCTION RIGHT-OF-WAY

STANDARD WORK CORRIDOR
WETLAND CROSSING

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A	ISSUED FOR 30% REVIEW	RJB	04/09/20	MAL	04/09/20

ISSUED 30%
DATE: 04/24/2020
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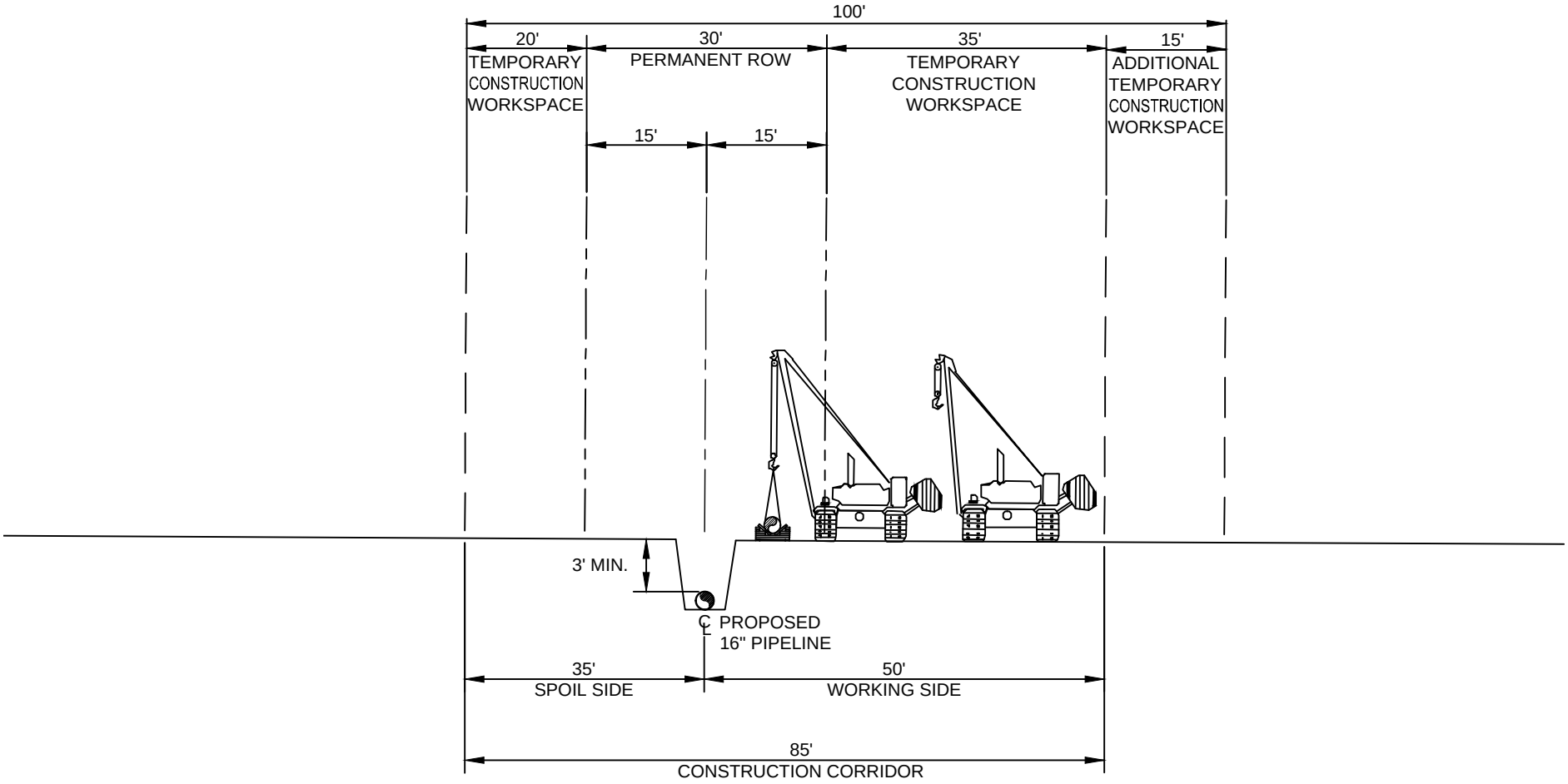
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SCALE	DRAWING NUMBER	REV
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PRESTON, JON



TYPICAL CONSTRUCTION RIGHT-OF-WAY

STANDARD WORK CORRIDOR
TOPSOIL SEGREGATION

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
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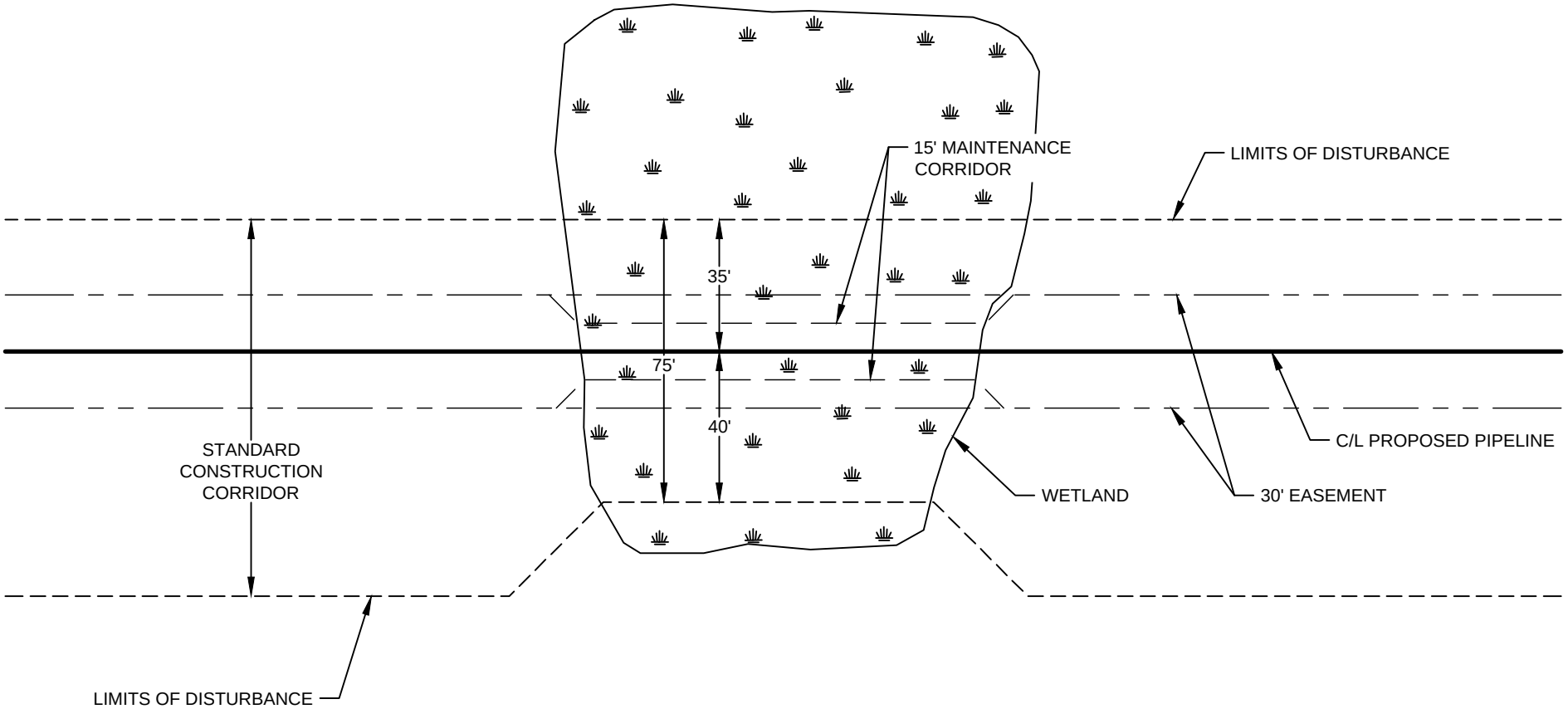
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NTS	4719-G-TYP WC-4	B

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TYPICAL CONSTRUCTION RIGHT-OF-WAY

STANDARD WORK CORRIDOR
WETLAND CROSSING

ISSUED 30%
DATE: 04/22/2020
- NOT FOR CONSTRUCTION -

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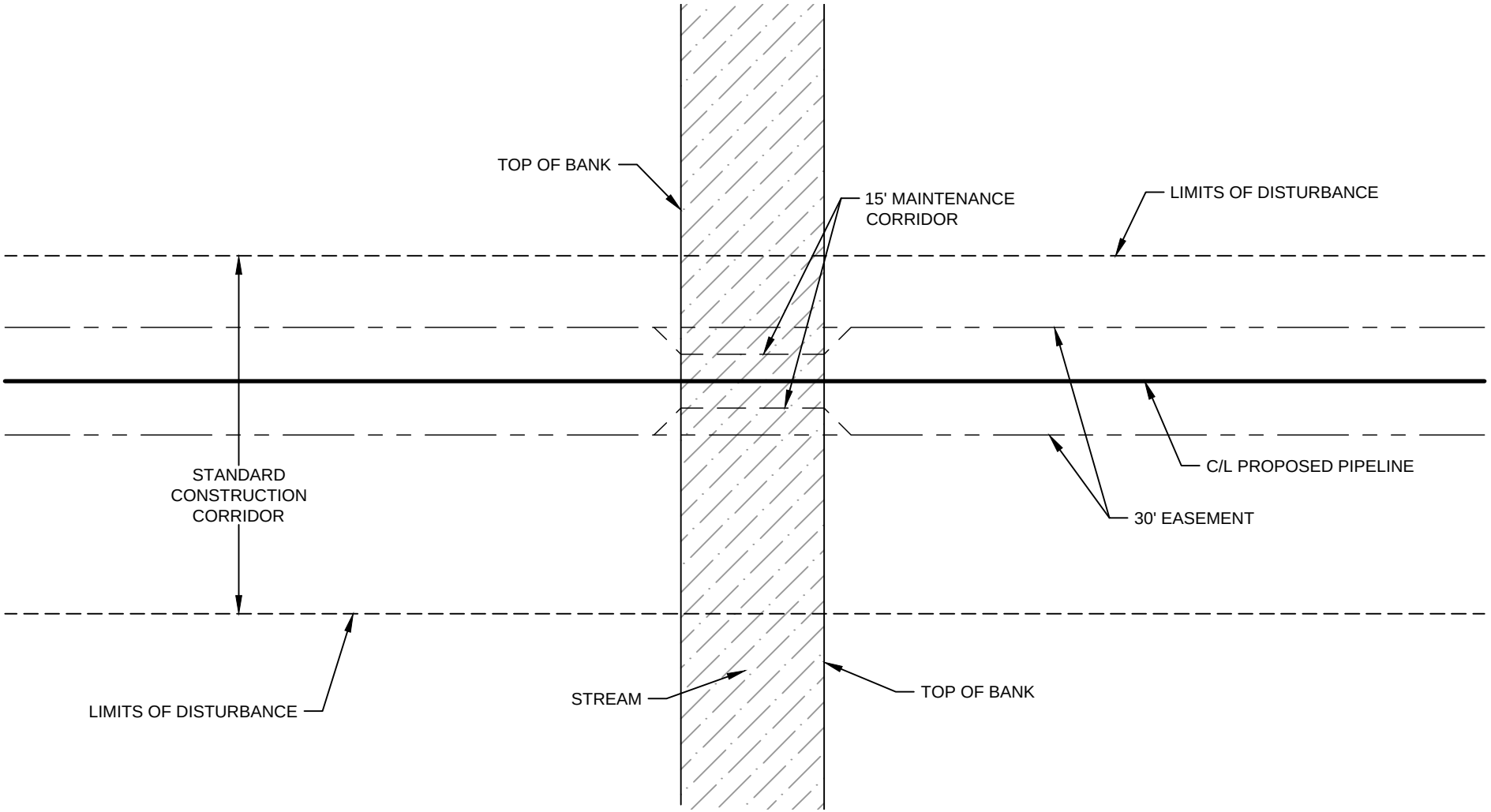
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SCALE	DRAWING NUMBER	REV
NTS	4719-G-TYP WC-5	A

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TYPICAL CONSTRUCTION RIGHT-OF-WAY

STANDARD WORK CORRIDOR
STREAM CROSSING

ISSUED 30%
DATE: 04/22/2020
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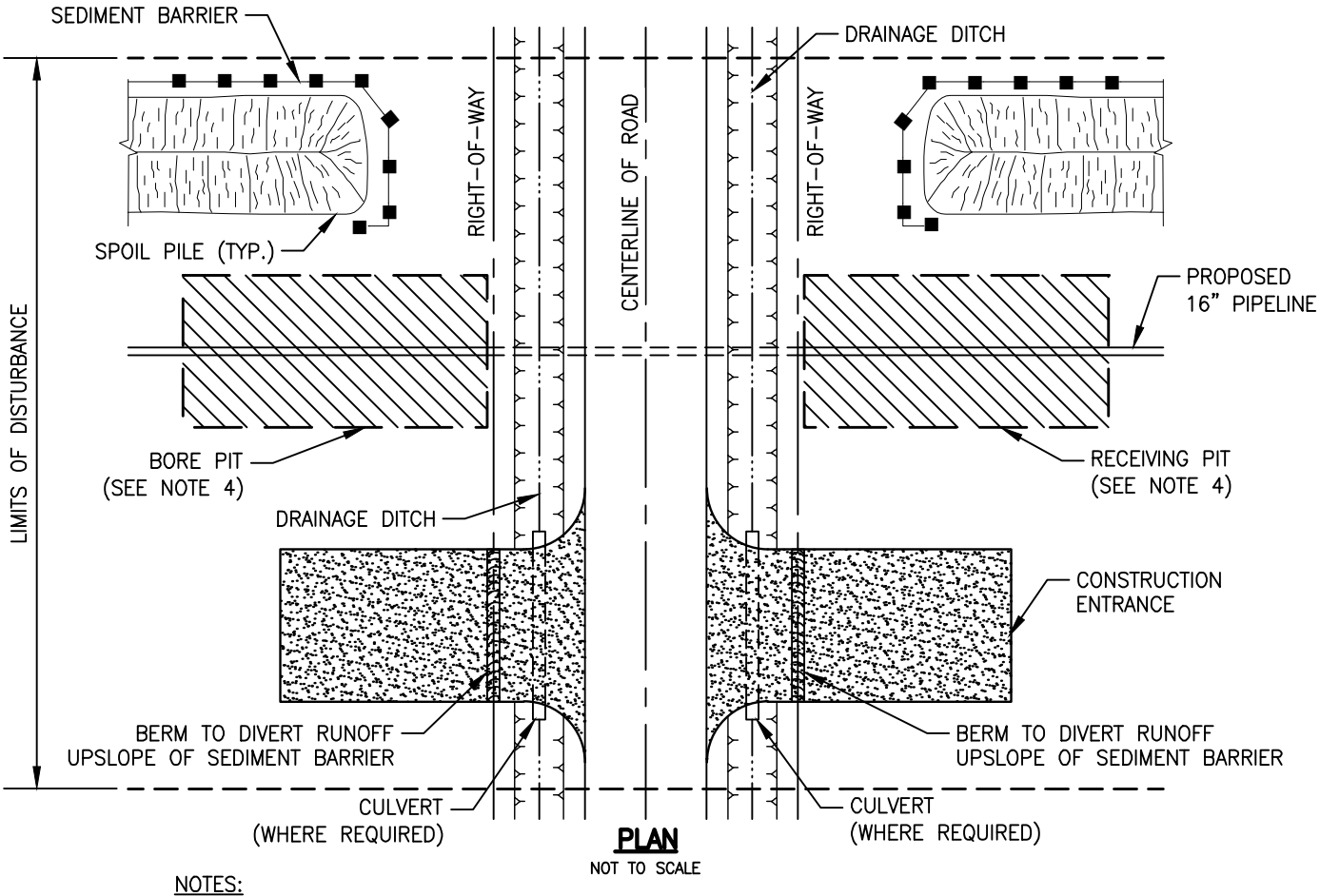
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TYPICAL ROW CONFIGURATION
LOWMAN PIPELINE PROJECT
WASHINGTON AND
CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
NTS	4719-G-TYP WC-6	A

4/22/2020 3:26 PM
PRESTON, JON

BORED ROAD CROSSING

TEMPORARY EROSION CONTROL MEASURES



PLAN

NOT TO SCALE

NOTES:

1. SEDIMENT BARRIER SHALL BE INSTALLED AT THE BASE OF SLOPES ADJACENT TO ROAD CROSSINGS WHERE VEGETATION IS DISTURBED TO INTERCEPT SURFACE RUNOFF.
2. PROTECTION FOR SPOIL PILES SHALL BE INSTALLED ONLY WHERE SEDIMENT BARRIERS ACROSS THE ENTIRE DISTURBED AREA ARE NOT REQUIRED.
3. SEDIMENT BARRIERS SHALL REMAIN IN PLACE UNTIL REVEGETATION IS ESTABLISHED.
4. WATER REMOVED FROM BORE PIT AND RECEIVING PIT SHALL BE FILTERED THROUGH A DEWATERING STRUCTURE OR FILTER BAG.
5. IF WELL POINTING IS REQUIRED PRIOR TO EXCAVATING BORE PITS, CONTRACTOR SHALL CONSULT WITH COMPANY'S ENVIRONMENTAL INSPECTOR PRIOR TO COMMENCEMENT OF WORK IN ORDER TO DETERMINE PROPER DEWATERING LOCATION.
6. CULVERTS TO BE SIZED AND PLACED WHERE REQUIRED TO MAINTAIN WATER FLOW.
7. CONTRACTOR SHALL BE REQUIRED TO KEEP THE ROAD CLEAN OF DEBRIS AT ALL TIMES.
8. CONTRACTOR MAY ELECT TO UTILIZE SHEET PILING IN ORDER TO STABILIZE BORE PITS.
9. DEPENDING ON TOPOGRAPHY AND STATE REQUIREMENTS, SEDIMENT BARRIER MAY BE REQUIRED ACROSS THE ENTIRE CONSTRUCTION RIGHT OF WAY AT THE EDGE OF ROAD. IN ADDITION TO THIS DETAIL, REFER TO THE ENVIRONMENTAL ALIGNMENT DRAWINGS FOR PLACEMENT OF SEDIMENT BARRIERS.

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
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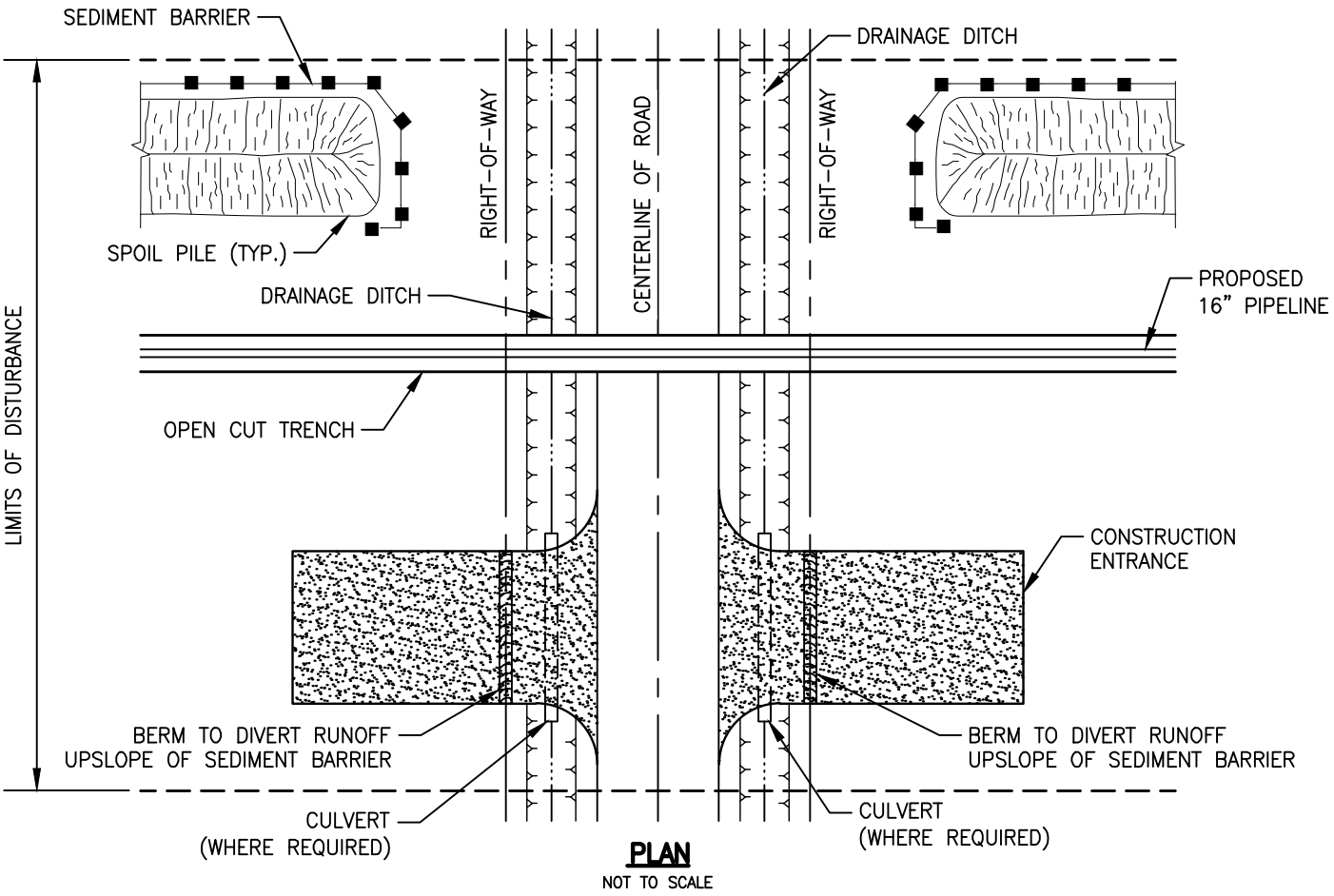
NEXTERA ENERGY
BORED ROAD CROSSING DETAIL
LOWMAN PIPELINE PROJECT
WASHINGTON & CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
N.T.S.	4719-G-BORED RX	B

4/22/2020 3:37 PM
PRESTON, JON

OPEN CUT ROAD CROSSING

TEMPORARY EROSION CONTROL MEASURES



PLAN

NOT TO SCALE

NOTES:

1. SEDIMENT BARRIER SHALL BE INSTALLED AT THE BASE OF SLOPES ADJACENT TO ROAD CROSSINGS WHERE VEGETATION IS DISTURBED TO INTERCEPT SURFACE RUNOFF.
2. PROTECTION FOR SPOIL PILES SHALL BE INSTALLED ONLY WHERE SEDIMENT BARRIERS ACROSS THE ENTIRE DISTURBED AREA ARE NOT REQUIRED.
3. SEDIMENT BARRIERS SHALL REMAIN IN PLACE UNTIL REVEGETATION IS ESTABLISHED.
4. CULVERTS TO BE SIZED AND PLACED WHERE REQUIRED TO MAINTAIN WATER FLOW.
5. CONTRACTOR SHALL BE REQUIRED TO KEEP THE ROAD CLEAN OF DEBRIS AT ALL TIMES.
6. CONTRACTOR MAY ELECT TO UTILIZE WELL-POINTS IN ORDER TO REDUCE THE WATER TABLE PRIOR TO COMMENCING EXCAVATION.
7. DEPENDING ON TOPOGRAPHY AND STATE REQUIREMENTS, SEDIMENT BARRIER MAY BE REQUIRED ACROSS THE ENTIRE CONSTRUCTION RIGHT OF WAY AT THE EDGE OF ROAD. IN ADDITION TO THIS DETAIL, REFER TO THE ENVIRONMENTAL ALIGNMENT DRAWINGS FOR PLACEMENT OF SEDIMENT BARRIERS.

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
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A	ISSUED FOR 30% REVIEW	RJB	04/09/20	MAL	04/09/20

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PLOT SCALE	1:1	
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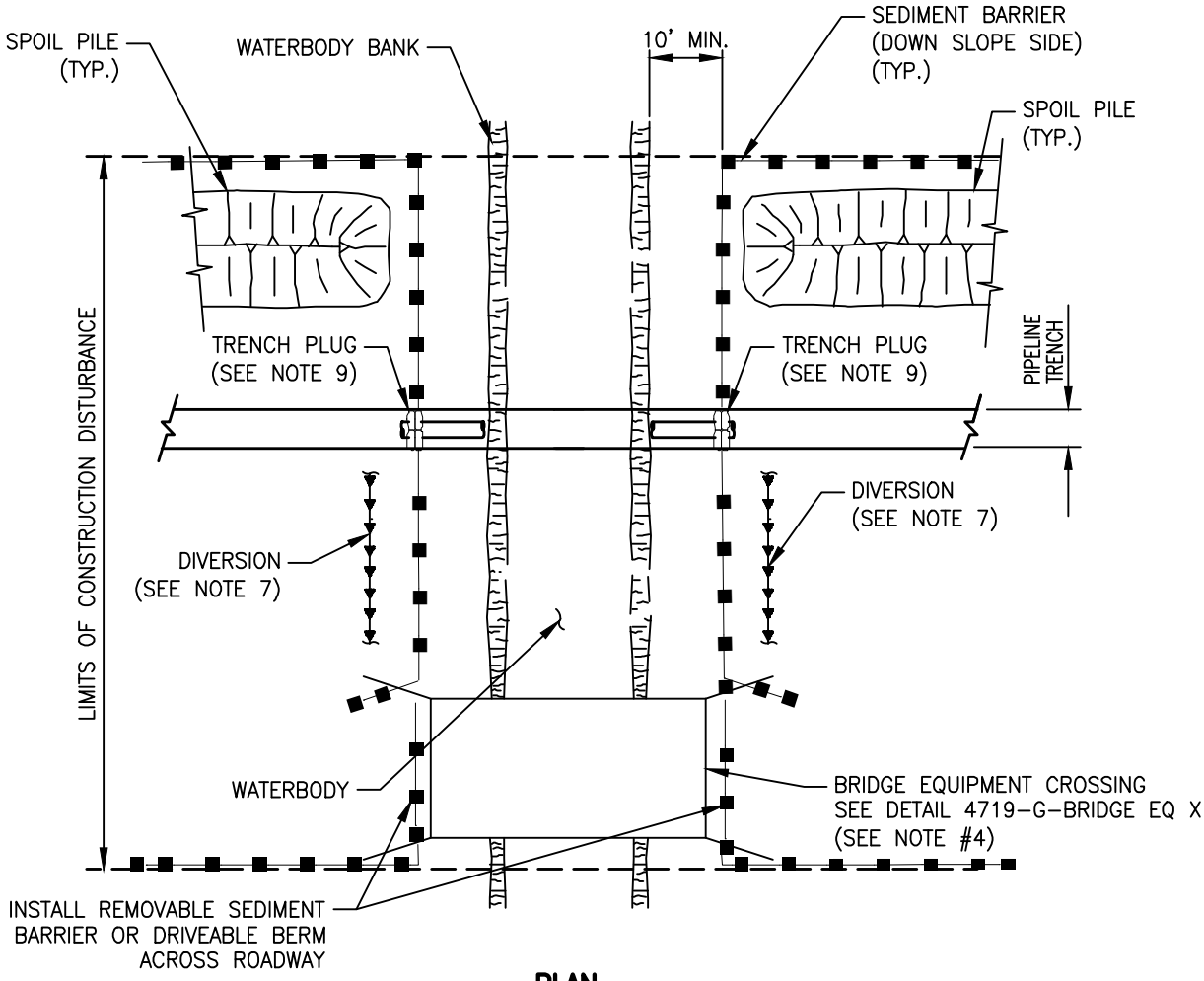
NEXTERA ENERGY
OPEN CUT ROAD CROSSING DETAIL
LOWMAN PIPELINE PROJECT
WASHINGTON & CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
N.T.S.	4719-G-OPEN CUT RX	B

4/22/2020 3:47 PM
PRESTON, JON

DRY MINOR WATERBODY CROSSING

TEMPORARY EROSION CONTROL MEASURE



PLAN

NOT TO SCALE

NOTES:

1. THIS METHOD APPLIES TO MINOR WATERBODY CROSSINGS THAT ARE DRY (NO FLOW) AT TIME OF CROSSING, AS DESCRIBED IN SECTION V.7. OF WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES.
2. SEDIMENT BARRIERS SHALL BE INSTALLED AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS THE WATERBODY OR LEAVES THE CONSTRUCTION RIGHT OF WAY.
3. HARD DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATERBODY IS INSTALLED AND BACKFILLED.
4. EQUIPMENT OPERATING IN THE WATERBODY SHALL BE LIMITED TO THAT NEEDED TO PERFORM CONSTRUCTION. IF OTHER TYPES OF EQUIPMENT MUST CROSS THE WATERBODY, CONTRACTOR SHALL PROVIDE AND USE A BRIDGE EQUIPMENT CROSSING (4719-G-BRIDGE EQ X).
5. STAGING AREA(S) FOR WATERBODY CROSSING(S), WHEN REQUIRED, SHALL BE LOCATED AT LEAST 50 FEET FROM WATER'S EDGE AND SHALL BE OF A MINIMUM SIZE NEEDED FOR CONVENIENT PREPARATION.
6. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED DAILY AND REPAIRED IF NECESSARY.
7. INSTALL DIVERSION TRENCHES AT THE BASE OF ALL SLOPES ADJACENT TO THE WATERBODY.
8. CHEMICALS, FUELS AND LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT SHALL NOT BE REFUELED WITHIN 100 FEET OF THE WATERBODY.
9. INSTALL TRENCH PLUGS ON BOTH SIDES OF THE WATERBODY TO KEEP ANY ACCUMULATED TRENCH WATER OUT OF THE WATERBODY.
10. CONTRACTOR SHALL POSTPONE GRADING OF RIGHT-OF-WAY IMMEDIATELY ADJACENT TO WATERBODY UNTIL STAGING AREA IS PREPARED AND WORK IN THE WATERBODY IS READY TO COMMENCE.
11. EXCEPT FOR BLASTING AND OTHER ROCK BREAKING MEASURES, COMPLETE IN STREAM CONSTRUCTION ACTIVITIES (INCLUDING TRENCHING, PIPE INSTALLATION, BACKFILL, AND RESTORATION OF THE STREAM BED CONTOURS) WITHIN 24 HOURS. STREAM BANKS AND UNCONSOLIDATED STREAM BEDS MAY REQUIRE ADDITIONAL RESTORATION AFTER THIS PERIOD.

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
B	ISSUED 30%	RJB	04/24/20	MAL	04/24/20
A	ISSUED FOR 30% REVIEW	RJB	04/09/20	MAL	04/09/20

DRAWN BY	HGA	04/03/20
DESIGNED BY	HGA	04/03/20
CHECKED BY	MEH	04/03/20
APPROVED BY	HGA	04/03/20
HGA JOB NO.	8.A19015	
PLOT SCALE	1:1	
MODEL ID		

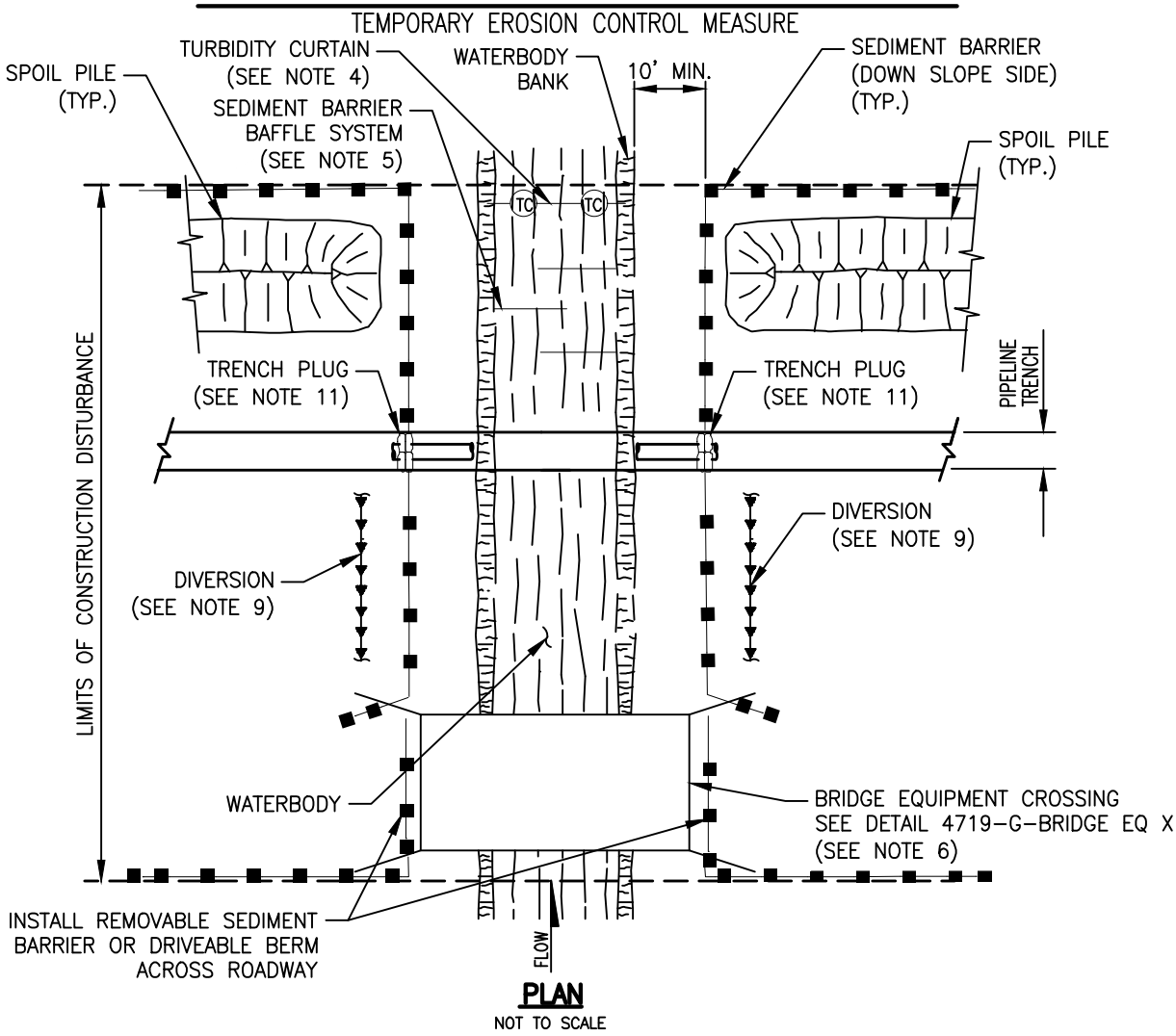
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T: 205-970-4977
FIRM #: AL CA-4334-E

NEXTERA ENERGY
DRY MINOR WATERBODY CROSSING DETAIL
LOWMAN PIPELINE PROJECT
WASHINGTON & CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
N.T.S.	4719-G-DRY MINOR X	B

4/22/2020 3:44 PM
PRESTON, JON

WET MINOR WATERBODY CROSSING



PLAN

NOT TO SCALE

NOTES:

1. THIS METHOD APPLIES TO MINOR WATERBODY CROSSINGS THAT ARE DEFINED AS WATERBODIES THAT ARE LESS THAN OR EQUAL TO 10 FEET AT WATERS EDGE AT THE TIME OF CROSSING.
2. SEDIMENT BARRIERS SHALL BE INSTALLED AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS THE WATERBODY OR LEAVES THE CONSTRUCTION RIGHT OF WAY.
3. HARD DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATERBODY IS INSTALLED AND BACKFILLED.
4. INSTALL TURBIDITY CURTAINS DOWNSTREAM OF CROSSING AT EDGE OF WORK CORRIDOR IF STREAM FLOW IS CONDUCIVE TO SUCH AN INSTALLATION.
5. IF FLOW OF WATERBODY IS SUCH THAT TURBIDITY CURTAIN CAN NOT BE INSTALLED, THEN INSTALL DOWNSTREAM SEDIMENT BARRIER BAFFLE SYSTEM AS DEPICTED.
6. EQUIPMENT OPERATING IN THE WATERBODY SHALL BE LIMITED TO THAT NEEDED TO PERFORM CONSTRUCTION. IF OTHER TYPES OF EQUIPMENT MUST CROSS THE WATERBODY, CONTRACTOR SHALL PROVIDE AND USE A BRIDGE EQUIPMENT CROSSING (4719-G-BRIDGE EQ X).
7. STAGING AREA(S) FOR WATERBODY CROSSING(S), WHEN REQUIRED, SHALL BE LOCATED AT LEAST 50 FEET FROM WATER'S EDGE AND SHALL BE OF A MINIMUM SIZE NEEDED FOR CONVENIENT PREPARATION.
8. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED DAILY AND REPAIRED IF NECESSARY.
9. INSTALL DIVERSION TRENCHES AT THE BASE OF ALL SLOPES ADJACENT TO THE WATERBODY.
10. CHEMICALS, FUELS AND LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT SHALL NOT BE REFUELED WITHIN 100 FEET OF THE WATERBODY.
11. INSTALL TRENCH PLUGS ON BOTH SIDES OF THE WATERBODY TO PREVENT DIVERSION OF WATER INTO UPLAND PORTIONS OF THE PIPELINE TRENCH AND TO KEEP ANY ACCUMULATED TRENCH WATER OUT OF THE WATERBODY.
12. CONTRACTOR SHALL POSTPONE GRADING OF RIGHT-OF-WAY IMMEDIATELY ADJACENT TO WATERBODY UNTIL STAGING AREA IS PREPARED AND WORK IN THE WATERBODY IS READY TO COMMENCE.
13. EXCEPT FOR BLASTING AND OTHER ROCK BREAKING MEASURES, COMPLETE IN STREAM CONSTRUCTION ACTIVITIES (INCLUDING TRENCHING, PIPE INSTALLATION, BACKFILL, AND RESTORATION OF THE STREAM BED CONTOURS) WITHIN 24 HOURS. STREAM BANKS AND UNCONSOLIDATED STREAM BEDS MAY REQUIRE ADDITIONAL RESTORATION AFTER THIS PERIOD.

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PLOT SCALE	1:1	
MODEL ID		

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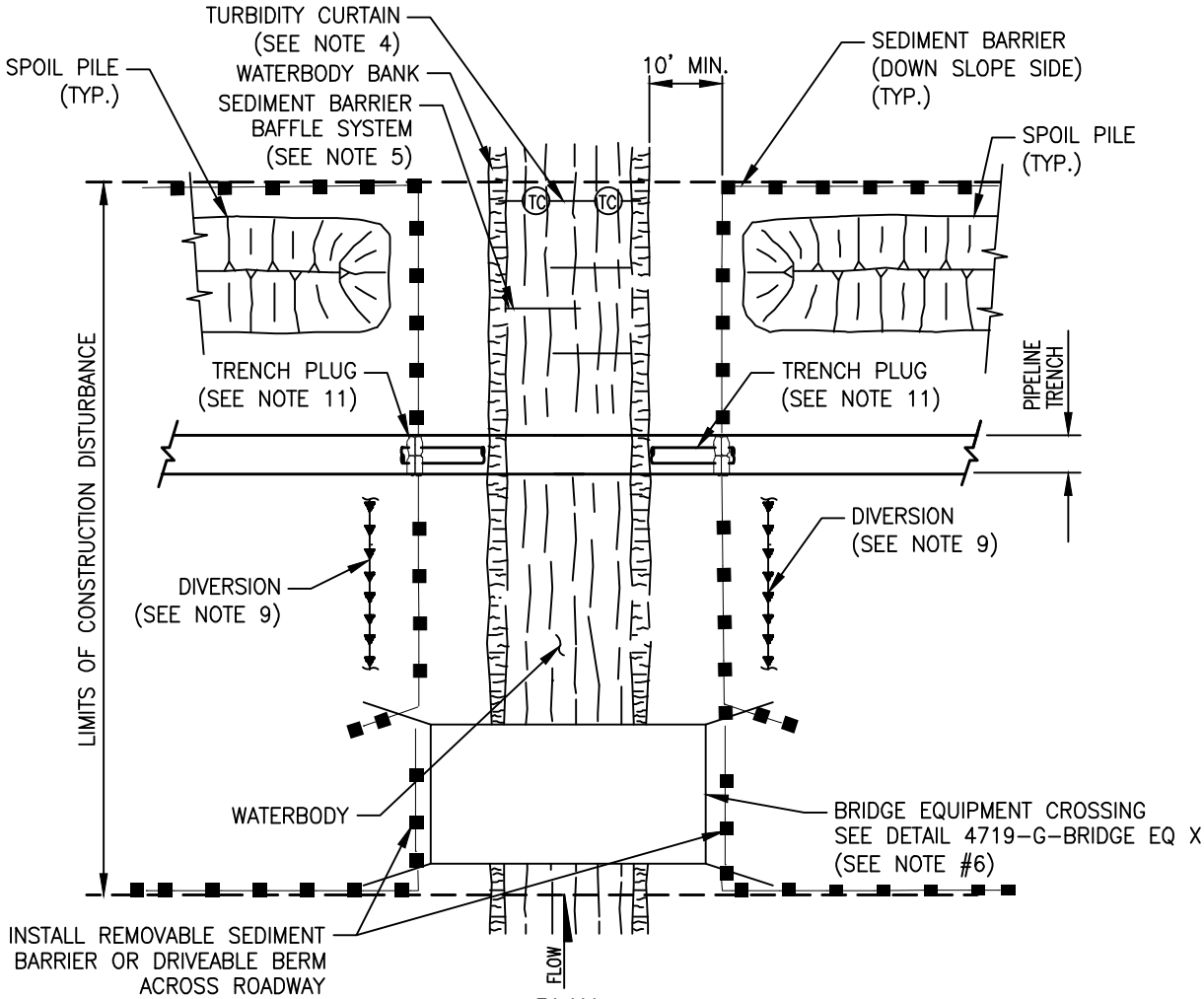
NEXTERA ENERGY
WET MINOR WATERBODY CROSSING DETAIL
LOWMAN PIPELINE PROJECT
WASHINGTON & CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
N.T.S.	4719-G-WET MINOR X	A

4/22/2020 4:39 PM
BENZ, ROGER

WET INTERMEDIATE WATERBODY CROSSING

TEMPORARY EROSION CONTROL MEASURE
(APPLIES TO WATERBODIES GREATER THAN 10' WIDE BUT LESS THAN 100' WIDE
AT WATERS EDGE AT TIME OF CROSSING)



PLAN
NOT TO SCALE

NOTES:

1. THIS METHOD APPLIES TO INTERMEDIATE WATERBODY CROSSINGS THAT ARE DEFINED AS WATERBODIES THAT ARE GREATER THAN 10 FEET WIDE BUT LESS THAN OR EQUAL TO 100 FEET WIDE AT THE WATERS EDGE AT THE TIME OF CONSTRUCTION.
2. SEDIMENT BARRIERS SHALL BE INSTALLED AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS THE WATERBODY OR LEAVES THE CONSTRUCTION RIGHT OF WAY.
3. HARD DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATERBODY IS INSTALLED AND BACKFILLED.
4. INSTALL TURBIDITY CURTAINS DOWNSTREAM OF CROSSING AT EDGE OF WORK CORRIDOR IF STREAM FLOW IS CONDUCIVE TO SUCH AN INSTALLATION.
5. IF FLOW OF WATERBODY IS SUCH THAT TURBIDITY CURTAIN CAN NOT BE INSTALLED, THEN INSTALL DOWNSTREAM SEDIMENT BARRIER BAFFLE SYSTEM AS DEPICTED.
6. EQUIPMENT OPERATING IN THE WATERBODY SHALL BE LIMITED TO THAT NEEDED TO PERFORM CONSTRUCTION. IF OTHER TYPES OF EQUIPMENT MUST CROSS THE WATERBODY, CONTRACTOR SHALL PROVIDE AND USE A BRIDGE EQUIPMENT CROSSING (4719-G-BRIDGE EQ X).
7. STAGING AREA(S) FOR WATERBODY CROSSING(S), WHEN REQUIRED, SHALL BE LOCATED AT LEAST 50 FEET FROM WATER'S EDGE AND SHALL BE OF A MINIMUM SIZE NEEDED FOR CONVENIENT PREPARATION.
8. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED DAILY AND REPAIRED IF NECESSARY.
9. INSTALL DIVERSION TRENCHES AT THE BASE OF ALL SLOPES ADJACENT TO THE WATERBODY.
10. CHEMICALS, FUELS AND LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT SHALL NOT BE REFUELED WITHIN 100 FEET OF THE WATERBODY.
11. INSTALL TRENCH PLUGS ON BOTH SIDES OF THE WATERBODY TO PREVENT DIVERSION OF WATER INTO UPLAND PORTIONS OF THE PIPELINE TRENCH AND TO KEEP ANY ACCUMULATED TRENCH WATER OUT OF THE WATERBODY.
12. CONTRACTOR SHALL POSTPONE GRADING OF RIGHT-OF-WAY ADJACENT TO WATERBODY UNTIL STAGING AREA IS PREPARED AND WORK IN THE WATERBODY IS READY TO COMMENCE.
13. COMPLETE IN STREAM CONSTRUCTION ACTIVITIES (NOT INCLUDING BLASTING AND OTHER ROCK BREAKING MEASURES) WITHIN 24 HOURS, UNLESS SITE SPECIFIC CONDITIONS MAKE COMPLETION WITHIN 48 HOURS INFEASIBLE.

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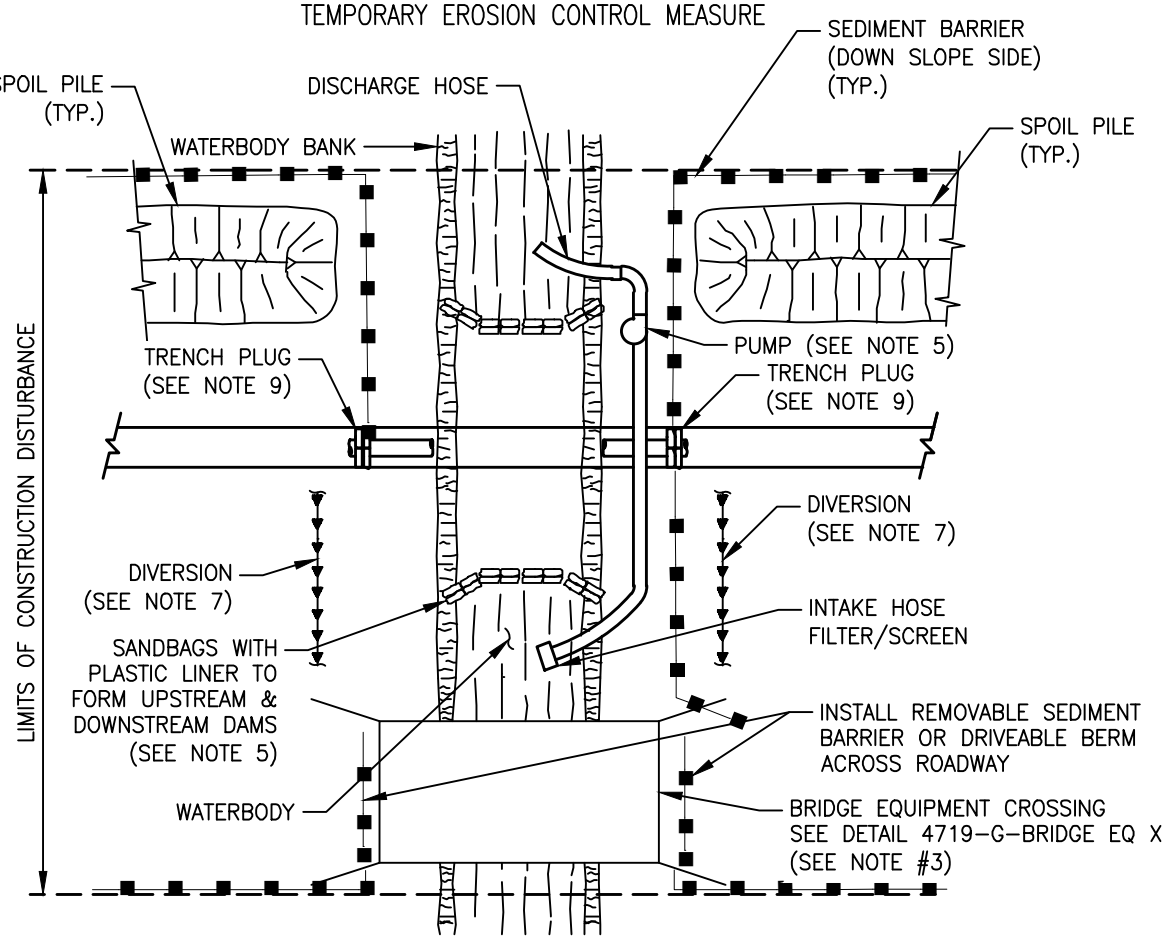
NEXTERA ENERGY
WET INTERMEDIATE WATERBODY
CROSSING DETAIL
LOWMAN PIPELINE PROJECT
WASHINGTON & CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
N.T.S.	4719-G-WET INT WB X	B

4/22/2020 3:54 PM
PRESTON, JON

DAM AND PUMP CROSSING

TEMPORARY EROSION CONTROL MEASURE



PLAN

NOT TO SCALE

NOTES:

1. SEDIMENT BARRIERS SHALL BE INSTALLED AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVY SILT LADEN WATER ENTERS THE WATERBODY OR LEAVES THE CONSTRUCTION RIGHT-OF-WAY.

2. HARD DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATERBODY CROSSING IS INSTALLED AND BACKFILLED.

3. EQUIPMENT OPERATING IN THE WATERBODY SHALL BE LIMITED TO THAT NEEDED TO PERFORM CONSTRUCTION. IF OTHER TYPES OF EQUIPMENT MUST CROSS THE WATERBODY, CONTRACTOR SHALL PROVIDE AND USE A BRIDGE EQUIPMENT CROSSING (4719-G-BRIDGE EQ X).

4. STAGING AREA(S) FOR WATERBODY CROSSING(S), WHEN REQUIRED, SHALL BE LOCATED AT LEAST 50 FEET FROM WATER'S EDGE AND SHALL BE OF A MINIMUM SIZE NEEDED FOR CONVENIENT PREPARATION.

5. IMPLEMENTATION OF THE DAM-AND-PUMP CROSSING METHOD MUST MEET THE FOLLOWING PERFORMANCE CRITERIA:
   (A) USE SUFFICIENT PUMPS, INCLUDING ON-SITE BACKUP PUMPS, TO MAINTAIN DOWNSTREAM FLOWS.
   (B) CONSTRUCT DAMS WITH MATERIALS THAT PREVENT SEDIMENT AND OTHER POLLUTANTS FROM ENTERING THE WATERBODY (E.G., SANDBAGS OR CLEAN GRAVEL WITH PLASTIC LINER).
   (C) SCREEN PUMP INTAKES;
   (D) PREVENT STREAMBED SCOUR AT PUMP DISCHARGE.
   (E) MONITOR THE DAM AND PUMPS TO ENSURE PROPER OPERATION THROUGHOUT THE WATERBODY CROSSING.

6. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED DAILY AND REPAIRED IF NECESSARY.

7. INSTALL DIVERSION TRENCHES AT THE BASE OF ALL SLOPES ADJACENT TO THE WATERBODY.

8. CHEMICALS, FUELS AND LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT SHALL NOT BE REFUELED WITHIN 100 FEET OF THE WATERBODY.

9. INSTALL TRENCH PLUGS ON BOTH SIDES OF THE WATERBODY TO PREVENT DIVERSION OF WATER INTO UPLAND PORTIONS OF THE PIPELINE TRENCH AND TO KEEP ANY ACCUMULATED TRENCH WATER OUT OF THE WATERBODY.

10. CONTRACTOR SHALL POSTPONE GRADING OF RIGHT-OF-WAY ADJACENT TO WATERBODY UNTIL STAGING AREA IS PREPARED AND WORK IN THE WATERBODY IS READY TO COMMENCE.

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PLOT SCALE	1:1	
MODEL ID		

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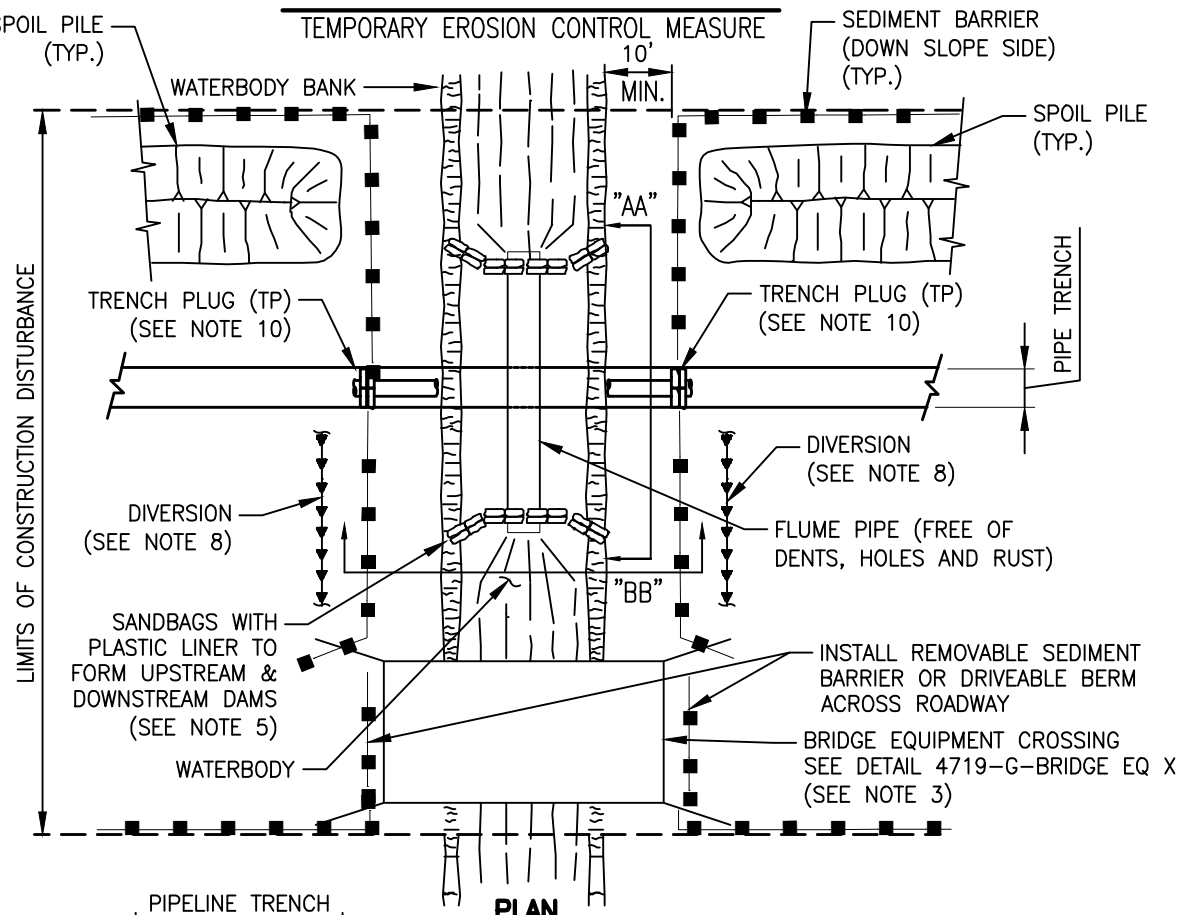
NEXTERA ENERGY
DAM AND PUMP CROSSING DETAIL
LOWMAN PIPELINE PROJECT
WASHINGTON & CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
N.T.S.	4719-G-DAM_PUMP X	B

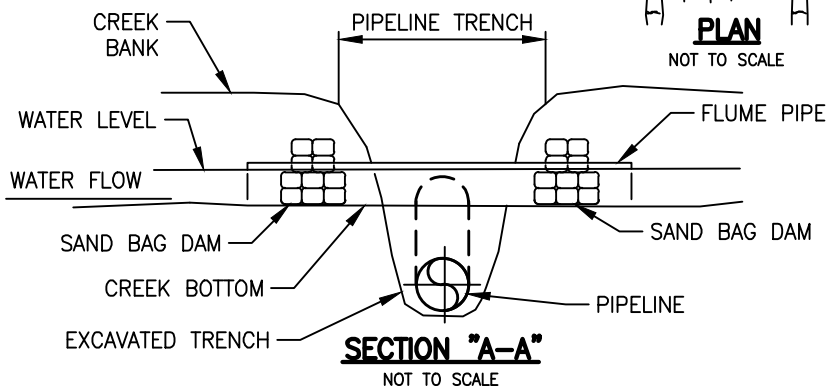
4/22/2020 3:42 PM
PRESTON, JON

FLUME CROSSING

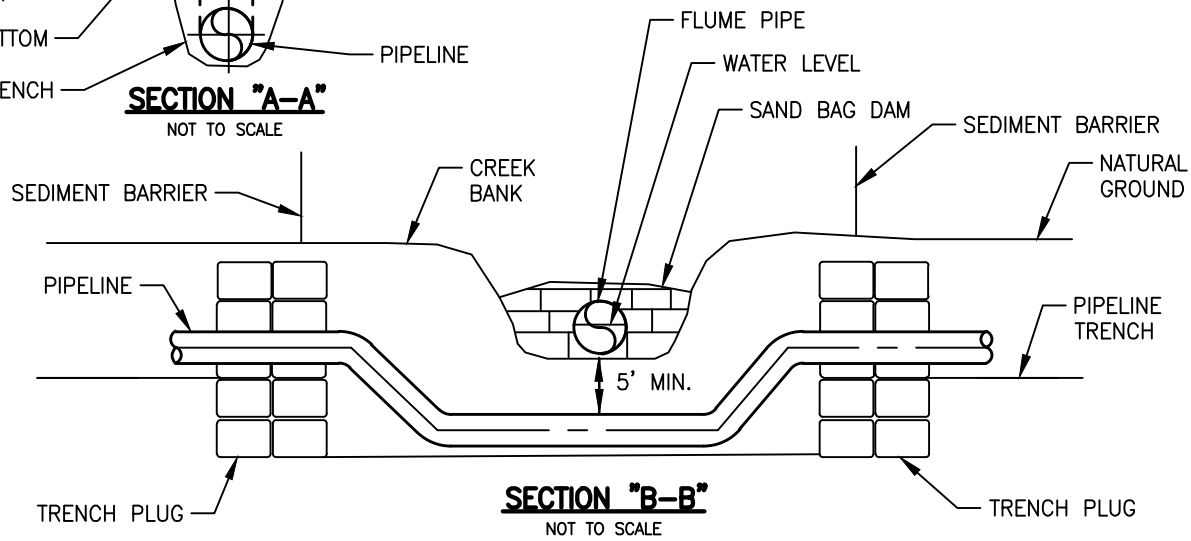
TEMPORARY EROSION CONTROL MEASURE



PLAN
NOT TO SCALE



SECTION "A-A"
NOT TO SCALE



SECTION "B-B"
NOT TO SCALE

REV	DESCRIPTION	CHK	DATE	APP	DATE
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HGA JOB NO.	8.A19015	
PLOT SCALE	1:1	
MODEL ID		

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NEXTERA ENERGY
FLUME CROSSING DETAIL
LOWMAN PIPELINE PROJECT
WASHINGTON & CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
N.T.S.	4719-G-FLUME X-1	A

BENZ, ROGER 4/22/2020 4:40 PM

FLUME CROSSING

TEMPORARY EROSION CONTROL MEASURE

NOTES:

1. SEDIMENT BARRIERS SHALL BE INSTALLED AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVY SILT LADEN WATER ENTERS THE WATERBODY OR LEAVES THE CONSTRUCTION RIGHT–OF–WAY.

2. HARD DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATERBODY CROSSING IS INSTALLED AND BACKFILLED.

3. EQUIPMENT OPERATING IN THE WATERBODY SHALL BE LIMITED TO THAT NEEDED TO PERFORM CONSTRUCTION. IF OTHER TYPES OF EQUIPMENT MUST CROSS THE WATERBODY, CONTRACTOR SHALL PROVIDE AND USE A BRIDGE EQUIPMENT CROSSING (4719–G–BRIDGE EQ X).

4. STAGING AREA(S) FOR WATERBODY CROSSING(S), WHEN REQUIRED, SHALL BE LOCATED AT LEAST 50 FEET FROM WATER'S EDGE AND SHALL BE OF A MINIMUM SIZE NEEDED FOR CONVENIENT PREPARATION.

5. FLUME CROSSING METHOD REQUIREMENTS INCLUDE:
   (A) INSTALL FLUME PIPE(S) AFTER BLASTING (IF NECESSARY), BUT BEFORE ANY TRENCHING.
   (B) USE SAND BAG OR SAND BAG AND PLASTIC SHEETING DIVERSION STRUCTURE OR EQUIVALENT TO DEVELOP AN EFFECTIVE SEAL AND TO DIVERT STREAM FLOW THROUGH THE FLUME PIPE (SOME MODIFICATIONS TO THE STREAM BOTTOM MAY BE REQUIRED TO ACHIEVE AN EFFECTIVE SEAL).
   (C) PROPERLY ALIGN FLUME PIPE(S) TO PREVENT BANK EROSION AND STREAM BED SCOUR.
   (D) DO NOT REMOVE FLUME PIPE DURING TRENCHING, PIPE LAYING OR BACKFILLING ACTIVITIES, OR INITIAL STREAM BED RESTORATION EFFORTS.
   (E) REMOVE ALL FLUME PIPES AND DAMS THAT ARE NOT ALSO PART OF THE EQUIPMENT BRIDGE AS SOON AS FINAL CLEANUP OF THE STREAM BED AND BANK IS COMPLETE.

6. THE FLUME PIPE MUST BE SIZED TO PREVENT IMPEDIMENT OF THE UPSTREAM FLOW AND TO MAINTAIN ADEQUATE FLOW RATES TO PROTECT AQUATIC LIFE, AND PREVENT THE INTERRUPTION OF EXISTING DOWNSTREAM USES.

7. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED DAILY AND REPAIRED IF NECESSARY.

8. INSTALL DIVERSION TRENCHES AT THE BASE OF ALL SLOPES ADJACENT TO THE WATERBODY.

9. CHEMICALS, FUELS AND LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT SHALL NOT BE REFUELED WITHIN 100 FEET OF THE WATERBODY.

10. INSTALL TRENCH PLUGS ON BOTH SIDES OF THE WATERBODY TO PREVENT DIVERSION OF WATER INTO UPLAND PORTIONS OF THE PIPELINE TRENCH AND TO KEEP ANY ACCUMULATED TRENCH WATER OUT OF THE WATERBODY.

11. CONTRACTOR SHALL POSTPONE GRADING OF RIGHT–OF–WAY ADJACENT TO WATERBODY UNTIL STAGING AREA IS PREPARED AND WORK IN THE WATERBODY IS READY TO COMMENCE.

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DATE: 04/22/2020
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PLOT SCALE	1:1	
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NEXTERA ENERGY
FLUME CROSSING DETAIL
LOWMAN PIPELINE PROJECT
WASHINGTON & CHOCTAW COUNTIES, ALABAMA

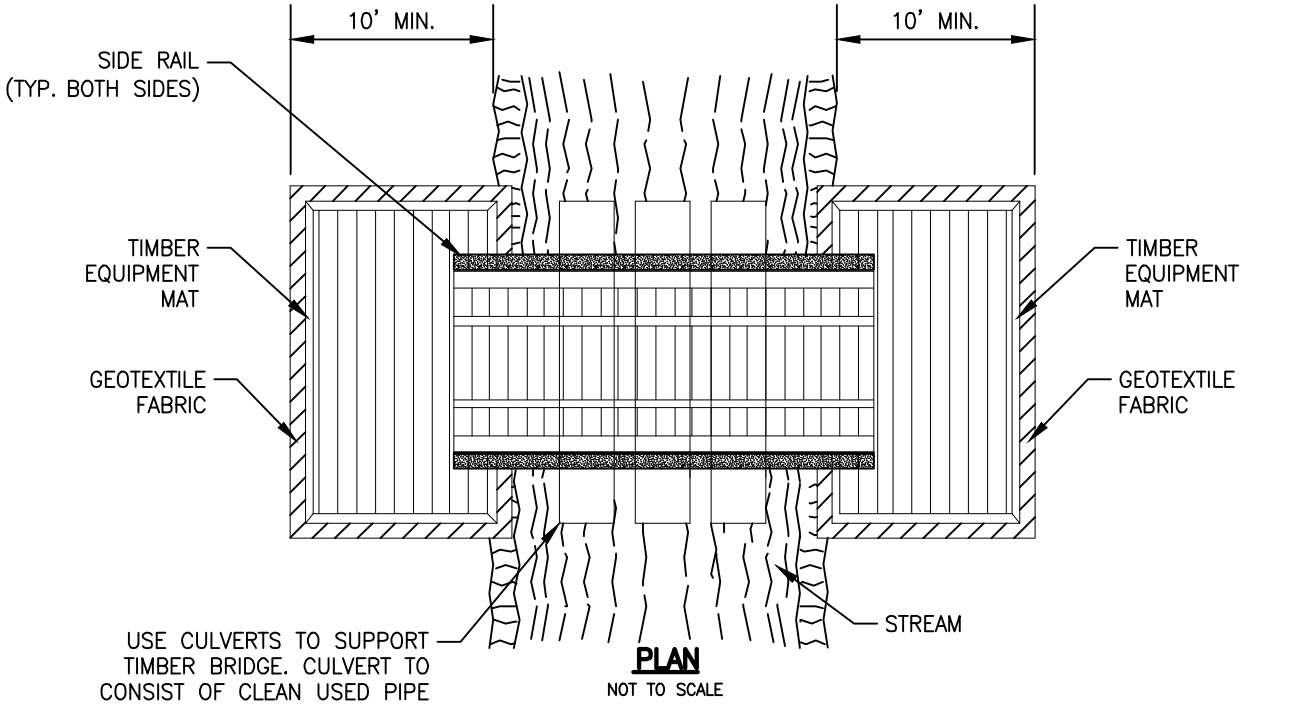
SCALE	DRAWING NUMBER	REV
N.T.S.	4719-G-FLUME X-2	A

4/22/2020 3:18 PM
PRESTON, JON

BRIDGE EQUIPMENT CROSSING

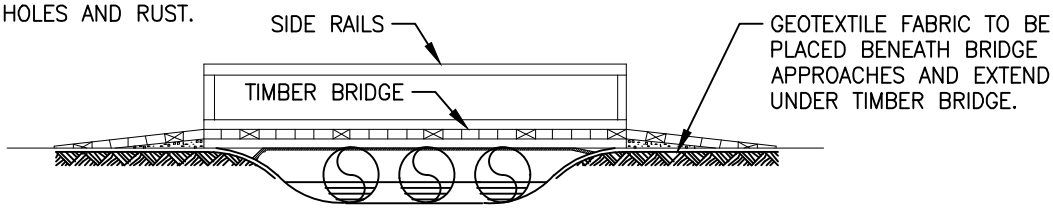
TEMPORARY EROSION CONTROL MEASURE

UNLESS OTHERWISE INDICATED ON PLAN, CROSSING SHALL BE REMOVED AFTER CONSTRUCTION IS COMPLETED.



PLAN

NOT TO SCALE



PROFILE

NOT TO SCALE

NOTES:

1. TIMBER BRIDGES SHALL BE ADEQUATELY ANCHORED AT BOTH ENDS.
2. PERIODICALLY CHECK BRIDGE INSTALLATION AND REMOVE BUILD–UP OF SEDIMENT OR DEBRIS ON BRIDGE.
3. BRIDGE APPROACHES SHALL BE TIMBER EQUIPMENT MATS.
4. MATERIALS PLACED ALONG STREAM CHANNEL SHALL BE COMPLETELY REMOVED DURING FINAL CLEAN–UP. REMOVAL OF THIS STRUCTURE IS NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.
5. CULVERTS SHALL BE USED TO SUPPORT THE TIMBER BRIDGE TO PREVENT SETTLEMENT OF THE BRIDGE, IF THE GEOMETRY OF THE STREAM ALLOWS FOR SUCH INSTALLATION. THE TIMBER BRIDGE AND GEOTEXTILE FABRIC SHALL REMAIN ABOVE THE WATER SURFACE ELEVATION AT ALL TIMES.
6. SIDE RAILS SHALL BE INSTALLED ON BOTH SIDES OF THE BRIDGE EQUIPMENT CROSSING IN ORDER TO PREVENT SEDIMENT FROM ENTERING THE WATERBODY. SIDE RAILS TO BE CONSTRUCTED OF PLYWOOD NAILED TO THE OUTER EDGES OF THE TIMBER EQUIPMENT MATS.
7. TIMBER EQUIPMENT MATS SHALL EXTEND A MINIMUM OF 10 FEET OUTSIDE OF THE WATERBODY OR WETLAND BOUNDARIES.
8. WHERE CONSTRUCTION ROADWAY SLOPES TOWARD STREAM, A DIVERSION TERRACE SHALL BE INSTALLED TO PREVENT RUNOFF FROM ENTERING EQUIPMENT CROSSING. DIVERSION TERRACE SHALL BE NOT LESS THAT 50 FEET FROM WATERBODY BANK TOP.

ISSUED 30%
DATE: 04/24/2020
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PLOT SCALE	1:1	
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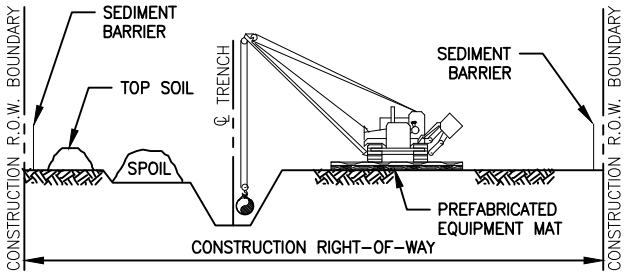
NEXTERA ENERGY
BRIDGE EQUIPMENT CROSSING DETAIL
LOWMAN PIPELINE PROJECT
WASHINGTON & CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
N.T.S.	4719-G-BRIDGE EQ X	B

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PRESTON, JON

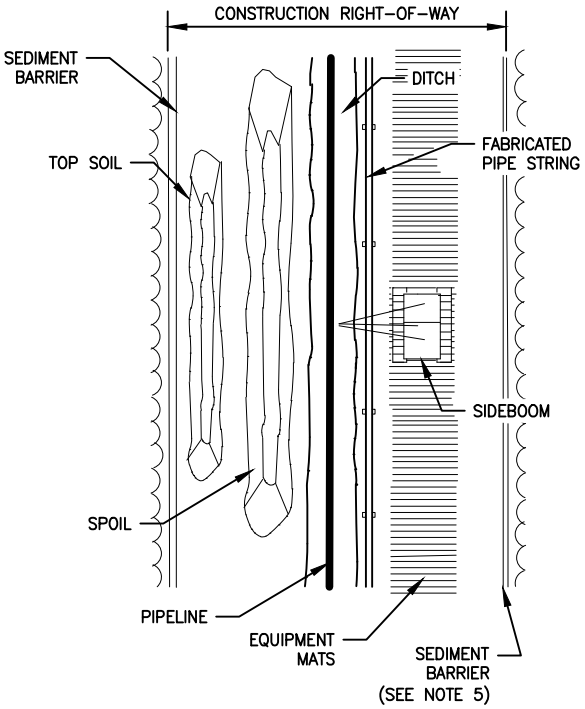
TYPE I "DRY WETLAND" CROSSING

TEMPORARY EROSION CONTROL MEASURE



CROSS SECTION

NOT TO SCALE



PLAN VIEW

NOT TO SCALE

CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES AND INSTALL BOUNDARY SIGNS PRIOR TO CLEARING.

2. NO OVERNIGHT PARKING OR REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.

3. INSTALL TEMPORARY SLOPE BREAKERS UPSLOPE OF WETLAND BOUNDARIES AS SHOWN ON DRAWINGS AND SPECIFICATIONS.

4. INSTALL PREFABRICATED EQUIPMENT MATS THROUGH ENTIRE WETLAND AREA ON THE WORKING SIDE OF THE CONSTRUCTION CORRIDOR.

5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS AT OUTER BOUNDARIES OF THE WETLAND. INSTALL SEDIMENT BARRIERS ALONG THE EDGE OF THE SPOIL SIDE OF THE CONSTRUCTION CORRIDOR THROUGH THE WETLAND AND ALONG THE DOWN SLOPE EDGE OF THE WETLAND. IF THE DOWN SLOPE EDGE OF THE WETLAND IS THE SPOIL SIDE, THEN SEDIMENT BARRIERS ARE NOT REQUIRED ON THE WORKING SIDE OF THE CORRIDOR UNLESS EQUIPMENT TRAVERSING THROUGH THE WETLAND CAUSES SPOIL AND SEDIMENT TO EXIT THE CONSTRUCTION CORRIDOR.

6. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER THE TRENCH LINE. DO NOT GRADE OR REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE RIGHT-OF-WAY IN WETLANDS UNLESS THE CHIEF INSPECTOR AND COMPANY ENVIRONMENTAL INSPECTOR DETERMINE THAT SAFETY-RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE RIGHT-OF-WAY.

7. CONDUCT TRENCH LINE TOPSOIL STRIPPING (IF TOPSOIL IS NOT SATURATED). SALVAGE TOPSOIL TO ACTUAL DEPTH OR A MAXIMUM DEPTH OF 12 INCHES, AS DETERMINED BY THE COMPANY ENVIRONMENTAL INSPECTOR. SEGREGATED TOPSOIL PILE MAY BE LOCATED ON SPOIL SIDE, AS REQUIRED.

8. LEAVE HARD PLUGS AT THE EDGES OF WETLAND UNTIL JUST PRIOR TO TRENCHING.

9. TRENCHING THROUGH WETLANDS MAY PROCEED WHEN THE PIPE SECTION IS FABRICATED AND READY TO LAY. ONCE TRENCHING COMMENCES, CONSTRUCTION THROUGH THE WETLAND IS TO PROCEED CONTINUOUSLY UNTIL THE CROSSING IS COMPLETED, BACKFILLED AND RESTORED IN ORDER TO MINIMIZE THE LENGTH OF TIME THE TRENCH IS OPEN.

10. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND ADJACENT TO PIPE TRENCH, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN. NO CONCRETE COATING ACTIVITY WITHIN 100 FEET OF WETLAND BOUNDARY UNLESS APPROVED BY COMPANY ENVIRONMENTAL INSPECTOR.

11. LOWER-IN PIPE. PRIOR TO BACK FILLING TRENCH, INSTALL TRENCH PLUGS IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS.

12. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL.

13. REMOVE PREFABRICATED MATS FROM WETLANDS UPON COMPLETION.

14. SEED DISTURBED WETLANDS AREA AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR AND AS SHOWN ON DRAWINGS.

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
B	ISSUED 30%	RJB	04/24/20	MAL	04/24/20
A	ISSUED FOR 30% REVIEW	RJB	04/09/20	MAL	04/09/20

DRAWN BY	HGA	04/03/20
DESIGNED BY	HGA	04/03/20
CHECKED BY	MEH	04/03/20
APPROVED BY	HGA	04/03/20
HGA JOB NO.	8.A19015	
PLOT SCALE	1:1	
MODEL ID		

HGA
www.hga-llc.com
One Metroplex Drive, Suite 100
Birmingham, AL 35209
T: 205-970-4977
FIRM #: AL CA-4334-E

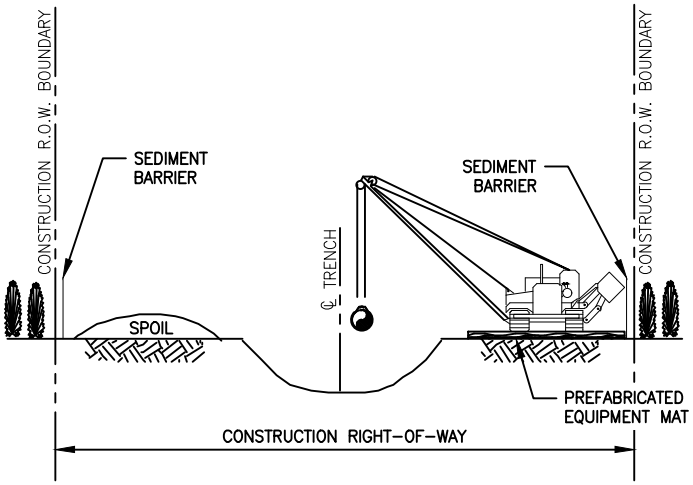
NEXTERA ENERGY
TYPE I "DRY WETLAND" CROSSING DETAIL
LOWMAN PIPELINE PROJECT
WASHINGTON & CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
N.T.S.	4719-G-DRY WETLAND X	B

4/22/2020 3:45 PM
PRESTON, JON

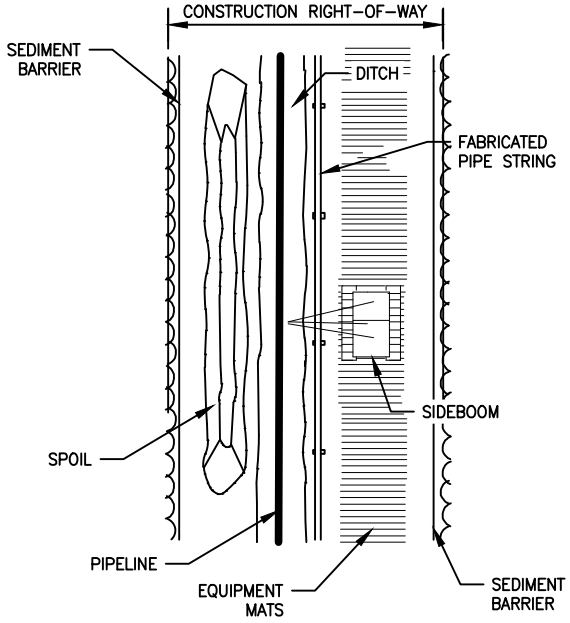
TYPE I "SATURATED WETLAND" CROSSING

TEMPORARY EROSION CONTROL MEASURE



CROSS SECTION

NOT TO SCALE



PLAN VIEW

NOT TO SCALE

CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES AND INSTALL BOUNDARY SIGNS PRIOR TO CLEARING.
2. NO OVERNIGHT PARKING OR REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.
3. INSTALL TEMPORARY SLOPE BREAKERS UPSLOPE OF WETLAND BOUNDARIES AS SHOWN ON DRAWINGS AND SPECIFICATIONS.
4. INSTALL PREFABRICATED EQUIPMENT MATS THROUGH ENTIRE WETLAND AREA ON THE WORKING SIDE OF THE CONSTRUCTION CORRIDOR.
5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS AT OUTER BOUNDARIES OF WETLAND AND ALONG BOTH WETLAND EDGES.
6. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER THE TRENCH LINE. DO NOT GRADE OR REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE RIGHT-OF-WAY IN WETLANDS UNLESS THE CHIEF INSPECTOR AND COMPANY ENVIRONMENTAL INSPECTOR DETERMINE THAT SAFETY-RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE RIGHT-OF-WAY.
7. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
8. LEAVE HARD PLUGS AT THE EDGES OF WETLAND UNTIL JUST PRIOR TO TRENCHING.
9. TRENCHING THROUGH WETLANDS MAY PROCEED WHEN THE PIPE SECTION IS FABRICATED AND READY TO LAY. ONCE TRENCHING COMMENCES, CONSTRUCTION THROUGH THE WETLAND IS TO PROCEED CONTINUOUSLY UNTIL THE CROSSING IS COMPLETED, BACKFILLED AND RESTORED IN ORDER TO MINIMIZE THE LENGTH OF TIME THE TRENCH IS OPEN.
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13. REMOVE PREFABRICATED MATS FROM WETLANDS UPON COMPLETION.
14. SEED DISTURBED WETLANDS AREA AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR AND AS SHOWN ON DRAWINGS.

ISSUED 30%
DATE: 04/22/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
A	ISSUED FOR 30% REVIEW	RJB	04/22/20	MAL	04/22/20

DRAWN BY	HGA	04/21/20
DESIGNED BY	HGA	04/21/20
CHECKED BY	MEH	04/22/20
APPROVED BY	HGA	04/22/20
HGA JOB NO.	8.A19015	
PLOT SCALE	1:1	
MODEL ID		

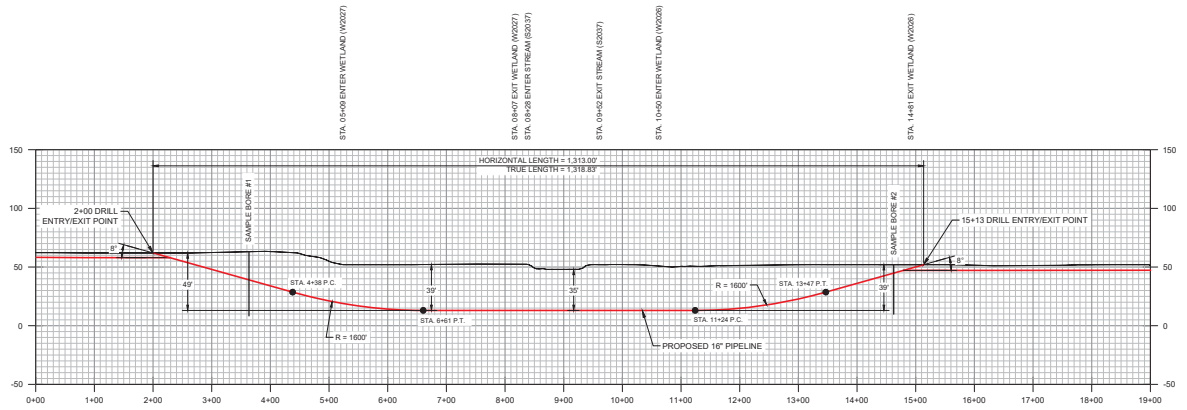
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One Metroplex Drive, Suite 100
Birmingham, AL 35209
T: 205-970-4977
FIRM #: AL CA-4334-E

NEXTERA ENERGY
TYPE I "SATURATED WETLAND" CROSSING DETAIL
LOWMAN PIPELINE PROJECT
WASHINGTON & CHOCTAW COUNTIES, ALABAMA

SCALE	DRAWING NUMBER	REV
N.T.S.	4719-G-SATURATED WETLAND X	A

4/22/2020 3:21 PM
PRESTON, JON

(b)(3), (b)(7)f



PROFILE

HORIZONTAL SCALE: 1"=100'

VERTICAL SCALE: 1"=50'

STREAM
POND
WETLAND
CULTURAL SITES

NEXTera ENERGY

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
B	ISSUED 30%	RJB	04/24/20	MAL	04/24/20
A	ISSUED FOR 30% REVIEW	RJB	04/07/20	MAL	04/07/20

REVISION

DRAWN BY	MBS	03/05/20
DESIGNED BY	HGA	03/05/20
CHECKED BY	MEH	04/06/20
APPROVED BY	MAL	04/06/20
HGA JOB NO.	8,A19015	
PLOT SCALE		
MODEL ID		

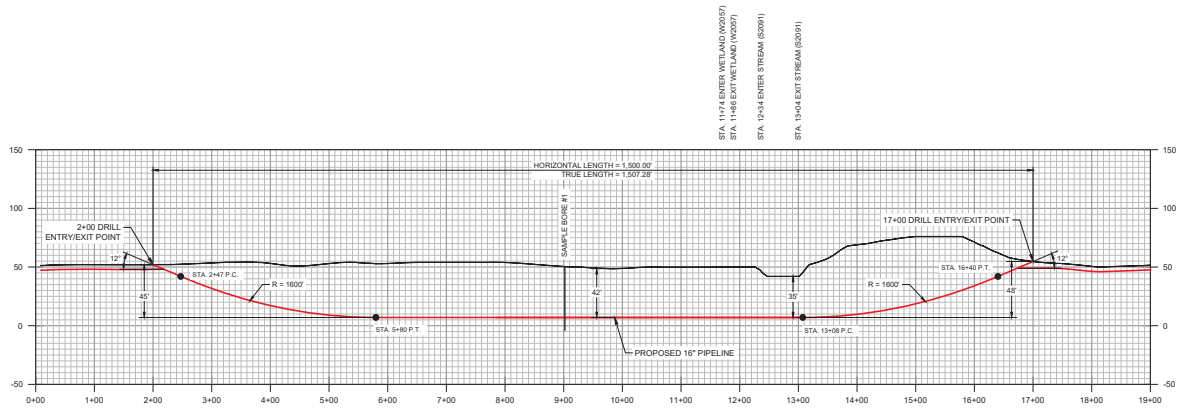
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FIRM #: AL: CA-4334-E

PROPOSED 16" PIPELINE
LOWMAN PIPELINE PROJECT
HORIZONTAL DIRECTIONAL DRILL
CHOCTAW COUNTY, ALABAMA

SCALE	DRAWING NUMBER	REV
AS SHOWN	4719-V-1000	B

M.P. 16.60

(b)(3), (b)(7)f



PROFILE

HORIZONTAL SCALE: 1"=100'

VERTICAL SCALE: 1"=50'

STREAM
POND
WETLAND
CULTURAL SITES

NEXTera ENERGY

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
B	ISSUED 30%	RJB	04/24/20	MAL	04/24/20
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REVISION

DRAWN BY	MBS	03/05/20
DESIGNED BY	HGA	03/05/20
CHECKED BY	MEH	04/06/20
APPROVED BY	MAL	04/06/20
HGA JOB NO.	8,A19015	
PLOT SCALE		
MODEL ID		

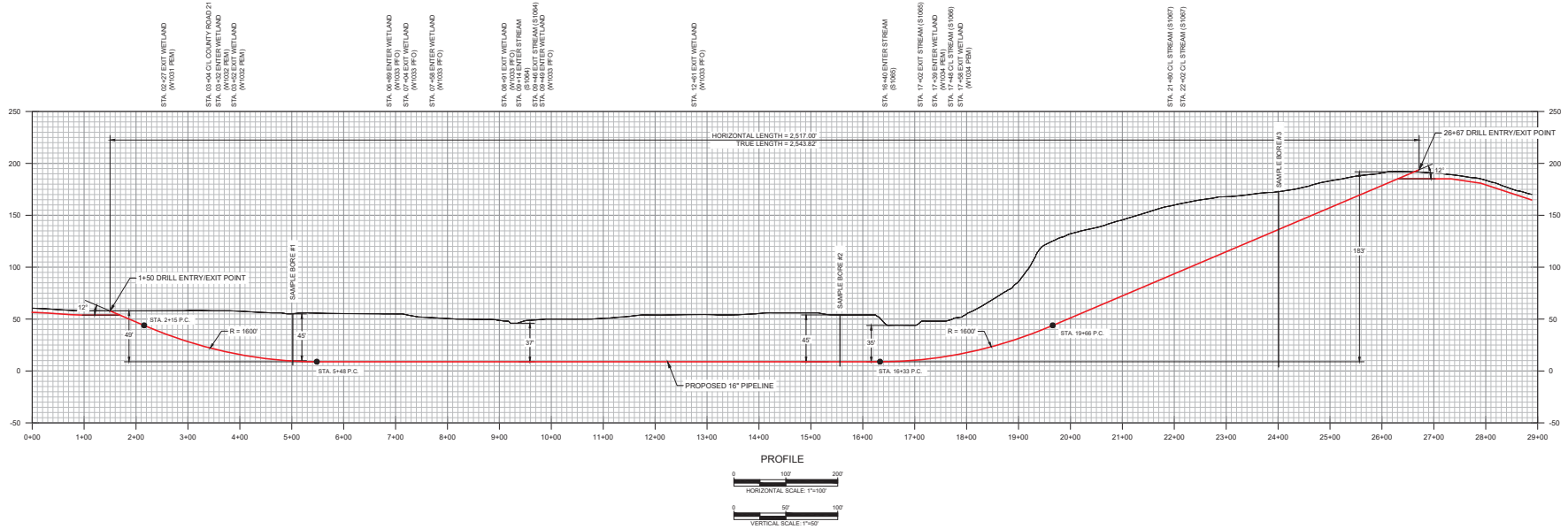
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PROPOSED 16" PIPELINE
LOWMAN PIPELINE PROJECT
HORIZONTAL DIRECTIONAL DRILL
CHOCTAW COUNTY, ALABAMA

SCALE	DRAWING NUMBER	REV
AS SHOWN	4719-V-1001	B

M.P. 19.11

(b)(3), (b)(7)f



PROFILE

HORIZONTAL SCALE: 1"=100'

VERTICAL SCALE: 1"=50'

STREAM
POND
WETLAND
CULTURAL SITES

NEXTera ENERGY

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
B	ISSUED 30%	RJB	04/24/20	MAL	04/24/20
A	ISSUED FOR 30% REVIEW	RJB	04/07/20	MAL	04/07/20

REVISION

DRAWN BY	MBS	03/05/20
DESIGNED BY	HGA	03/05/20
CHECKED BY	MEH	04/06/20
APPROVED BY	MAL	04/06/20
HGA JOB NO.	8,A19015	
PLOT SCALE		
MODEL ID		

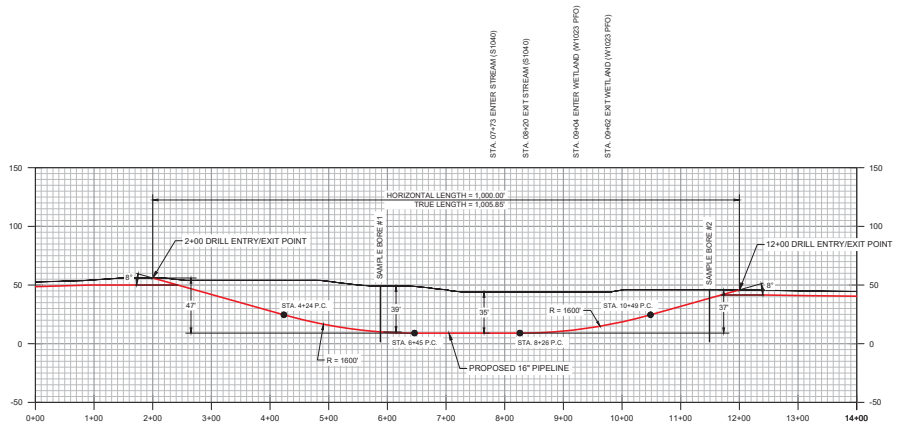
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FIRM #: AL CA-4334-E

PROPOSED 16" PIPELINE
LOWMAN PIPELINE PROJECT
HORIZONTAL DIRECTIONAL DRILL
CHOCTAW COUNTY, ALABAMA

SCALE	DRAWING NUMBER	REV
AS SHOWN	4719-V-1002	B

M.P. 22.04

(b)(3), (b)(7)f



PROFILE

HORIZONTAL SCALE: 1"=100'

VERTICAL SCALE: 1"=50'

STREAM
POND
WETLAND
CULTURAL SITES

NEXTera ENERGY

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
B	ISSUED 30%	RJB	04/24/20	MAL	04/24/20
A	ISSUED FOR 30% REVIEW	RJB	04/07/20	MAL	04/07/20

REVISION

DRAWN BY	MBS	03/05/20
DESIGNED BY	HGA	03/05/20
CHECKED BY	MEH	04/06/20
APPROVED BY	MAL	04/06/20
HGA JOB NO.	8,A19015	
PLOT SCALE		
MODEL ID		

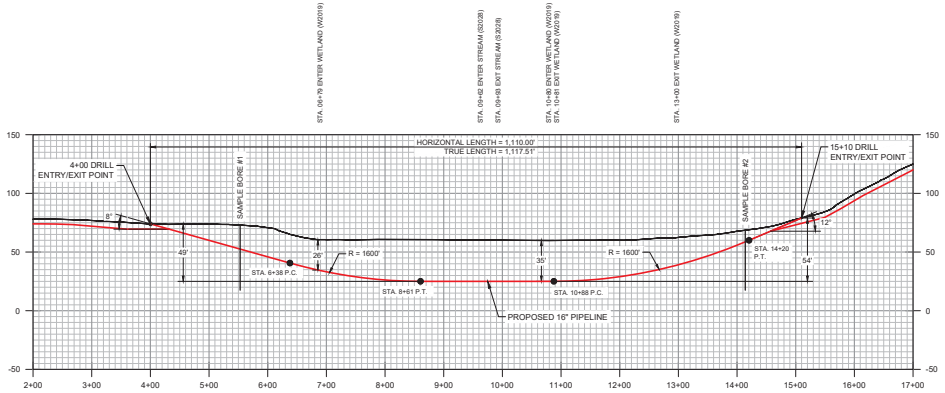
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FIRM #: AL: CA-4334-E

PROPOSED 16" PIPELINE
LOWMAN PIPELINE PROJECT
HORIZONTAL DIRECTIONAL DRILL
WASHINGTON COUNTY, ALABAMA

SCALE	DRAWING NUMBER	REV
AS SHOWN	4719-V-1003	B

M.P. 32.71

(b)(3), (b)(7)f



PROFILE

0 100' 200'
HORIZONTAL SCALE: 1"=100'

0 50' 100'
VERTICAL SCALE: 1"=50'

STREAM
POND
WETLAND
CULTURAL SITES

NEXTera ENERGY

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
B	ISSUED 30%	RJB	04/24/20	MAL	04/24/20
A	ISSUED FOR 30% REVIEW	RJB	04/07/20	MAL	04/07/20

REVISION

DRAWN BY	MBS	03/05/20
DESIGNED BY	HGA	03/05/20
CHECKED BY	MEH	04/06/20
APPROVED BY	MAL	04/06/20
HGA JOB NO.	8,A19015	
PLOT SCALE		
MODEL ID		

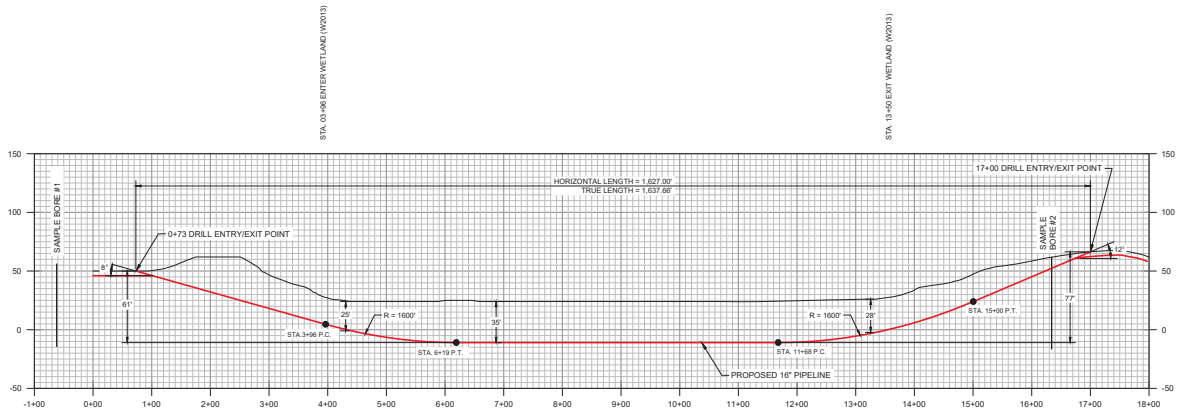
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PROPOSED 16" PIPELINE
LOWMAN PIPELINE PROJECT
HORIZONTAL DIRECTIONAL DRILL
WASHINGTON COUNTY, ALABAMA

SCALE	DRAWING NUMBER	REV
AS SHOWN	4719-V-1004	B

M.P. 35.62

(b)(3), (b)(7)f



PROFILE

HORIZONTAL SCALE: 1"=100'

VERTICAL SCALE: 1"=50'

STREAM
POND
WETLAND
CULTURAL SITES

NEXTera ENERGY

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
B	ISSUED 30%	RJB	04/24/20	MAL	04/24/20
A	ISSUED FOR 30% REVIEW	RJB	04/07/20	MAL	04/07/20

REVISION

DRAWN BY	MBS	03/05/20
DESIGNED BY	HGA	03/05/20
CHECKED BY	MEH	04/06/20
APPROVED BY	MAL	04/06/20
HGA JOB NO.	8,A19015	
PLOT SCALE		
MODEL ID		

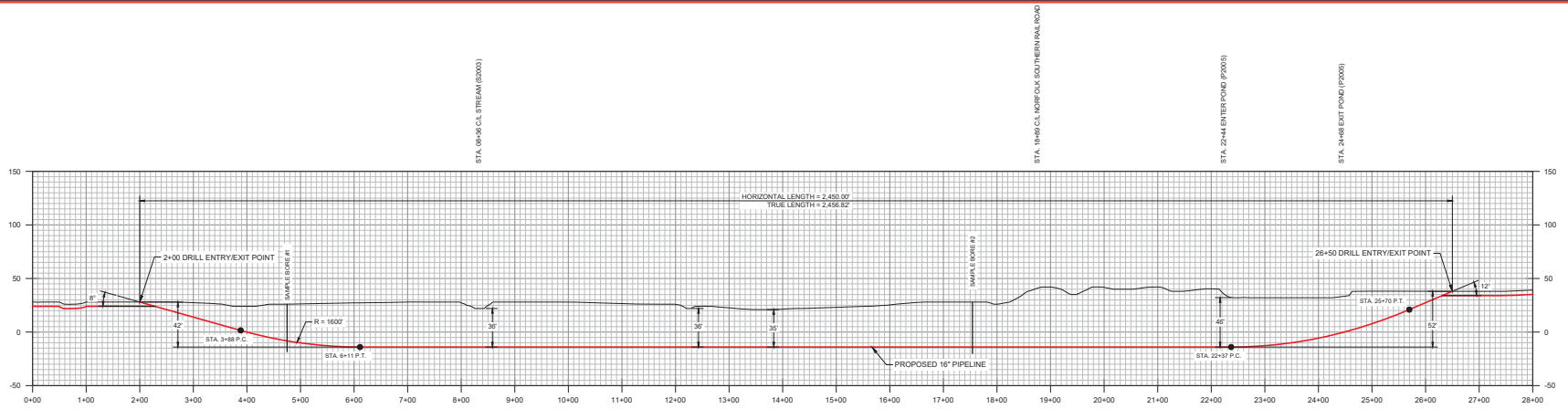
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PROPOSED 16" PIPELINE
LOWMAN PIPELINE PROJECT
HORIZONTAL DIRECTIONAL DRILL
WASHINGTON COUNTY, ALABAMA

SCALE	DRAWING NUMBER	REV
AS SHOWN	4719-V-1005	B

M.P. 39.74

(b)(3), (b)(7)f



PROFILE

0 100' 200'
HORIZONTAL SCALE: 1"=100'

0 50' 100'
VERTICAL SCALE: 1"=50'

STREAM
POND
WETLAND
CULTURAL SITES

NEXTera ENERGY

ISSUED 30%
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HGA JOB NO.	8,A19015	
PLOT SCALE		
MODEL ID		

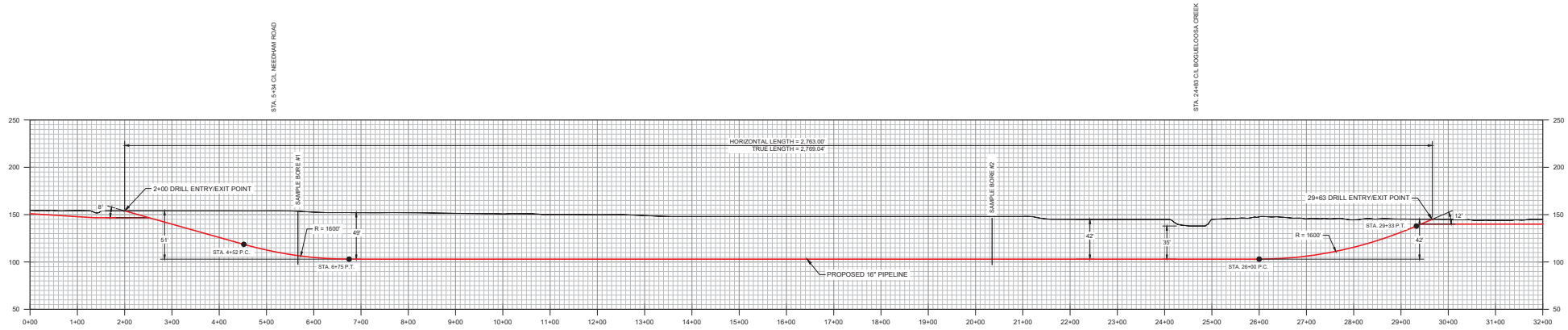
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T: 205-970-4977
FIRM #: AL CA-4334-E

PROPOSED 16" PIPELINE
LOWMAN PIPELINE PROJECT
HORIZONTAL DIRECTIONAL DRILL
WASHINGTON COUNTY, ALABAMA

SCALE	DRAWING NUMBER	REV
AS SHOWN	4719-V-1006	B

M.P. 53.30

(b)(3), (b)(7)f



PROFILE

HORIZONTAL SCALE: 1"=100'

VERTICAL SCALE: 1"=50'

STREAM
POND
WETLAND
CULTURAL SITES

NEXTera ENERGY

ISSUED 30%
DATE: 04/24/2020
- NOT FOR CONSTRUCTION -

REV	DESCRIPTION	CHK	DATE	APP	DATE
B	ISSUED 30%	RJB	04/24/20	MAL	04/24/20
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HGA JOB NO.	8,A19015	
PLOT SCALE		
MODEL ID		

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PROPOSED 16" PIPELINE
LOWMAN PIPELINE PROJECT
HORIZONTAL DIRECTIONAL DRILL
CHOCTAW COUNTY, ALABAMA

SCALE	DRAWING NUMBER	REV
AS SHOWN	4719-V-1007	B

M.P. 5.88

Appendix B

CONSULTATION LETTERS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1208-B Main Street
Daphne, Alabama 36526

DEC 05 2019

IN REPLY REFER TO:
2020-TA-0086

Mr. Andrew Grammer
Edge Engineering and Science, LLC.
16285 Park Ten Place, Suite 400
Houston, TX 77084

Dear Mr. Grammer:

Thank you for your letter dated October 16, 2019, requesting review on the behalf of NextEra Energy Resources (NextEra), for the proposed Lowman Pipeline Project in Choctaw and Washington counties, Alabama. We understand NextEra has contracted Edge Engineering and Science, LLC to provide environmental consulting support and is seeking a Nationwide Permit 12 – Utility Line Activities through the U.S. Army Corps of Engineers. Following is the Service's list of species concerning this project as it relates to the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

Federally Listed Species
Our records and information provided in your report indicate that habitat exists in the project area and the following endangered and threatened species may occur in the immediate project area:

- Wood Stork *Mycteria americana* Threatened
- Gopher Tortoise *Gopherus polyphemus* (West of Mobile and Tombigbee Rivers) Threatened
- Black Pine Snake *Pituophis melanoleucus lodingi* Threatened
- Inflated Heelsplitter *Potamilus inflatus* Threatened
- Southern Clubshell *Pleurobema decisum* Endangered

Based on the proposed pipeline route provided via email on November 18, 2019, we have no concerns for the Atlantic sturgeon, *Acipenser oxyrhynchus oxyrchynchus*.

Species Surveys
Please be aware that "take", as defined under section 3 of the ESA, "means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" and is prohibited without a permit issued under section 10 of the ESA. Individuals conducting surveys for federally threatened or endangered species must possess federal recovery permits as described under section 10(a)(1)(A) of the ESA and implementing regulations found at 50 CFR 17.22 and 17.32, along with State scientific collection permits. Furthermore, survey plans

should be submitted to our office for review prior to being carried out. Please acquire proper state and federal permits or coordinate with permitted biologists if you intend to conduct surveys for threatened and endangered species.

We support your plans to conduct pedestrian surveys to evaluate suitable habitat and presence/probably absence of gopher tortoise burrows and the site list provided in your letter for aquatic habitat assessment/surveys species. Please acquire the proper federal and state permits and provide this office a copy of the survey plans for approval prior to conducting burrow occupancy and instream surveys. If surveys indicate that listed species occur within the proposed project area and proposed work cannot be altered to avoid take as defined by the ESA, formal consultation would be recommended.

To provide the Service with the necessary information in a burrow survey report, please provide the following: survey design, survey dates, ambient temperature, maps of survey area including total number of miles, locations of gopher tortoise burrows including maps, photos of the burrows if found, if the burrows are active or inactive, and maps of burrow locations. The aquatic survey report should include a detailed description of the site including species and substrates present, survey methods, area surveyed and surveyor(s) credentials. We also recommend the report include a description of stream habitat and water quality.

For further discussion, please contact Mrs. Jennifer Grunewald of my staff at (205) 247-3726. Please refer to the reference number located at the top of this letter in future phone calls or written correspondence.

Sincerely,

William J. Pearson
Field Supervisor
Alabama Ecological Services Field Office

EDGE ENGINEERING & SCIENCE | 16285 Park Ten Place, Suite 400 | Houston, Texas 77084 | 832.772.3000 edge-es.com

October 16, 2019

Bill Pearson
Field Supervisor
U.S. Fish and Wildlife Service
Alabama Ecological Services Field Office
1208 Main Street
Daphne, Alabama 36526-4419

RE: Request for Threatened and Endangered Species Consultation
NextEra Energy Resources Proposed Lowman Pipeline Project
Choctaw and Washington Counties, Alabama

Dear Mr. Pearson,

NextEra Energy Resources (NextEra), is seeking authorization from the U.S. Army Corps of Engineers (USACE) under Nationwide Permit 12 - Utility Line Activities (NWP 12) for its proposed Lowman Pipeline Project (Project). The Project will include new construction in Choctaw and Washington Counties in Louisiana (see Attachment 1). NextEra has contracted Edge Engineering and Science, LLC (EDGE) to provide environmental support for the Project, including agency consultation and field surveys as well as federal, state, and local permitting. Due to the required approval from the USACE and the resulting federal nexus, EDGE is contacting you to initiate consultation in accordance with Section 7 of the Endangered Species Act (ESA).

PROJECT DESCRIPTION

The Project is located in Choctaw and Washington counties, Alabama, and will consist of approximately 51 miles of 16-inch-diameter intrastate natural gas pipeline. The Project is being constructed to allow for natural gas conversion of the existing coal-fired PowerSouth Lowman Power Plant in Washington County, Alabama. In addition to the pipeline, the Project will include the construction of one new compressor station, four meter stations, and a launcher/receiver facility.

Concurrent with pedestrian wetland and waterbody delineation surveys, habitat assessments will be conducted at each of the Project components.

THREATENED AND ENDANGERED SPECIES ASSESSMENT

EDGE has identified federal threatened, endangered, and candidate species that are have the potential to occur within the Project area. The species list was compiled from a review of the U.S. Fish and Wildlife (USFWS) Information, Planning and Conservation System (IPaC). The IPaC results are provided as Attachment 2, and a summary of those species identified is included in Table 1, below. Potential suitable

habitat for the wood stork (*Mycteria Americana*), black pine snake (*Pituophis melanoleucus lodingi*) and gopher tortoise (*Gopherus Polyphemus*) exists within or immediately adjacent to the Project area, as well as potential habitats for Inflated heelsplitters *(Potamilus inflatus*) and Southern clubshell (*Pleurobema decisum*). These species are discussed in additional detail. Federally designated critical habitat locations were also reviewed, and no designated critical habitat occurs in areas affected by the Project.

TABLE 1
Federally Listed Species in Choctaw and Washington Counties, Louisiana

Common Name	Scientific Name	Listing Status	Habitat Description	Potential for Occurrence
Birds				
Wood stork	*Mycteria americana*	Threatened	Breeding occurs in fresh and brackish forested wetlands. Storks nest in trees above standing water in cypress swamps and oaks in flooded inpoundments. Storks forage in swamps, ponds, and marshes with water depths 4-12 inches.	Known to occur in the lower Tombigbee River drainage crossed by the Project.
Reptiles				
Gopher tortoise	*Gopherus polyphemus*	Threatened	Dry, deep sandy soils where the overhead canopy is open. Longleaf pine-scrub oak wiregrass sand hills that are fequently burned.	Suitable soils located within open longleaf pine-scrub oak wiregrass sand hills may exist in the vicinity of the Project area.
Black pine snake	*Pituophis melanoleucus lodingi*	Threatened	Xeric, fire-maintained longleaf pine forest with sandy, well-drained soils; usually on hilltops, ridges, and toward tops of slopes. Potential to occur in dry, periodically burned pine or mixed pine-scrub oak forest with abundant groundcover vegetation.	Suitable longleaf pine forest with suitable soils, which could provide habitat, are likely to exist in the vicinity of the Project area.
Fish				
Atlantic sturgeon	*Acipenser oxyrhynchus oxyrhynchus*	Threatened	Inhabits shallow waters of the continental shelf and coastal brackish waters; spawns in large river systems and hatches in freshwater systems. Preferred substrates consist of rock, coble, and gravel.	No suitable habitat exists within or immediately adjacent to the Project area.
Mollusks				
Inflated heelsplitter	*Potamilus inflatus*	Threatened	Sand, mud, silt, and sandy-gravel substrates in slow to moderate freshwater currents.	The Tombigbee River drainage in Alabama is know to support the species.

TABLE 1
Federally Listed Species in Choctaw and Washington Counties, Louisiana

Common Name	Scientific Name	Listing Status	Habitat Description	Potential for Occurrence
Southern clubshell	*Pleurobema decisum*	Endangered	Highly oxygenated streams with sand and gravel substrate in shoals of large rivers to small streams. May be found in sand and gravel in the center of a stream or in sand along the margins of the stream	The Tombigbee River drainage in Alabama is know to support the species.

BIRDS

The wood stork (*Mycteria americana*) is federally threatened and known to inhabit the lower Tombigbee river drainage. EDGE plans to survey for wood stork habitat (nesting) and potential occupancy coinciding with wetland/waterbody and mussel habitat surveys (see discussion, below).

REPTILES

The gopher tortoise (*Gopherus polyphemus*) is known to occur in Washington and Choctaw counties, Alabama. The species is designated as federally threatened under ESA within this portion of their range and are protected under state regulation. Based upon a desktop review of the Project area, EDGE anticipates that potential suitable habitat for the tortoise may be crossed, and plans to conduct pedestrian surveys to evaluate suitable habitat and presence/probable absence of burrows. If burrows are found during surveys, measurements of the width, height, and condition of the burrow will be recorded and mapped, and a subsequent occupancy survey will be conducted to estimate population size and density to determine if translocation or implementation of on-site construction Best Management Practices (BMPs) are necessary.

The southern black pinesnake (*Pituophis melanoleucus lodingi*; SBP) is federally threatened and occupies similar upland habitats as the gopher tortoise. Based on EDGE's experience, we do not anticipate targeted species efforts for SBP, rather it will be evaluated in conjunction with gopher tortoise field survey efforts. Surveys will be conducted in land cover types and soil associations that are known to support the life history requirements of the SBP and gopher tortoise. Surveys will occur during the active season for tortoises, generally from March to October.

MOLLUSKS

The Tombigbee River drainage in Alabama is known to support multiple federally listed freshwater mussels. Those mussel species listed as potentially occurring in Choctaw and Washington counties, including the inflated heelsplitter (*Potamilus inflatus*) and southern clubshell (*Pleurobema decisum*) are predominantly based on known occurrences in the upper Tombigbee River drainage. EDGE anticipates conducting aquatic habitat assessment/surveys at nine (9) perennial waterbodies/tributaries traversed by the ROW in Choctaw (Bogueloosa Creek, Buck Creek, Okatuppa Creek, Souwilpa Creek, Black Creek, Turkey Creek) and Washington (Santa Bogue Creek, Elias Creek, Tauler Creek) counties. Mussel habitat surveys can also evaluate/supplement other aquatic species concerns including fishes, invertebrates, snails, and herptofauna that may be raised during the Project review process.

BALD EAGLES AND MIGRATORY BIRDS

In addition to species listed under the ESA, NextEra recognizes the legal requirements for complying with bald and golden eagles and migratory birds under the jurisdiction of the USFWS. In the event that a bald eagle is encountered, construction will be conducted in compliance with the USFWS National Bald Eagle Management Guidelines.

NextEra is familiar with the requirements under the Migratory Bird Treaty Act (MBTA). NextEra has designed the Project to minimize impacts on forested vegetation to the extent practicable; however, tree removal will be necessary for construction of the Project. Tree removal will be conducted outside the migratory bird nesting season (April 15 through August 1) to the extent practicable.

NextEra and EDGE appreciate your assistance. Should you have any questions or comments, please contact me at (832) 772-3018 or via email wagrammer@edge-es.com

Sincerely,

Andrew Grammer
Project Manager
Edge Engineering and Science, LLC

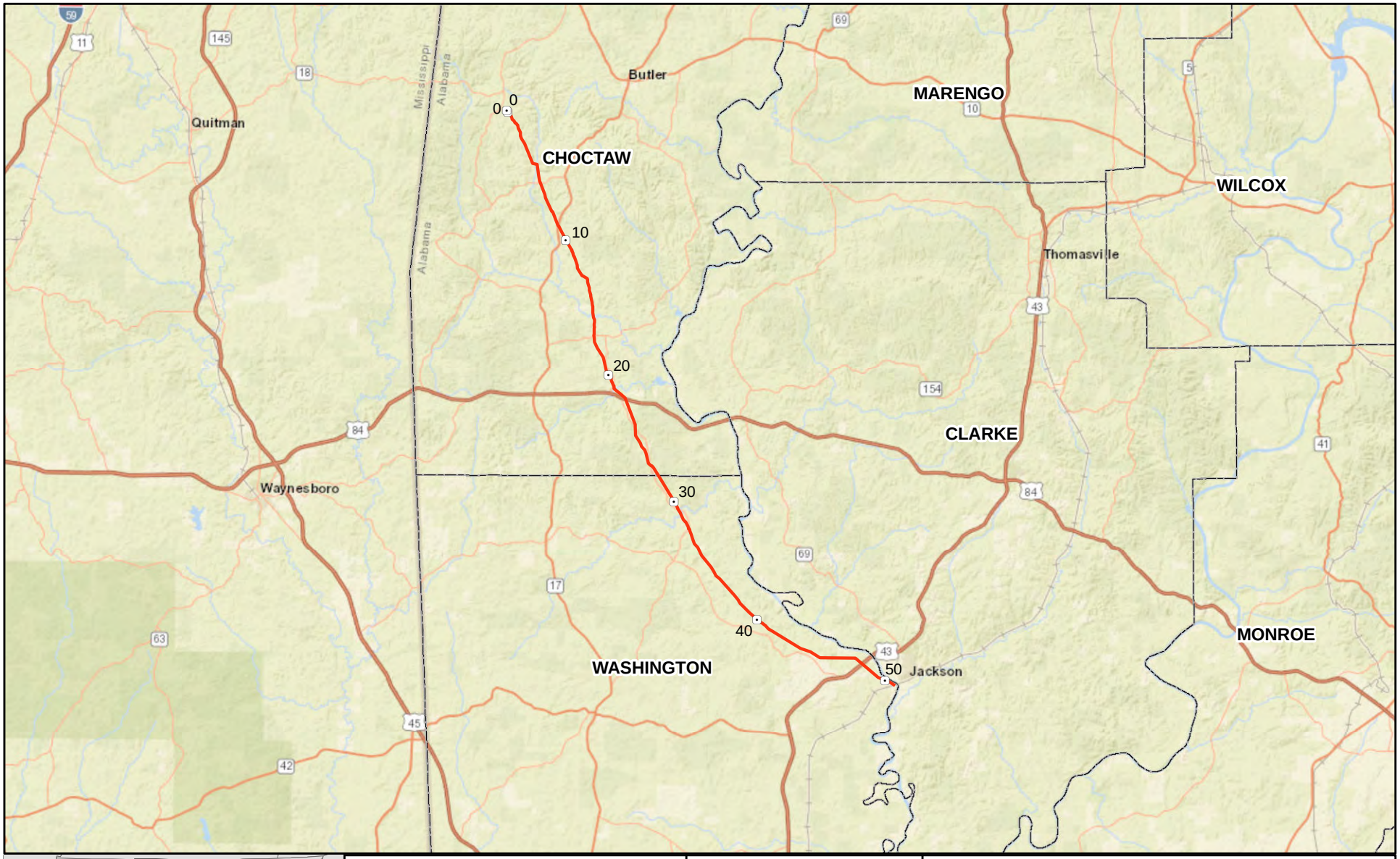
Cc: Ray Loving, NextEra

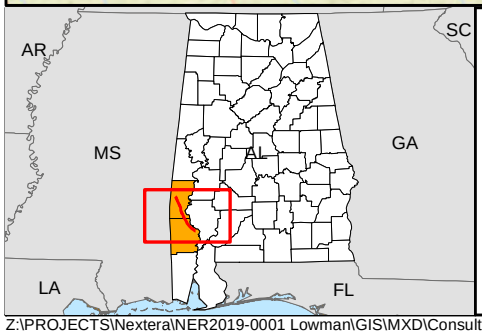
Attachments:

Attachment 1: Project Location Map of the Lowman Pipeline Project
Attachment 2: Information, Planning and Conservation System Species Lists

Attachment 1

Project Location Map of the Lowman Pipeline Project





Legend

- Mile Post
- Proposed Pipeline
- County Boundary

N

0 5 10

Miles

Scale: 1:600,000

EDGE ENGINEERING & SCIENCE

NextEra Energy
Lowman Pipeline Project

Attachment 1
Project Location Map

Choctaw and Washington Counties, Alabama

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Attachment 2

Information, Planning and Conservation System Species Lists

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

Location

Choctaw and Washington counties, Alabama



Local office

Alabama Ecological Services Field Office

(251) 441-5181
(251) 441-6222

1208 B Main Street
Daphne, AL 36526-4419

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS

Wood Stork Mycteria americana No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8477	Threatened

Reptiles

NAME	STATUS
Black Pine Snake Pituophis melanoleucus lodingi There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/452	Threatened
Gopher Tortoise Gopherus polyphemus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6994	Threatened

Fishes

NAME	STATUS
Atlantic Sturgeon (gulf Subspecies) Acipenser oxyrinchus (=oxyrhynchus) desotoi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/651	Threatened

Clams

NAME	STATUS
Inflated Heelsplitter Potamilus inflatus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7286	Threatened
Southern Clubshell Pleurobema decisum There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/6113	Endangered

NOT FOR CONSULTATION

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

NOT FOR CONSULTATION

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE.

	"BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Common Ground-dove Columbina passerina exigua This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Feb 1 to Dec 31
Prairie Warbler Dendroica discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler Protonotaria citrea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Swallow-tailed Kite Elanoides forficatus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938	Breeds Mar 10 to Jun 30
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

NOT FOR CONSULTATION

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

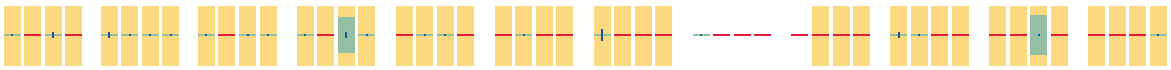
Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

NOT FOR CONSULTATION

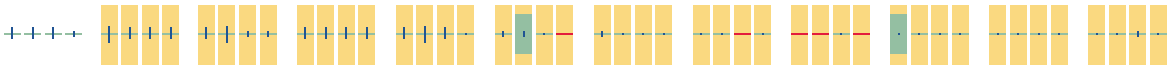
■ probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Bald Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



Common Ground-dove
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



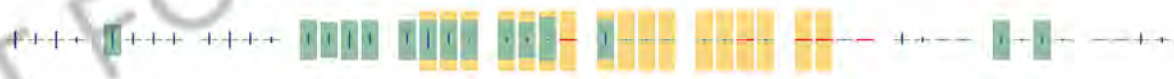
Prairie Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Prothonotary Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Red-headed Woodpecker
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Rusty Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

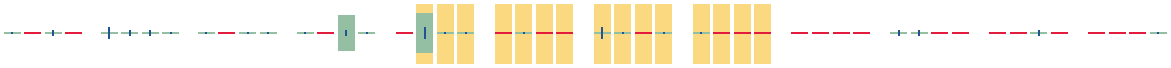


Swallow-tailed Kite
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



NOT FOR CONSULTATION

Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

NOT FOR CONSULTATION

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

NOT FOR CONSULTATION

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1A
- PEM1Ch
- PEM1C
- PEM1Fh

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1C
- PFO1A
- PFO6F
- PFO6/5F
- PFO1/4A
- PFO5/EM1Fh
- PSS4/1A
- PFO1/5Fh
- PFO1/SS1A
- PSS1A
- PFO1Cb

NOT FOR CONSULTATION

PFO4/1A
PSS1Cd
PSS1C
PSS4A
PFO1Fh

FRESHWATER POND

PUBHh
PUBF
PUBHx

LAKE

L1UBHh

RIVERINE

R2UBH
R4SBC
R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

Appendix C

HYDROSTATIC TEST PLAN

Lowman Energy Pipeline Holdings

Lowman Pipeline Project

Hydrostatic Test Plan

Prepared by:

EDGE Engineering & Science

July 2020

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1.0 INTRODUCTION

Lowman Energy Pipeline Holdings (Lowman) prepared this Hydrostatic Test Plan (Plan) to be implemented during hydrostatic testing of Lowman Pipeline Project (Project) natural gas pipeline. The Plan identifies measures to ensure pipeline integrity in accordance with U.S. Department of Transportation (DOT) regulations under Title 49 Code of Federal Regulations 192, entitled *Transportation of Natural and other Gas by Pipeline: Minimum Federal Safety Standards*, and to be carried out in accordance with federal, state, and local agency regulations.

2.0 HYDROSTATIC TESTING PROCEDURES

Following backfilling of the trench, the completed pipeline will be hydrostatically tested according to applicable DOT and Lowman specifications to ensure structural integrity. Each pipeline segment to be installed by horizontal directional drill (HDD) may also be pre-tested prior to installation. In this event, test segments of the pipeline will be capped, filled with water, and pressurized. Any loss of pressure that cannot be attributed to other factors such as temperature changes will be investigated. Any leaks detected will be repaired and the segment retested. Upon completion of the test, the water may be discharged, or it will be pumped to the next pipeline segment for testing.

Best management practices regarding sources, volumes, and discharge locations of hydrostatic test water are provided in in Section 3.0. Upon completion of each test, the water will be discharged in accordance with best management practices (BMP) and any applicable regulations. It is anticipated that hydrostatic test water will be discharged overland along the edges of the construction right-of-way using energy dissipation devices to minimize erosion and sedimentation.

Hydrostatic test water will contact only new pipe, and no chemicals or biocides will be added to the test water. The water will be sampled prior to withdrawal and discharge and tested in accordance with Lowman's internal procedures and any applicable permit conditions to determine suitability for discharge. If treatment of hydrostatic test water is found to be required, treatment procedures will be developed prior to discharge.

Once a segment of pipe has been successfully tested and dried, the test cap and manifold will be removed, and the pipe segment will be connected to the remainder of the pipeline. After completion of hydrostatic testing, the new pipeline will be cleaned and dried using pipeline pigs that are propelled through the pipeline with compressed air. Once cleaned and purged of air, the pipeline will be packed with the product to be transported

3.0 SOURCE WATER, VOLUMES, AND DISCHARGE LOCATIONS

Lowman plans to primarily utilize surface water sources, and the pipeline will be hydrostatically tested in segments.

In general, the pipeline will be dewatered at several locations and approved by private landowners. To minimize total water volumes utilized for hydrostatic testing, water will be transferred between successive pipeline segments for reuse where feasible.

Additionally, pipe that is fabricated for HDD locations will be tested prior to being pulled through the bore hole and either discharged on-site according to the appropriate permit approvals, or collected in water tanks and reused for testing of other HDD pull strings.
Facilities such as pig launcher/receivers, valves, and other assemblies that are not tested during their fabrication, prior to delivery to the Project work area, will be tested on-site. Any associated discharges will be done in accordance with applicable permits.

4.0 HYDROSTATIC TESTING BEST MANAGEMENT PRACTICES

4.1 Water Use Registration and Discharge Permitting

- The proposed source water and discharge plans for all hydrostatic testing will be identified prior to initiation of hydrostatic testing, or associated water withdrawals.

- Any surface water use will be appropriate permitted or obtained according to landowner, state, and federal requirements.

- Discharge of hydrostatic test water must comply with applicable regulations. Lowman will ensure that any requisite landowner approvals for discharges of hydrostatic test water are obtained in writing prior to initiating such activities.

- Planned use of municipal water for hydrostatic testing, whether sourced locally or trucked to the test site, will not typically require resource agency approval. If trucked, truck tanks will be verified as clean and free of contaminants to avoid inadvertent contamination of the test water.

4.2 Sample Collection and Analysis

Discharge samples will be collected and analyzed according to applicable permit conditions. The effluent parameters or constituents for which analyses will be conducted will be specified by permit conditions.

- Proper care will be taken to ensure proper collection, treatment, and transport of samples. discharge samples for analysis.

- Discharge samples will be taken at the point of discharge, prior to mixing with receiving waters and immediately after exiting the treatment mechanism (e.g., hay bale containment structure), and samples shall be representative of the monitored discharge. The discharge permit may specify the exact timing and frequency of sample collection (e.g., prior to discharge, during discharge, etc.).

4.3 Test Water Discharge

- Upon commencement of discharge, grab samples will be taken in accordance with the appropriate permit conditions. If effluent limitations or permitted requirements are not in compliance with the associated permit, discharge will be immediately ceased and held until re-analysis and/or alternate plans (e.g., on-site filtration/treatment or collection/hauling of discharge water) can be implemented.

- All water discharges will be performed in accordance with applicable permit conditions and Company procedures, as applicable.
    - Discharge rates of hydrostatic test waters shall be regulated and energy dissipation devices shall be used to prevent upland area erosion, streambed scour, suspension of sediments, or excessive stream flow.
    - Test water shall be discharged into a filter bag, hay/straw bale or silt fence containment structure to minimize erosion and sedimentation of adjacent streams and wetlands.
    - Any solid wastes, such as straw used for filtering or erosion control, shall be disposed of in accordance with local, state, and federal law.

Appendix D

WETLAND AND WATERBODY CROSSING TABLES

Appendix D Waterbodies Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

Feature ID	Approximate MP	Type	Latitude	Longitude	Name	Crossing Method	Stream Length (ft.)	Stream Width (ft.)	Temorary Impact (acres)
S2047	0.31	Perennial	(b)(7)f		Unnamed Trib. to Long Creek	Open Cut	105	3.5	0.008
S2049	0.36	Intermittent			Unnamed Trib. to Long Creek	Open Cut	92	2	0.004
S2050	0.41	Ephemeral			Unnamed Trib. to Long Creek	Open Cut	142	1.5	0.005
S2119	0.52	Ephemeral			Unnamed Trib. to Long Creek	Open Cut	40	1	0.001
S2057	0.85	Intermittent			Unnamed Trib. to Long Creek	Open Cut	134	2	0.006
S2056	0.98	Perennial			Unnamed Trib. to Long Creek	Open Cut	95	4	0.009
S2058	1.61	Perennial			Unnamed Trib. to Long Creek	Open Cut	94	4	0.009
S2059	1.72	Ephemeral			Unnamed Trib. to Long Creek	Open Cut	99	2	0.005
S2111	2.35	Intermittent			Unnamed Trib. to Church Branch	Open Cut	96	2	0.004
S2112	2.49	Intermittent			Church Branch	Open Cut	77	2	0.004
S1336	3.52	Intermittent			Unnamed Trib. to Bogueloosa Creek	Open Cut	41	3	0.003
S2193	3.62	Intermittent			Unnamed Trib. to Bogueloosa Creek	Open Cut	86	2.5	0.005
S2192	3.69	Perennial			Unnamed Trib. to Bogueloosa Creek	Open Cut	88	4	0.008
S2190	3.99	Intermittent			Unnamed Trib. to Bogueloosa Creek	Open Cut	332	2.5	0.019
S2189	4.05	Perennial			Unnamed Trib. to Bogueloosa Creek	Open Cut	312	2.5	0.018
S1287	4.10	Ephemeral			Unnamed Trib. to Bogueloosa Creek	Open Cut	42	2	0.002
P1008	4.18	Pond			Unnamed Pond	Open Cut	N/A	N/A	0.006
S2188	4.21	Intermittent			Unnamed Trib. to Bogueloosa Creek	Open Cut	137	1.5	0.005
S2187	4.23	Intermittent			Unnamed Trib. to Bogueloosa Creek	Open Cut	94	1.5	0.003
S2184	4.45	Perennial			Unnamed Trib. to Bogueloosa Creek	Open Cut	856	2.5	0.049
P2101	4.58	Pond			Unnamed Pond	Open Cut	N/A	N/A	0.154
S2183	4.58	Perennial			Unnamed Trib. to Bogueloosa Creek	Open Cut	32	3	0.002
S2182	4.85	Intermittent			Unnamed Trib. to Church Branch	Open Cut	171	1.5	0.006
S2181	4.92	Perennial			Church Branch	Open Cut	93	7	0.031
S2180	4.93	Ephemeral			Unnamed Trib. to Church Branch	Open Cut	113	2	0.005
S2179	5.00	Perennial			Unnamed Trib. to Church Branch	Open Cut	101	1.5	0.003
S2178	5.11	Perennial			Unnamed Trib. to Church Branch	Open Cut	90	2.5	0.005
S2177	5.43	Perennial			Unnamed Trib. to Bogueloosa Creek	Open Cut	371	5	0.043
S1285	5.43	Intermittent			Unnamed Trib. to Bogueloosa Creek	Open Cut	31	1.5	0.001
S2175	5.63	Perennial			Unnamed Trib. to Bogueloosa Creek	Open Cut	297	2.5	0.017
S2173	5.80	Perennial			Unnamed Trib. to Bogueloosa Creek	Open Cut	14	5	0.002
S1323	5.81	Ephemeral			Unnamed Trib. to Bogueloosa Creek	Open Cut	88	3	0.006
S2196	6.46	Perennial			Unnamed Trib. to Bogueloosa Creek	Open Cut	14	5	0.002
S2198	6.72	Ephemeral			Unnamed Trib. to Bogueloosa Creek	Open Cut	104	2.5	0.006
S2197	6.73	Ephemeral			Unnamed Trib. to Bogueloosa Creek	Open Cut	103	1.5	0.004
S1280	6.99	Ephemeral			Unnamed Trib. to Bogueloosa Creek	Open Cut	9	3	0.001
S1279	7.48	Perennial			Unnamed Trib. to Bogueloosa Creek	Open Cut	52	12	0.022
S1284	7.54	Intermittent			Unnamed Trib. to Bogueloosa Creek	Open Cut	49	3	0.003
S1274A	7.67	Perennial			Unnamed Trib. to Bogueloosa Creek	Open Cut	15	4.5	0.002
S1275	7.68	Ephemeral			Unnamed Trib. to Bogueloosa Creek	Open Cut	57	3.5	0.005
S1276	7.90	Ephemeral			Unnamed Trib. to Bogueloosa Creek	Open Cut	163	2.5	0.009
S1278	8.01	Intermittent			Unnamed Trib. to Bogueloosa Creek	Open Cut	171	15	0.053

Appendix D Waterbodies Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

S1273	8.03	Perennial	(b)(7)f	Unnamed Trib. to Bogueloosa Creek	Open Cut	84	3	0.006
S1269	8.28	Ephemeral		Unnamed Trib. to Bogueloosa Creek	Open Cut	61	1.5	0.002
S1288	8.67	Perennial		Unnamed Trib. to Bogueloosa Creek	Open Cut	117	4	0.011
S1270	8.92	Perennial		Buck Creek	Open Cut	106	20	0.057
S1271	9.21	Perennial		Unnamed Trib. to Bogueloosa Creek	Open Cut	76	5	0.009
S2214	9.57	Perennial		Unnamed Trib. to Rock Branch	Open Cut	245	2	0.011
S2213	9.64	Intermittent		Unnamed Trib. to Rock Branch	Open Cut	14	2	0.001
S2211	9.66	Ephemeral		Unnamed Trib. to Rock Branch	Open Cut	110	2	0.005
S2210	9.74	Intermittent		Unnamed Trib. to Rock Branch	Open Cut	92	2	0.004
S1312	9.87	Intermittent		Unnamed Trib. to Rock Branch	Open Cut	119	2	0.005
S1313	10.23	Intermittent		Unnamed Trib. to Rock Branch	Open Cut	66	2	0.003
S2208	10.46	Perennial		Unnamed Trib. to Rock Branch	Open Cut	99	1.5	0.003
S2209	10.47	Intermittent		Unnamed Trib. to Rock Branch	Open Cut	76	1.5	0.003
S2143	10.78	Intermittent		Unnamed Trib. to Bogueloosa Creek	Open Cut	83	2	0.004
S2140	10.81	Perennial		Unnamed Trib. to Bogueloosa Creek	Open Cut	103	2.5	0.006
S1318	11.68	Intermittent		Unnamed Trib. to Bogueloosa Creek	Open Cut	94	1.5	0.003
S1114	12.94	Ephemeral		Unnamed Trib. to Mill Branch	Open Cut	93	1	0.002
S1112	13.16	Intermittent		Unnamed Trib. to Mill Branch	Open Cut	223	3.5	0.018
S1111	13.35	Perennial		Unnamed Trib. to Mill Branch	Open Cut	92	3	0.006
S1110	13.52	Intermittent		Unnamed Trib. to Mill Branch	Open Cut	160	3	0.011
S1109	13.80	Ephemeral		Unnamed Trib. to Golden Horn Branch	Open Cut	14	2	0.001
S1108	13.80	Ephemeral		Unnamed Trib. to Golden Horn Branch	Open Cut	88	4	0.008
S1116	14.36	Perennial		Golden Horn Branch	Open Cut	74	5.5	0.013
S1118	14.55	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	105	2	0.005
S9011	14.65	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	89	2	0.004
S1121	14.82	Ephemeral		Unnamed Trib. to Golden Horn Branch	Open Cut	96	0.25	0.001
S1120	14.82	Perennial		Unnamed Trib. to Golden Horn Branch	Open Cut	93	2	0.004
S1119	14.94	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	90	1.5	0.003
S1143	15.01	Perennial		Golden Horn Branch	Open Cut	157	6	0.033
S1146	15.04	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	12	2.5	0.001
S1145	15.06	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	88	4	0.008
S1138	15.11	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	107	2	0.005
S1139	15.12	Ephemeral		Unnamed Trib. to Golden Horn Branch	Open Cut	0	0.5	0.000
S1140	15.12	Ephemeral		Unnamed Trib. to Golden Horn Branch	Open Cut	46	1	0.001
S1134	15.23	Perennial		Unnamed Trib. to Golden Horn Branch	Open Cut	113	3	0.008
S1135	15.27	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	93	2	0.004
S1132	15.35	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	111	3	0.008
S1131	15.45	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	62	1.5	0.002
S1130	15.46	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	93	3	0.006
S1129	15.53	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	121	2	0.006
S1128	15.56	Ephemeral		Unnamed Trib. to Golden Horn Branch	Open Cut	101	3.5	0.008
S2123	15.73	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	80	2.5	0.005

Appendix D Waterbodies Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

Feature ID	Approximate MP	Type	Latitude Longitude	Name	Crossing Method	Stream Length (ft.)	Stream Width (ft.)	Temorary Impact (acres)
S2122	15.88	Intermittent	(b)(7)f	Unnamed Trib. to Golden Horn Branch	Open Cut	160	1.5	0.005
S2121	16.01	Intermittent		Unnamed Trib. to Golden Horn Branch	Open Cut	123	3	0.008
S2116	16.45	Perennial		Golden Horn Branch	Open Cut	127	8	0.051
S2108	17.80	Intermittent		Unnamed Trib. to Okatuppa Creek	Open Cut	114	5	0.013
S2110	17.81	Intermittent		Unnamed Trib. to Okatuppa Creek	Open Cut	76	3.5	0.006
S1266	18.32	Perennial		Unnamed Trib. to Souwilpa Creek	Open Cut	123	4.5	0.013
S2086	18.45	Perennial		Unnamed Trib. to Souwilpa Creek	Open Cut	121	4	0.011
S2084	18.69	Ephemeral		Unnamed Trib. to Souwilpa Creek	Open Cut	41	1.5	0.001
S2083	18.71	Perennial		Unnamed Trib. to Souwilpa Creek	Open Cut	119	6	0.016
S2087	18.87	Ephemeral		Unnamed Trib. to Souwilpa Creek	Open Cut	29	2	0.001
S2155	19.08	Perennial		Unnamed Trib. to Souwilpa Creek	Open Cut	101	2	0.005
S2158	19.23	Ephemeral		Unnamed Trib. to Souwilpa Creek	Open Cut	89	2	0.004
S2092	19.57	Intermittent		Unnamed Trib. to Souwilpa Creek	Open Cut	3	1.5	0.000
S2093	19.59	Ephemeral		Unnamed Trib. to Souwilpa Creek	Open Cut	40	1	0.001
S2094	19.62	Ephemeral		Unnamed Trib. to Souwilpa Creek	Open Cut	99	1	0.002
S2096	19.73	Ephemeral		Unnamed Trib. to Souwilpa Creek	Open Cut	106	2.5	0.006
S2097	19.74	Ephemeral		Unnamed Trib. to Souwilpa Creek	Open Cut	39	2.5	0.002
S2095	19.78	Ephemeral		Unnamed Trib. to Souwilpa Creek	Open Cut	28	2.5	0.002
S2098	19.83	Intermittent		Unnamed Trib. to Souwilpa Creek	Open Cut	93	2.5	0.005
S2100	19.97	Perennial		Unnamed Trib. to Souwilpa Creek	Open Cut	214	4	0.020
S2106	20.21	Intermittent		Unnamed Trib. to McNish Branch	Open Cut	87	3	0.006
S2107	20.28	Intermittent		Unnamed Trib. to McNish Branch	Open Cut	161	2.5	0.009
S1106B	20.56	Intermittent		Unnamed Trib. to McNish Branch	Open Cut	149	3	0.010
S1106	20.60	Intermittent		Unnamed Trib. to McNish Branch	Open Cut	6	3	0.000
S1103	20.79	Perennial		Unnamed Trib. to McNish Branch	Open Cut	81	3.5	0.007
S2082B	21.13	Perennial		Unnamed Trib. to McNish Branch	Open Cut	80	5	0.009
S2082	21.13	Perennial		Unnamed Trib. to McNish Branch	Open Cut	77	5	0.009
S2081	21.17	Intermittent		Unnamed Trib. to McNish Branch	Open Cut	72	3	0.005
S2080	21.20	Ephemeral		Unnamed Trib. to McNish Branch	Open Cut	83	2	0.004
S2079	21.32	Intermittent		Unnamed Trib. to McNish Branch	Open Cut	79	2	0.004
S2077	21.51	Intermittent		Unnamed Trib. to McNish Branch	Open Cut	96	2.5	0.006
S1330	21.78	Ephemeral		Unnamed Trib. to Black Creek	Open Cut	111	3	0.008
S1090	22.02	Intermittent		Unnamed Trib. to Black Creek	Open Cut	231	2.25	0.012
S1068	22.81	Ephemeral		Unnamed Trib. to Turkey Creek	Open Cut	96	2.5	0.006
S1072	22.84	Ephemeral		Unnamed Trib. to Turkey Creek	Open Cut	52	1	0.001
S1069	22.85	Perennial		Unnamed Trib. to Turkey Creek	Open Cut	249	4	0.023
S1070	22.89	Ephemeral		Unnamed Trib. to Turkey Creek	Open Cut	48	1	0.001
S1073	22.97	Intermittent		Unnamed Trib. to Turkey Creek	Open Cut	104	2.5	0.006
S1074	23.02	Ephemeral		Unnamed Trib. to Turkey Creek	Open Cut	33	2.5	0.002
S1075	23.06	Intermittent		Unnamed Trib. to Turkey Creek	Open Cut	65	3	0.004
S1078	23.16	Ephemeral		Unnamed Trib. to Turkey Creek	Open Cut	122	1.5	0.004
S1079	23.19	Perennial		Unnamed Trib. to Turkey Creek	Open Cut	94	3	0.006

Appendix D Waterbodies Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

Feature ID	Approximate MP	Type	Latitude Longitude	Name	Crossing Method	Stream Length (ft.)	Stream Width (ft.)	Temorary Impact (acres)
S1081	23.36	Intermittent	(b)(7)f	Unnamed Trib. to Turkey Creek	Open Cut	82	3	0.006
S1082	23.42	Perennial		Unnamed Trib. to Turkey Creek	Open Cut	200	3	0.014
S1083	23.42	Intermittent		Unnamed Trib. to Turkey Creek	Open Cut	35	3	0.002
S1085	23.81	Perennial		Unnamed Trib. to Turkey Creek	Open Cut	14	7	0.011
P1003	23.81	Pond		Unnamed Pond	Open Cut	N/A	N/A	0.101
S1262	24.72	Intermittent		Unnamed Trib. to Thompson Creek	Open Cut	125	3	0.009
S1263	24.87	Perennial		Unnamed Trib. to Thompson Creek	Open Cut	117	7.5	0.032
S2063	25.31	Intermittent		Unnamed Trib. to Sea Warrior Creek	Open Cut	255	2	0.012
S2064	25.47	Intermittent		Unnamed Trib. to Sea Warrior Creek	Open Cut	197	2	0.009
S2060	25.49	Perennial		Unnamed Trib. to Sea Warrior Creek	Open Cut	99	4	0.009
S2074	25.66	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	92	1.5	0.003
S2073	25.81	Intermittent		Unnamed Trib. to Sea Warrior Creek	Open Cut	223	2	0.010
S2072	25.83	Intermittent		Unnamed Trib. to Sea Warrior Creek	Open Cut	108	1.5	0.004
S2069	25.95	Perennial		Unnamed Trib. to Sea Warrior Creek	Open Cut	280	4	0.026
S2071	25.95	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	28	1.5	0.001
S2070	26.00	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	9	1.5	0.000
S2068	26.08	Intermittent		Unnamed Trib. to Sea Warrior Creek	Open Cut	110	1.5	0.004
S2067	26.28	Perennial		Unnamed Trib. to Sea Warrior Creek	Open Cut	114	3.5	0.009
S1332	27.24	Intermittent		Unnamed Trib. to Sea Warrior Creek	Open Cut	111	2	0.005
S1331	27.25	Perennial		Sea Warrior Creek	Open Cut	35	12	0.008
S1328	27.33	Intermittent		Unnamed Trib. to Sea Warrior Creek	Open Cut	511	2.5	0.029
S1329	27.34	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	91	2	0.004
S2054	27.72	Perennial		Unnamed Trib. to Sea Warrior Creek	Open Cut	79	5	0.009
S2053	27.85	Intermittent		Unnamed Trib. to Sea Warrior Creek	Open Cut	53	2	0.002
P2002	27.86	Pond		Unnamed Pond	Open Cut	N/A	N/A	0.040
S9004	28.09	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	134	4	0.012
S9005	28.20	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	89	4	0.008
S9006	28.21	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	34	4	0.003
S9008	28.42	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	141	4	0.013
S9009	28.66	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	250	4	0.023
S9010	28.81	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	79	4	0.007
S2052	29.35	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	176	1	0.004
S2051	29.46	Ephemeral		Unnamed Trib. to Sea Warrior Creek	Open Cut	241	1	0.006
S9011	30.58	Ephemeral		Unnamed Trib. to Caney Creek	Open Cut	87	4	0.008
S1062B	31.01	Intermittent		Unnamed Trib. to Caney Creek	Open Cut	97	3	0.007
S1061	31.08	Perennial		Unnamed Trib. to Caney Creek	Open Cut	130	5	0.015
S1060	31.13	Perennial		Unnamed Trib. to Caney Creek	Open Cut	121	3	0.008
S1058	31.24	Intermittent		Unnamed Trib. to Caney Creek	Open Cut	46	1	0.001
S1057	31.24	Intermittent		Unnamed Trib. to Caney Creek	Open Cut	88	1	0.002
S1059	31.25	Intermittent		Unnamed Trib. to Caney Creek	Open Cut	66	1	0.002
S2224	32.41	Perennial		Unnamed Trib. to Santa Bogue Creek	Open Cut	302	3.5	0.024
S2225	32.55	Perennial		Unnamed Trib. to Santa Bogue Creek	Open Cut	150	12	0.037

Appendix D Waterbodies Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

S1295	32.60	Intermittent	(b)(7)f	Unnamed Trib. to Santa Bogue Creek	Open Cut	37	1.5	0.001
S1294	32.61	Intermittent		Unnamed Trib. to Santa Bogue Creek	Open Cut	107	1.5	0.004
S1037	32.68	Intermittent		Unnamed Trib. to Santa Bogue Creek	Open Cut	61	2.5	0.003
S1038	32.71	Perennial		Unnamed Trib. to Santa Bogue Creek	Open Cut	96	3	0.007
S1039	32.78	Ephemeral		Unnamed Trib. to Santa Bogue Creek	Open Cut	12	1	0.000
S1042	33.21	Intermittent		Unnamed Trib. to Santa Bogue Creek	Open Cut	26	2.5	0.002
S1044	33.50	Ephemeral		Unnamed Trib. to Santa Bogue Creek	Open Cut	32	1.5	0.001
S1046	33.64	Ephemeral		Unnamed Trib. to Santa Bogue Creek	Open Cut	87	2.5	0.005
S1047	33.69	Perennial		Unnamed Trib. to Santa Bogue Creek	Open Cut	96	3.5	0.013
S1049	33.71	Ephemeral		Unnamed Trib. to Santa Bogue Creek	Open Cut	35	2.5	0.002
S1048	33.72	Ephemeral		Unnamed Trib. to Santa Bogue Creek	Open Cut	187	2.5	0.011
S1050	33.72	Ephemeral		Unnamed Trib. to Santa Bogue Creek	Open Cut	27	1	0.001
S1051	33.78	Ephemeral		Unnamed Trib. to Santa Bogue Creek	Open Cut	101	2.5	0.006
S1052	33.82	Intermittent		Unnamed Trib. to Santa Bogue Creek	Open Cut	90	2.5	0.005
S1053	33.86	Perennial		Unnamed Trib. to Santa Bogue Creek	Open Cut	94	2.5	0.005
S2046	33.96	Intermittent		Unnamed Trib. to Santa Bogue Creek	Open Cut	135	3	0.009
S2045	34.04	Ephemeral		Unnamed Trib. to Santa Bogue Creek	Open Cut	102	2	0.005
S2044	34.46	Intermittent		Unnamed Trib. to Santa Bogue Creek	Open Cut	119	4	0.011
S2042	34.81	Intermittent		Unnamed Trib. to Elias Creek	Open Cut	107	2.5	0.006
S2026	35.17	Perennial		Unnamed Trib. to Elias Creek	Open Cut	87	2	0.004
S2027	35.67	Intermittent		Unnamed Trib. to Elias Creek	Open Cut	96	2.5	0.006
S2029	36.35	Ephemeral		Unnamed Trib. to Elias Creek	Open Cut	155	1.5	0.005
S2030	36.39	Ephemeral		Unnamed Trib. to Elias Creek	Open Cut	27	2.5	0.002
S2032	36.57	Perennial		Unnamed Trib. to Elias Creek	Open Cut	130	5	0.015
S1030	36.65	Intermittent		Unnamed Trib. to Elias Creek	Open Cut	90	3.75	0.008
S1029	36.77	Intermittent		Unnamed Trib. to Elias Creek	Open Cut	96	2.5	0.006
S1028	37.05	Perennial		Unnamed Trib. to Elias Creek	Open Cut	77	25	0.069
S1322	37.31	Ephemeral		Unnamed Trib. to Elias Creek	Open Cut	267	2	0.012
S1018	38.21	Perennial		Unnamed Trib. to Elias Creek	Open Cut	25	4	0.002
S1015	38.39	Intermittent		Unnamed Trib. to Elias Creek	Open Cut	102	2.5	0.006
S1014	38.68	Perennial		Unnamed Trib. to Elias Creek	Open Cut	92	3	0.006
S1013	38.71	Perennial		Unnamed Trib. to Elias Creek	Open Cut	105	3.5	0.008
S1010	38.86	Intermittent		Unnamed Trib. to Elias Creek	Open Cut	10	2	0.000
S1011	39.32	Intermittent		Unnamed Trib. to Tauler Creek	Open Cut	130	3.5	0.010
S1012	39.50	Intermittent		Unnamed Trib. to Tauler Creek	Open Cut	148	2.5	0.008
S2133	39.59	Ephemeral		Unnamed Trib. to Tauler Creek	Open Cut	100	1.5	0.003
S2023	40.30	Ephemeral		Unnamed Trib. to Tauler Creek	Open Cut	90	2	0.004
S2025	40.40	Ephemeral		Unnamed Trib. to Tauler Creek	Open Cut	93	2.5	0.005
S2024	40.44	Intermittent		Unnamed Trib. to Tauler Creek	Open Cut	48	3.5	0.004
S2024B	40.45	Intermittent		Unnamed Trib. to Tauler Creek	Open Cut	118	2.5	0.007
S1036	41.00	Ephemeral		Unnamed Trib. to Folsoms Creek	Open Cut	86	2.5	0.005
S1034	41.30	Ephemeral		Unnamed Trib. to Folsoms Creek	Open Cut	161	2.5	0.009

Appendix D Waterbodies Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

S2038	41.58	Ephemeral	(b)(7)f	Unnamed Trib. to Folsoms Creek	Open Cut	251	2	0.012
S2037B	41.74	Ephemeral		Unnamed Trib. to Folsoms Creek	Open Cut	190	2	0.009
S2036	41.96	Perennial		Unnamed Trib. to Folsoms Creek	Open Cut	87	12	0.030
S2035	42.21	Ephemeral		Unnamed Trib. to Folsoms Creek	Open Cut	92	1.5	0.003
S2040	42.36	Ephemeral		Unnamed Trib. to Folsoms Creek	Open Cut	109	1.5	0.004
S2041	42.50	Perennial		Folsoms Creek	Open Cut	101	3.5	0.008
S1025	43.26	Perennial		Unnamed Trib. to Tombigbee River	Open Cut	105	4	0.010
S1024	43.32	Intermittent		Unnamed Trib. to Tombigbee River	Open Cut	69	3.5	0.006
S1023	43.50	Perennial		Unnamed Trib. to Tombigbee River	Open Cut	90	3	0.006
S1020	43.59	Perennial		Unnamed Trib. to Tombigbee River	Open Cut	113	3.5	0.009
S1022	43.59	Intermittent		Unnamed Trib. to Tombigbee River	Open Cut	50	3.5	0.004
S1009	43.87	Intermittent		Unnamed Trib. to Smiths Creek	Open Cut	79	2.5	0.005
S2021	44.33	Intermittent		Unnamed Trib. to Smiths Creek	Open Cut	60	3	0.004
S2022B	44.35	Intermittent		Unnamed Trib. to Smiths Creek	Open Cut	103	2	0.005
S2168	44.55	Intermittent		Unnamed Trib. to Smiths Creek	Open Cut	99	2.5	0.006
S2167	44.61	Intermittent		Unnamed Trib. to Smiths Creek	Open Cut	83	3	0.006
S1005	45.13	Perennial		Smiths Creek	Open Cut	99	6.5	0.027
S1008	45.16	Ephemeral		Unnamed Trib. to Smiths Creek	Open Cut	94	1.5	0.003
S2161	45.31	Ephemeral		Unnamed Trib. to Smiths Creek	Open Cut	88	2	0.004
S2162	45.31	Ephemeral		Unnamed Trib. to Smiths Creek	Open Cut	82	2	0.004
S2164	45.36	Intermittent		Unnamed Trib. to Smiths Creek	Open Cut	111	2	0.005
S2019	45.98	Perennial		Unnamed Trib. to Smiths Creek	Open Cut	153	3	0.011
S2017	46.15	Perennial		Unnamed Trib. to Smiths Creek	Open Cut	97	4	0.009
S2018	46.15	Ephemeral		Unnamed Trib. to Smiths Creek	Open Cut	21	1.5	0.001
S2016	46.17	Ephemeral		Unnamed Trib. to Smiths Creek	Open Cut	220	1.5	0.008
S2222	48.26	Ephemeral		Unnamed Trib. to Tombigbee River	Open Cut	89	1.5	0.003
S2033	48.26	Perennial		Unnamed Trib. to Tombigbee River	Open Cut	88	3	0.006
S2034	48.28	Ephemeral		Unnamed Trib. to Tombigbee River	Open Cut	48	2	0.002
S2013	48.73	Perennial		Unnamed Trib. to Tombigbee River	Open Cut	110	5	0.013
S2014	48.81	Intermittent		Unnamed Trib. to Tombigbee River	Open Cut	154	1.5	0.005
S2014B	48.82	Intermittent		Unnamed Trib. to Tombigbee River	Open Cut	83	1.5	0.003
S2015	49.01	Perennial		Unnamed Trib. to Tombigbee River	Open Cut	63	1.5	0.002
S1003	49.30	Perennial		Unnamed Trib. to Tombigbee River	Open Cut	95	2.5	0.005
S1004	49.31	Perennial		Unnamed Trib. to Tombigbee River	Open Cut	52	2	0.002
S1261	51.08	Intermittent		Unnamed Trib. to Tombigbee River	Open Cut	440	3	0.030
S2002	51.60	Perennial		Unnamed Trib. to Tombigbee River	Open Cut	82	4.5	0.008
S1107	52.32	Perennial		Unnamed Trib. to Tombigbee River	Open Cut	143	15	0.264
S2004	53.35	Ephemeral		Unnamed Trib. to Tombigbee River	Open Cut	88	2	0.004
				Pipe Yard				
S1321	PY-02	Intermittent	(b)(7)f	Unnamed Trib. to Tombigbee River	Culvert/Temporary Matting	280	2.0	0.013

Appendix D Waterbodies Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

S2169	PY-02	Intermittent	(b)(7)f	Unnamed Trib. to Tombigbee River	Culvert/Temporary Matting	450	2.0	0.021
				Access Roads				
S1280	AR-06.8	Ephemeral		Unnamed Trib. to Bogueloosa Creek	Culvert/Temporary Matting	3	3	0.000
S1316	AR-06.8	Perennial		Unnamed Trib. to Bogueloosa Creek	Culvert/Temporary Matting	75	14	0.011
S1270	AR-08.9	Perennial		Buck Creek	Culvert/Temporary Matting	45	20	0.026
S2217	AR-09.5	Ephemeral		Unnamed Trib. to Rock Branch	Culvert/Temporary Matting	33	1.5	0.001
S2219	AR-09.5	Perennial		Rock Branch	Culvert/Temporary Matting	30	15	0.006
S1309	AR-16.2	Perennial		Unnamed Trib. to Golden Horn Branch	Culvert/Temporary Matting	1	2	0.000
S1310	AR-16.2	Perennial		Unnamed Trib. to Golden Horn Branch	Culvert/Temporary Matting	43	3	0.003
S1311	AR-16.2	Perennial		Unnamed Trib. to Golden Horn Branch	Culvert/Temporary Matting	30	2.5	0.002
S1317	AR-16.2	Perennial		Golden Horn Branch	Culvert/Temporary Matting	30	13	0.010
S2116	AR-16.2-EX	Perennial	(b)(7)f	Golden Horn Branch	Culvert/Temporary Matting	59	8	0.017
S2108	AR-17.3	Intermittent		Unnamed Trib. to Okatuppa Creek	Culvert/Temporary Matting	31	5	0.004
S2109	AR-17.3	Intermittent		Unnamed Trib. to Okatuppa Creek	Culvert/Temporary Matting	136	3.5	0.011
S2087	AR-18.5-EX	Ephemeral		Unnamed Trib. to Souwilpa Creek	Culvert/Temporary Matting	31	2	0.001
S2088	AR-18.5-EX	Intermittent		Unnamed Trib. to Souwilpa Creek	Culvert/Temporary Matting	56	1.5	0.002
S1106B	AR-20.3	Intermittent		Unnamed Trib. to McNish Branch	Culvert/Temporary Matting	9	3	0.001
S1085	AR-23.5-EX	Perennial		Unnamed Trib. to Turkey Creek	Culvert/Temporary Matting	6	7	0.005
S1334	AR-25.0	Intermittent		Unnamed Trib. to Sea Warrior Creek	Culvert/Temporary Matting	38	2	0.002
S1335	AR-25.0	Intermittent		Unnamed Trib. to Sea Warrior Creek	Culvert/Temporary Matting	30	3	0.002
S2223	AR-31.7	Perennial		Unnamed Trib. to Santa Bogue Creek	Culvert/Temporary Matting	33	3.5	0.003

Appendix D Waterbodies Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

S2224	AR-32.2-EX	Perennial		Unnamed Trib. to Santa Bogue Creek	Culvert/Temporary Matting	40	3.5	0.003
S2227	AR-32.4	Ephemeral		Unnamed Trib. to Santa Bogue Creek	Culvert/Temporary Matting	13	1	0.000
S2226	AR-32.4	Ephemeral		Unnamed Trib. to Santa Bogue Creek	Culvert/Temporary Matting	37	2.5	0.002
S1294	AR-32.4	Intermittent		Unnamed Trib. to Santa Bogue Creek	Culvert/Temporary Matting	30	1.5	0.001
S2225	AR-32.4	Perennial		Unnamed Trib. to Santa Bogue Creek	Culvert/Temporary Matting	49	12	0.012
S1302	AR-32.5	Perennial		Unnamed Trib. to Santa Bogue Creek	Culvert/Temporary Matting	32	4	0.003
S1303	AR-32.8	Perennial		Unnamed Trib. to Santa Bogue Creek	Culvert/Temporary Matting	31	10	0.017
S1306	AR-33.1	Intermittent		Unnamed Trib. to Santa Bogue Creek	Culvert/Temporary Matting	31	3	0.002
S1305	AR-33.1	Perennial		Unnamed Trib. to Santa Bogue Creek	Culvert/Temporary Matting	32	6	0.009
S2236	AR-35.1	Intermittent		Unnamed Trib. to Elias Creek	Culvert/Temporary Matting	32	2.5	0.002
S2028	AR-35.1	Perennial	(b)(7)f	Elias Creek	Culvert/Temporary Matting	30	18	0.023
S2232	AR-36.5	Intermittent		Unnamed Trib. to Elias Creek	Culvert/Temporary Matting	33	2.5	0.002
S2231	AR-36.6	Perennial		Unnamed Trib. to Elias Creek	Culvert/Temporary Matting	20	20	0.010
S1158	AR-37.5	Intermittent		Unnamed Trib. to Elias Creek	Culvert/Temporary Matting	23	1.5	0.001
P1007	AR-37.5	Pond		Unnamed Pond	Culvert/Temporary Matting	N/A	N/A	0.013
S2025	AR-40.2	Ephemeral		Unnamed Trib. to Tauler Creek	Culvert/Temporary Matting	32	2.5	0.002
S2025	AR-40.2-EX	Ephemeral		Unnamed Trib. to Tauler Creek	Culvert/Temporary Matting	38	2.5	0.002
S1153	AR-40.6	Perennial		Folsoms Creek	Culvert/Temporary Matting	30	9	0.018
S2037B	AR-41.5	Ephemeral		Unnamed Trib. to Folsoms Creek	Culvert/Temporary Matting	30	2	0.001
S2137	AR-41.5	Perennial		Folsoms Creek	Culvert/Temporary Matting	30	20	0.015
P2004	AR-41.5	Pond		Unnamed Pond	Culvert/Temporary Matting	N/A	N/A	0.000

Appendix D Waterbodies Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

Feature ID	Approximate MP	Type	Latitude Longitude	Name	Crossing Method	Stream Length (ft.)	Stream Width (ft.)	Temorary Impact (acres)
S1005	AR-44.8	Perennial	(b)(7)f	Smiths Creek	Culvert/Temporary Matting	30	6.5	0.007
S1148	AR-47.1	Ephemeral		Gaines Creek	Culvert/Temporary Matting	45	1	0.001
S1107	AR-51.9	Perennial		Unnamed Trib. to Tombigbee River	Culvert/Temporary Matting	30	15	0.037

Attachment D Wetlands Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

W1117 PEM	0.00	PEM	(b)(7)f	Open Cut	0.00	0.02	0.02	0
W2032 PFO	0.26	PFO		Open Cut	0.00	0.03	0.03	0
W2033 PFO	0.31	PFO		Open Cut	0.06	0.10	0.16	88
W2034 PFO	0.41	PFO		Open Cut	0.05	0.07	0.11	80
W2078 PFO	0.53	PFO		Open Cut	0.02	0.07	0.09	33
W2039 PFO	0.95	PFO		Open Cut	0.15	0.26	0.41	186
W2040 PFO	1.17	PFO		Open Cut	0.00	0.02	0.02	0
W2144 PFO	1.72	PFO		Open Cut	0.00	0.03	0.03	0
W1151 PFO	2.01	PFO		Open Cut	0.07	0.09	0.16	97
W1150 PSS	2.10	PSS		Open Cut	0.03	0.06	0.09	40
W1149 PFO	2.26	PFO		Open Cut	0.04	0.10	0.14	58
W2070 PSS	2.34	PSS		Open Cut	0.03	0.05	0.08	44
W2071 PSS	2.49	PSS		Open Cut	0.01	0.03	0.04	16
W2132 PEM	3.55	PEM		Open Cut	0.06	0.14	0.20	98
W2128 PFO	3.80	PFO		Open Cut	0.10	0.14	0.24	111
W2129 PFO	3.95	PFO		Open Cut	0.00	0.02	0.02	0
W2127 PFO	4.05	PFO		Open Cut	0.00	0.00	0.00	0
W2126 PFO	4.14	PFO		Open Cut	0.19	0.04	0.23	299
W2124 PFO	4.14	PFO		Open Cut	0.00	0.04	0.04	0
W2125 PFO	4.27	PFO		Open Cut	0.16	0.09	0.24	359
W2121 PEM	4.34	PEM		Open Cut	0.02	0.07	0.10	0
W2101 PFO	4.62	PFO		Open Cut	0.15	0.10	0.25	139
W2117 PFO	4.78	PFO		Open Cut	0.15	0.07	0.22	254
W2116 PFO	4.81	PFO		Open Cut	0.00	0.02	0.02	0
W1106 PSS	4.84	PSS		Open Cut	0.02	0.01	0.04	0
W2115 PFO	4.90	PFO		Open Cut	0.01	0.03	0.04	0
W2114 PFO	5.03	PFO		Open Cut	0.12	0.05	0.17	265
W2114 PEM	5.06	PEM		Open Cut	0.03	0.02	0.05	17
W2113 PFO	5.17	PFO		Open Cut	0.05	0.01	0.06	89
W2111 PFO	5.28	PFO		Open Cut	0.17	0.07	0.24	323
W2112 PEM	5.28	PEM		Open Cut	0.00	0.00	0.00	0
W2110 PFO	5.46	PFO		Open Cut	0.01	0.02	0.03	0
W1105 PFO	5.51	PFO		Open Cut	0.00	0.00	0.00	0
W2109 PFO	5.56	PFO		Open Cut	0.15	0.12	0.27	203

Attachment D Wetlands Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

Feature ID	Approx. MP	Type	Latitude	Longitude	Crossing Method	Operational Impacts (acres)*	Temporary Impacts (acres)	Total Impacts (acres)	Length Crossed by Pipeline Centerline (ft)
W2108 PFO	5.60	PFO	(b)(7)f		Open Cut	0.00	0.00	0.00	0
W2107 PFO	5.73	PFO			Open Cut	0.20	0.41	0.61	148
W2135 PFO	6.73	PFO			Open Cut	0.01	0.03	0.04	15
W2135 PSS	6.78	PSS			Open Cut	0.05	0.15	0.20	71
W2136 PFO	6.83	PFO			Open Cut	0.34	0.39	0.73	599
W1100 PEM	6.99	PEM			Open Cut	0.00	0.00	0.00	0
W1101 PEM	7.01	PEM			Open Cut	0.02	0.00	0.03	49
W1099 PEM	7.59	PEM			Open Cut	0.01	0.01	0.02	2
W1096 PFO	7.77	PFO			Open Cut	0.01	0.01	0.03	33
W1095 PFO	7.88	PFO			Open Cut	0.00	0.01	0.01	0
W1098 PFO	7.99	PFO			Open Cut	0.26	0.57	0.83	0
W1094 PFO	8.10	PFO			Open Cut	0.00	0.00	0.00	0
W1093 PEM	8.16	PEM			Open Cut	0.00	0.05	0.05	0
W1082 PEM	8.27	PEM			Open Cut	0.01	0.02	0.02	0
W1083 PEM	8.35	PEM			Open Cut	0.01	0.00	0.01	0
W1084 PEM	8.44	PEM			Open Cut	0.03	0.04	0.06	0
W1110 PSS	8.51	PSS			Open Cut	0.02	0.05	0.07	0
W1111 PEM	8.62	PEM			Open Cut	0.16	0.65	0.81	188
W1112 PFO	8.71	PFO			Open Cut	0.00	0.06	0.06	0
W1086 PEM	8.76	PEM			Open Cut	0.06	0.00	0.06	105
W1085 PEM	8.77	PEM			Open Cut	0.00	0.00	0.00	0
W1089 PFO	8.96	PFO			Open Cut	0.00	0.02	0.02	0
W1092 PEM	9.10	PEM			Open Cut	0.26	0.04	0.29	726
W1090 PEM	9.12	PEM			Open Cut	0.00	0.08	0.08	0
W2141 PFO	9.30	PFO			Open Cut	0.15	0.46	0.61	202
W2141 PEM	9.35	PEM			Open Cut	0.09	0.10	0.18	92
W2143 PSS	9.42	PSS			Open Cut	0.22	0.05	0.27	399
W2143 PEM	9.45	PEM			Open Cut	0.17	0.05	0.22	304
W2142 PEM	9.54	PEM			Open Cut	0.00	0.01	0.01	0
W2140 PFO	9.62	PFO			Open Cut	0.14	0.18	0.32	221
W2146 PEM	9.90	PEM			Open Cut	0.02	0.03	0.05	24
W2137 PFO	9.97	PFO			Open Cut	0.07	0.11	0.18	102
W2139 PFO	10.46	PFO			Open Cut	0.05	0.08	0.13	70
W2096 PFO	10.78	PFO			Open Cut	0.02	0.02	0.04	20

Attachment D Wetlands Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

W2093 PFO	10.82	PFO	(b)(7)f	Open Cut	0.01	0.02	0.03	13
W2082 PSS	11.68	PSS		Open Cut	0.04	0.06	0.09	52
W1051 PFO	12.65	PFO		Open Cut	0.02	0.04	0.06	41
W1050 PSS	13.17	PSS		Open Cut	0.02	0.13	0.15	11
W1050 PFO	13.21	PFO		Open Cut	0.07	0.10	0.17	101
W1049 PFO	13.35	PFO		Open Cut	0.04	0.06	0.11	66
W1049 PSS	13.35	PSS		Open Cut	0.00	0.00	0.00	0
W1048 PSS	13.80	PSS		Open Cut	0.02	0.02	0.04	56
W1065 PSS	13.99	PSS		Open Cut	0.05	0.07	0.12	73
W1066 PEM	14.25	PEM		Open Cut	0.06	0.07	0.13	92
W1053 PSS	14.31	PSS		Open Cut	0.01	0.01	0.02	11
W1054 PEM	14.33	PEM		Open Cut	0.06	0.11	0.16	83
W1054 PSS	14.34	PSS		Open Cut	0.08	0.15	0.23	114
W1054 PFO	14.37	PFO		Open Cut	0.08	0.11	0.19	114
W1055 PEM	14.41	PEM		Open Cut	0.04	0.06	0.10	56
W1056 PFO	14.58	PFO		Open Cut	0.01	0.09	0.10	17
W1059 PFO	14.82	PFO		Open Cut	0.03	0.04	0.07	39
W1058 PFO	14.94	PFO		Open Cut	0.04	0.06	0.10	52
W1057 PSS	14.95	PSS		Open Cut	0.01	0.02	0.03	18
W1064 PFO	15.02	PFO		Open Cut	0.00	0.03	0.03	0
W1064 PEM	15.04	PEM		Open Cut	0.04	0.05	0.09	55
W1061 PFO	15.53	PFO		Open Cut	0.01	0.04	0.05	0
W2081 PFO	15.73	PFO		Open Cut	0.02	0.03	0.05	32
W2080 PFO	15.89	PFO		Open Cut	0.00	0.02	0.02	0
W2079 PFO	16.01	PFO		Open Cut	0.03	0.04	0.08	46
W2077 PFO	16.09	PFO		Open Cut	0.00	0.00	0.00	0
W2076 PFO	16.22	PFO		Open Cut	0.02	0.04	0.06	31
W2076 PEM	16.31	PEM		Open Cut	0.02	0.04	0.06	32
W2074 PFO	16.43	PFO		Open Cut	0.25	0.35	0.60	378
W1079 PEM	16.49	PEM		Open Cut	0.01	0.00	0.01	12
W2027 PSS	16.54	PSS		Open Cut	0.06	0.12	0.18	95
W1078 PEM	16.61	PEM		Open Cut	0.00	0.01	0.01	0
W2025 PEM	17.05	PEM		Open Cut	0.30	0.62	0.92	430
W2066 PEM	17.20	PEM		Open Cut	0.04	0.08	0.13	62

Attachment D Wetlands Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

Feature ID	Approx. MP	Type	Latitude	Longitude	Crossing Method	Operational Impacts (acres)*	Temporary Impacts (acres)	Total Impacts (acres)	Length Crossed by Pipeline Centerline (ft)
W2065 PFO	17.33	PFO	(b)(7)f		Open Cut	0.14	0.21	0.35	203
W2065 PEM	17.35	PEM			Open Cut	0.03	0.03	0.06	42
W2067 PEM	17.56	PEM			Open Cut	0.66	1.04	1.70	964
W2068 PEM	17.79	PEM			Open Cut	0.59	0.90	1.49	847
W2068 PSS	17.92	PSS			Open Cut	0.21	0.31	0.53	315
W1076 PSS	18.32	PSS			Open Cut	0.02	0.08	0.10	19
W1075 PEM	18.40	PEM			Open Cut	0.00	0.02	0.02	0
W2053 PFO	18.46	PFO			Open Cut	0.25	0.40	0.64	354
W2050 PFO	18.70	PFO			Open Cut	0.04	0.04	0.07	62
W2051 PFO	18.71	PFO			Open Cut	0.00	0.00	0.00	0
W2054 PFO	18.91	PFO			Open Cut	0.07	0.11	0.18	102
W2054 PEM	18.98	PEM			Open Cut	0.37	0.62	0.98	528
W2056 PEM	19.15	PEM			Open Cut	0.02	0.04	0.06	22
W2103 PEM	19.26	PEM			Open Cut	0.02	0.11	0.13	31
W2104 PEM	19.32	PEM			Open Cut	0.00	0.10	0.10	0
W2058 PFO	19.59	PFO			Open Cut	0.21	0.35	0.55	306
W2061 PFO	19.73	PFO			Open Cut	0.01	0.01	0.02	21
W2062 PFO	19.97	PFO			Open Cut	0.04	0.04	0.08	52
W1045 PEM	20.55	PEM			Open Cut	0.00	0.00	0.00	0
W1044 PEM	20.56	PEM			Open Cut	0.01	0.01	0.02	8
W1043 PFO	20.79	PFO			Open Cut	0.05	0.08	0.12	75
W2049 PFO	21.15	PFO			Open Cut	0.24	0.37	0.62	359
W2049 PEM	21.23	PEM			Open Cut	0.01	0.03	0.03	0
W2048 PFO	21.44	PFO			Open Cut	0.06	0.10	0.17	89
W1031 PFO	22.03	PFO			Open Cut	0.00	0.01	0.01	0
W1031 PEM	22.13	PEM			Open Cut	0.48	1.44	1.92	695
W1037 PEM	23.30	PEM			Open Cut	0.00	0.02	0.02	0
W2041 PEM	25.45	PEM			Open Cut	0.00	0.02	0.02	0
W2047 PEM	25.59	PEM			Open Cut	0.00	0.00	0.00	0
W2046 PFO	25.64	PFO			Open Cut	0.06	0.10	0.16	70
W2045 PFO	25.82	PFO			Open Cut	0.04	0.02	0.06	68
W2044 PFO	26.00	PFO			Open Cut	0.04	0.05	0.09	51
W2043 PFO	26.07	PFO			Open Cut	0.03	0.05	0.07	38
W9003 PFO	27.13	PFO			Open Cut	0.74	1.32	2.06	1,069

Attachment D Wetlands Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

Feature ID	Approx. MP	Type	Latitude	Longitude	Crossing Method	Operational Impacts (acres)*	Temporary Impacts (acres)	Total Impacts (acres)	Length Crossed by Pipeline Centerline (ft)
W1154 PSS	27.27	PSS	(b)(7)f		Open Cut	0.30	0.66	0.96	441
W9012 PFO	27.30	PFO			Open Cut	0.00	0.03	0.03	0
W1152 PFO	27.35	PFO			Open Cut	0.14	0.31	0.45	228
W2042 PFO	27.60	PFO			Open Cut	0.00	0.04	0.04	0
W2038 PFO	27.73	PFO			Open Cut	0.39	0.55	0.94	551
W2037 PEM	29.22	PEM			Open Cut	0.00	0.01	0.01	0
W2036 PFO	29.35	PFO			Open Cut	0.01	0.02	0.03	13
W2035 PFO	29.45	PFO			Open Cut	0.03	0.03	0.06	41
W1029 PFO	31.07	PFO			Open Cut	0.09	0.10	0.18	127
W1028 PEM	31.10	PEM			Open Cut	0.01	0.01	0.02	19
W1027 PSS	31.24	PSS			Open Cut	0.05	0.06	0.11	73
W2151 PFO	32.53	PFO			Open Cut	0.02	0.02	0.04	36
W2151 PEM	32.53	PEM			Open Cut	0.01	0.02	0.03	16
W1120 PFO	32.55	PFO			Open Cut	0.00	0.00	0.00	0
W1017 PFO	32.72	PFO			Open Cut	0.05	0.08	0.13	75
W1018 PFO	32.78	PFO			Open Cut	0.06	0.09	0.14	84
W1020 PEM	32.88	PEM			Open Cut	0.01	0.01	0.02	11
W1022 PFO	33.20	PFO			Open Cut	0.40	0.65	1.06	623
W1025 PFO	33.68	PFO			Open Cut	0.01	0.02	0.02	0
W2031 PFO	33.96	PFO			Open Cut	0.06	0.09	0.15	88
W2090 PFO	34.46	PFO			Open Cut	0.04	0.04	0.08	53
W2030 PEM	34.80	PEM			Open Cut	0.03	0.08	0.11	42
W2017 PFO	35.17	PFO			Open Cut	0.04	0.07	0.11	61
W2018 PFO	35.67	PFO			Open Cut	0.12	0.18	0.29	171
W2021 PEM	36.59	PEM			Open Cut	0.00	0.00	0.00	0
W1015 PFO	36.65	PFO			Open Cut	0.00	0.01	0.01	0
W1014 PFO	37.04	PFO			Open Cut	0.23	0.31	0.54	333
W1011 PFO	38.20	PFO			Open Cut	0.05	0.08	0.13	74
W1010 PFO	38.70	PFO			Open Cut	0.15	0.23	0.38	223
W1009 PEM	39.58	PEM			Open Cut	0.02	0.02	0.03	23
W1009 PFO	39.59	PFO			Open Cut	0.00	0.02	0.02	0
W2014 PEM	39.67	PEM			Open Cut	0.00	0.00	0.00	0
W2015 PEM	39.71	PEM			Open Cut	0.07	0.07	0.14	112
W2016 PFO	40.30	PFO			Open Cut	0.01	0.03	0.04	21

Attachment D Wetlands Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

Feature ID	Approx. MP	Type	Latitude	Longitude	Crossing Method	Operational Impacts (acres)*	Temporary Impacts (acres)	Total Impacts (acres)	Length Crossed by Pipeline Centerline (ft)
W1016 PFO	40.45	PFO	(b)(7)f		Open Cut	0.04	0.04	0.08	55
W2024 PFO	41.63	PFO			Open Cut	0.00	0.01	0.01	0
W2023 PFO	41.75	PFO			Open Cut	0.06	0.07	0.13	76
W2028 PSS	42.35	PSS			Open Cut	0.01	0.02	0.02	2
W2029 PEM	42.36	PEM			Open Cut	0.00	0.01	0.01	0
W1012 PFO	43.27	PFO			Open Cut	0.07	0.10	0.17	111
W1013 PFO	43.50	PFO			Open Cut	0.00	0.01	0.01	0
W1008 PSS	43.80	PSS			Open Cut	0.04	0.10	0.14	61
W1008 PFO	43.88	PFO			Open Cut	0.08	0.10	0.17	124
W2105 PSS	45.60	PSS			Open Cut	0.00	0.00	0.00	0
W2012 PEM	47.29	PEM			Open Cut	0.02	0.03	0.05	33
W2009 PFO	48.27	PFO			Open Cut	0.04	0.07	0.11	66
W2010 PEM	48.79	PEM			Open Cut	0.00	0.04	0.04	0
W2011 PFO	49.01	PFO			Open Cut	0.04	0.04	0.07	59
W2011 PEM	49.01	PEM			Open Cut	0.00	0.03	0.03	0
W1007 PFO	49.31	PFO			Open Cut	0.06	0.11	0.17	79
W1007 PEM	49.32	PEM			Open Cut	0.00	0.01	0.01	0
W1006 PEM	49.79	PEM			Open Cut	0.00	0.01	0.01	0
W1005 PSS	49.86	PSS			Open Cut	0.00	0.01	0.01	0
W1005 PFO	49.90	PFO			Open Cut	0.03	0.19	0.22	40
W1004 PEM	50.04	PEM			Open Cut	0.09	0.14	0.23	130
W1073 PEM	51.09	PEM			Open Cut	0.00	0.01	0.01	0
W1074 PFO	51.15	PFO			Open Cut	0.02	0.09	0.11	39
W2002 PEM	51.34	PEM			Open Cut	0.00	0.01	0.01	0
W2003 PEM	51.47	PEM			Open Cut	0.00	0.00	0.00	0
W2004 PSS	51.59	PSS			Open Cut	0.00	0.07	0.07	0
W2004 PFO	51.59	PFO			Open Cut	0.16	0.16	0.32	218
W2001 PEM	51.95	PEM			Open Cut	0.00	0.01	0.01	7
W1001 PSS	52.17	PSS			Open Cut	0.00	0.02	0.02	0
W1001 PFO	52.22	PFO			Open Cut	0.34	0.47	0.81	506
W1001 PEM	52.23	PEM			Open Cut	0.01	0.13	0.15	0
W1002 PEM	52.29	PEM			Open Cut	0.03	0.14	0.17	26
W1002 PFO	52.33	PFO			Open Cut	0.03	0.04	0.07	56
W1003 PEM	52.45	PEM			Open Cut	0.00	0.01	0.01	0

Attachment D Wetlands Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

W1003 PFO	52.45	PFO	(b)(7)f	Open Cut	0.18	0.29	0.46	260
W2007 PEM	53.04	PEM		Open Cut	0.00	0.01	0.01	0
W2007 PFO	53.05	PFO		Open Cut	0.07	0.10	0.17	107
W2022 PEM	53.29	PEM		Open Cut	0.00	0.01	0.01	0
W2022 PFO	53.30	PFO		Open Cut	0.09	0.12	0.21	131
W2006 PSS	53.39	PSS		Open Cut	0.00	0.01	0.01	0
Pipe Yards								
W1129 PEM	PY-01	PEM	(b)(7)f	Temporary Fill	0.00	0.08	0.08	N/A
W1131 PEM	PY-01	PEM		Temporary Fill	0.00	0.00	0.00	N/A
W1140 PEM	PY-02	PEM		Temporary Fill	0.00	0.61	0.61	N/A
Access Roads								
W1117 PEM	AR-00.0	PEM	(b)(7)f	Permanent Fill	0.00	0.00	0.00	N/A
W2135 PSS	AR-06.7	PSS		Permanent Fill	0.11	0.00	0.11	N/A
W2135 PFO	AR-06.7	PFO		Permanent Fill	0.01	0.00	0.01	N/A
W1146 PEM	AR-06.7	PEM		Permanent Fill	0.08	0.00	0.08	N/A
W1147 PEM	AR-06.7	PEM		Permanent Fill	0.15	0.00	0.15	N/A
W2076 PEM	AR-16.2	PEM		Permanent Fill	0.00	0.00	0.00	N/A
W1132 PFO	AR-16.2	PFO		Permanent Fill	0.02	0.00	0.02	N/A
W1133 PSS	AR-16.2	PSS		Permanent Fill	0.00	0.00	0.00	N/A
W2027 PFO	AR-16.4	PFO		Permanent Fill	0.27	0.00	0.27	N/A
W1078 PEM	AR-16.4	PEM		Permanent Fill	0.02	0.00	0.02	N/A
W2067 PEM	AR-17.3	PEM		Permanent Fill	0.18	0.00	0.18	N/A
W2099 PEM	AR-17.3	PEM		Permanent Fill	0.00	0.00	0.00	N/A
W2100 PEM	AR-17.3	PEM		Permanent Fill	0.01	0.00	0.01	N/A
W2097 PFO	AR-18.5	PFO		Permanent Fill	0.02	0.00	0.02	N/A
W2097 PEM	AR-18.5	PEM		Permanent Fill	0.05	0.00	0.05	N/A
W2054 PFO	AR-18.5-EX	PFO		Permanent Fill	0.01	0.00	0.01	N/A
W2054 PEM	AR-18.5-EX	PEM		Permanent Fill	0.14	0.00	0.14	N/A
W1045 PEM	AR-20.3	PEM		Permanent Fill	0.00	0.00	0.00	N/A
W1037 PEM	AR-23.1	PEM		Permanent Fill	0.00	0.00	0.00	N/A
W1069 PFO	AR-40.6	PFO		Permanent Fill	0.35	0.00	0.35	N/A
W1001 PFO	AR-51.1	PFO		Permanent Fill	0.04	0.00	0.04	N/A
W1002 PEM	AR-51.1	PEM		Permanent Fill	0.02	0.00	0.02	N/A
W1114 PEM	AR-51.1	PEM		Permanent Fill	0.01	0.00	0.01	N/A

Attachment D Wetlands Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

Feature ID	Approx. MP	Type	Latitude	Longitude	Crossing Method	Operational Impacts (acres)*	Temporary Impacts (acres)	Total Impacts (acres)	Length Crossed by Pipeline Centerline (ft)
W2107 PFO	AR-05.8	PFO	(b)(7)f		Temporary Fill	0.00	0.16	0.16	N/A
W1100 PEM	AR-06.8	PEM			Temporary Fill	0.00	0.06	0.06	N/A
W1135 PEM	AR-06.8	PEM			Temporary Fill	0.00	0.05	0.05	N/A
W2146 PEM	AR-09.5	PEM			Temporary Fill	0.00	0.19	0.19	N/A
W2074 PFO	AR-16.2-EX	PFO			Temporary Fill	0.00	0.25	0.25	N/A
W2075 PSS	AR-16.2-EX	PSS			Temporary Fill	0.00	0.01	0.01	N/A
W2025 PEM	AR-16.8	PEM			Temporary Fill	0.00	0.37	0.37	N/A
W2067 PEM	AR-16.8	PEM			Temporary Fill	0.00	0.01	0.01	N/A
W2065 PEM	AR-16.8	PEM			Temporary Fill	0.00	0.14	0.14	N/A
W2025 PEM	AR-16.8-EX	PEM			Temporary Fill	0.00	0.33	0.33	N/A
W1157 PEM	AR-22.4	PEM			Temporary Fill	0.00	0.03	0.03	N/A
W1156 PEM	AR-25.0	PEM			Temporary Fill	0.00	0.00	0.00	N/A
W2037 PEM	AR-28.9	PEM			Temporary Fill	0.00	0.00	0.00	N/A
W2151 PEM	AR-32.2-EX	PEM			Temporary Fill	0.00	0.01	0.01	N/A
W2152 PEM	AR-32.4	PEM			Temporary Fill	0.00	0.02	0.02	N/A
W2154 PFO	AR-32.4	PFO			Temporary Fill	0.00	0.03	0.03	N/A
W1126 PEM	AR-32.5	PEM			Temporary Fill	0.00	0.01	0.01	N/A
W1127 PEM	AR-32.5	PEM			Temporary Fill	0.00	0.00	0.00	N/A
W1021 PSS	AR-33.1	PSS			Temporary Fill	0.00	0.05	0.05	N/A
W1128 PFO	AR-33.1	PFO			Temporary Fill	0.00	0.17	0.17	N/A
W2019 PFO	AR-35.1	PFO			Temporary Fill	0.00	0.20	0.20	N/A
W2165 PEM	AR-35.1	PEM			Temporary Fill	0.00	0.02	0.02	N/A
W2162 PEM	AR-36.5	PEM			Temporary Fill	0.00	0.02	0.02	N/A
W2164 PFO	AR-36.5	PFO			Temporary Fill	0.00	0.00	0.00	N/A
W2165 PFO	AR-36.5	PFO			Temporary Fill	0.00	0.00	0.00	N/A
W1158 PFO	AR-36.5	PFO			Temporary Fill	0.00	0.00	0.00	N/A
W2160 PFO	AR-36.6	PFO			Temporary Fill	0.00	0.02	0.02	N/A
W2161 PFO	AR-36.6	PFO			Temporary Fill	0.00	0.06	0.06	N/A
W2087 PFO	*AR-39.5*	PFO			Temporary Fill	0.00	0.13	0.13	N/A
W2088 PEM	AR-39.5	PEM			Temporary Fill	0.00	0.05	0.05	N/A
W2089 PFO	AR-39.5	PFO			Temporary Fill	0.00	0.00	0.00	N/A
W1115 PEM	AR-40.2-EX	PEM			Temporary Fill	0.00	0.02	0.02	N/A
W1006 PEM	AR-49.4	PEM			Temporary Fill	0.00	0.01	0.01	N/A
W1001 PFO	AR-51.8	PFO			Temporary Fill	0.00	0.00	0.00	N/A

Attachment D Wetlands Impacts Table
Lowman Pipeline Project
NextEra Energy Pipeline (Lowman), Inc.

Feature ID	Approx. MP	Type	Latitude	Longitude	Crossing Method	Operational Impacts (acres)*	Temporary Impacts (acres)	Total Impacts (acres)	Length Crossed by Pipeline Centerline (ft)
W1113 PSS	AR-51.8	PSS	(b)(7)f		Temporary Fill	0.00	0.00	0.00	N/A
W1001 PFO	AR-51.9	PFO			Temporary Fill	0.00	0.09	0.09	N/A
W1002 PEM	AR-51.9	PEM			Temporary Fill	0.00	0.00	0.00	N/A
W1002 PFO	AR-51.9	PFO			Temporary Fill	0.00	0.01	0.01	N/A
W1003 PFO	AR-51.9	PFO			Temporary Fill	0.00	0.00	0.00	N/A
W1003 PFO	AR-52.2	PFO			Temporary Fill	0.00	0.70	0.70	N/A
W2007 PFO	AR-52.7	PFO			Temporary Fill	0.00	0.10	0.10	N/A

* Operationial impacts include conversion of PFO to PEM for the pipeline.

Appendix E

CONSTRUCTION BEST MANAGEMENT PRACTICES PLAN

Construction Best Management Practices Plan (CBMPP)

Lowman Energy Pipeline Holdings

Lowman Pipeline Project

Plan Date: July 2020

Prepared By

July 2020

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List of Acronyms

ADEM	Alabama Department of Environmental Management
BMPs	Best Management Practices
CBMPP	Construction Best Management Practices Plan
ECDs	Erosion and Sediment Control Devices
GP	General Permit
MS4s	Municipal Separate Storm Sewer Systems
Lowman	Lowman Energy Resources
NPDES	National Pollutant Discharge Elimination System
Project	Lowman Pipeline Project
SDSs	Safety Data Sheets
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

_____ _____

[Name] Date

[Title]

1.0 SITE EVALUATION, ASSESSMENT, AND PLANNING

Lowman Energy Pipeline Holdings, Inc. (Lowman) is committed to meeting or exceeding applicable federal, state, and local environmental requirements during the planning, construction, and operation of their Lowman Pipeline Project (Project). In accordance with Section 401 of the Clean Water Act (CWA): State Certification of Water Quality, Lowman is committed to ensuring that construction activities associated with the Project do not negatively affect water quality, and are compliant with the Alabama Department of Environmental Management (ADEM) National Pollutant Discharge Elimination System (NPDES) General Permit (GP).

Lowman has prepared this Construction Best Management Practices Plan (CBMPP) to provide relevant site information and the implementation sequence for construction activities that require Best Management Practices (BMPs) for the purpose of minimizing erosion and sediment loss from the area of ground disturbance resulting from construction activities. In addition, the CBMPP describes general construction practices and BMPs to be implemented by Lowman or its contractor(s) during construction of the Project to minimize impacts on the environment. This document provides descriptions of the various BMPs to be implemented during installation of the pipeline to contain sediment and minimize runoff and erosion during equipment installation and restoration of areas disturbed by construction activities. This CBMPP will be kept onsite at construction yards during active construction activities.

1.1 Project/Site Information

The Project will be constructed and operated in Choctaw and Washington Counties, Alabama, and will consist of approximately 53.75 miles of 16-inch-diameter intrastate natural gas pipeline. In addition to the pipeline, the Project will include the construction of one new compressor station, three (3) meter stations, and a launcher/receiver facility. Following construction, Lowman will maintain a 30-foot-wide permanent easement. A site map of the Project is included in Appendix A. For information on stormwater controls refer to Section 4.0. The locations of where chemicals to be used and stored are discussed in the Spill Prevention, Control and Countermeasures (SPCC) Plan in Appendix B.

Area of Disturbance

Construction activities associated with the Project will result in approximately 729 acres of ground disturbance, and Table 1 describes the areas of disturbance associated with the Project. Due to the nature of Project construction, different disturbances may occur concurrently as construction progresses (Refer to the following sections for sequence of construction activities).

TABLE 1

Lowman Pipeline Project
Area of Disturbance

	Land Disturbed by Construction (acres)
Permanent Right-of-Way	186.5
Temporary Construction Right-of-Way	337.4

TABLE 1

Lowman Pipeline Project
Area of Disturbance

	Land Disturbed by Construction (acres)
Extra Temporary Workspaces	63.1
Access Roads	142.4
Total	**729.4**

The Project footprint identified on the project maps (Appendix A) and the estimates of potential soil disturbance summarized in Table 3 are based upon the proposed Project at the time of Lowman's draft of this CBMPP. Minor modifications to the Project, location or size of temporary workspaces, or additional access roads may occur. These changes may result from negotiations with the landowner or the need for additional or modified workspace necessary due to site-specific factors encountered during installation of the Project.

General Description of Areas of Disturbance

Lowman plans to use an 85-foot-wide temporary construction right-of-way for the majority of the pipeline route, with some additional temporary workspace (STWS) at road crossing, stream crossings, and other areas where needed. Following construction, Lowman30 feet to be retained as permanent right-of-way for operation of the new pipeline. Workspace associated with the construction and installation of pipelines requires careful planning to provide sufficient space and proper configuration to allow a safe work environment while satisfying regulatory obligations. The actual breakdown of workspace within the construction right-of-way (e.g., spoil storage areas, equipment travel lanes) will vary depending on site-specific conditions. The workspace configuration is generally comprised of three major elements: spoil storage, trench-line, and work area.

Spoil Storage

Construction of pipelines requires management of soils. Several factors ranging from soil type, depth of cover requirements, and land use must be accounted for when evaluating how much workspace will be reserved for spoil management. Where it is segregated, topsoil will generally be stored along the outer boundary of the construction workspace. Subsoil spoils originating from excavations will generally be stored between the topsoil and the excavated construction area.

Trench-line

Construction of pipelines must also dedicate workspace to the trench-line. Several factors including depth of cover requirements and soil types will influence the amount of space required for the trench-line. The pipeline will be 24 inches in diameter, and will typically require 100 feet of construction workspace to facilitate excavation. In order to meet standard industry safety requirements and construction BMPs, the base of the trench for these pipe diameters is typically 3 to 4 feet wide. The top of the trench is typically 4 to 5 feet wide, with the balance of the remaining space to remain vacant (without the weight of pipe or spoil in proximity) and undisturbed to minimize trench wall failure.

Work Area

The work area is the largest portion of the construction workspace. This space must accommodate equipment and various construction activities.

A portion of this space is dedicated to pipeline fabrication activities associated with field layout, welding, bending, coating, and testing. In addition to the space allocated to pipeline fabrication, this space is sized to allow for equipment operation and a travel lane for construction equipment and personnel to pass safely and unimpeded.

In addition to the construction right-of-way, Lowman will use extra temporary workspaces (ETWS) for staging areas; truck turnarounds; and utility, road, railroad, waterbody, and wetland crossings; and in areas of rocky soils, steep slopes, and rugged terrain. These temporary workspaces will be located adjacent and contiguous to the construction right-of-way. The permanent easement, temporary workspace, ETWSs, and any special restrictions are depicted on the construction drawings.

Lowman will use public roadways and private access roads to access the construction right-of-way. Use of private access roads (either existing or new) may require improvements or maintenance to provide access for construction personnel and/or delivery of construction materials and equipment.

Prior to the commencement of project activities, Lowman will clearly mark the boundaries of approved work areas. Construction activities are not permitted outside these areas. The total estimated areas to be disturbed within Alabama as a result of the project are summarized in Table 3.

Soils

The depth of topsoil to be segregated will depend on the soil conditions. In areas of deep topsoil, stripping to a maximum depth of 12 inches will generally be considered adequate to minimize impacts on agricultural soils. Additional workspace may be needed for spoil storage if more than 12 inches of topsoil are segregated. If less than 12 inches of topsoil are present, the Contractor will attempt to segregate to the depth that is present. The Environmental Inspectors and Lowman will work with the Contractor to determine topsoil depth to be stripped.

Restoration

Lowman intends to restore disturbed areas as near as practicable to pre-construction conditions following installation of the pipeline with the exception of permanent aboveground facilities (i.e., meter stations and valves). Lowman's contractors will permanently stabilize, by revegetating, non-cultivated areas disturbed by construction activities to prevent and minimize erosion with the exception of sites where impervious areas will be installed such as valve sites. Lowman does anticipate a slight increase in the runoff coefficient at the location of new impervious areas associated with valves and at locations where vegetation maintenance within the permanent pipeline right-of-way will prohibit the reestablishment of forest or shrub habitats.

1.2 Contact Information and Responsible Parties

Lowman and its contractor(s) are responsible for developing, implementing, maintaining, and revising the CBMPP. Lowman will be responsible for ensuring that the CBMPP and related plans and drawings are available at the Project field offices throughout construction; providing environmental inspectors to monitor performance and ensure compliance with this CBMPP and related plans; and providing training to construction personnel about Project sediment and pollution control measures. The CBMPP's responsible parties are identified in Table 2.

TABLE 2

Lowman Pipeline Project
Contact Information and Responsible Parties

Title	Company	Contact Information
Operator		
Environmental Permitting Manager	Lowman	Name: Mr. John Tessler Address: Phone: 561.694.4131 E-mail:
Environmental Inspector	TBD	Name: Phone: E-mail:
Contractor		
Superintendent	TBD	Name: Phone: Email:

The Contractor will be responsible for committing all necessary labor and equipment to implement and maintain the BMPs identified in this CBMPP and related plans; conducting additional workforce training as necessary; and performing regular inspection, maintenance, and repair of BMPs. Lowman's environmental inspectors will be responsible for training staff on sediment and pollution control measures, conducting regular inspections of BMPs, and ensuring that the Contractor is aware of BMPs requiring repair or maintenance.

1.3 Nature and Sequence of Construction Activity

General Description of Project Activity

Conventional pipeline construction is composed of specific activities that make up a linear construction sequence. These operations collectively include survey and staking of the right-of-way; clearing and grading; trenching; pipe stringing, bending, and welding; lowering the pipeline into the trench; backfilling the trench; hydrostatic testing; final tie-ins; commissioning; and right-of-way cleanup and restoration.

Pipeline construction activities such as clearing, grading, trench excavation, and backfilling, as well as the movement of construction equipment along the right-of-way will result in soil disturbance. Clearing removes protective cover and exposes soil to the effects of wind and precipitation, which may increase the potential for soil erosion and movement of sediments into sensitive environmental areas (such as waterbodies and wetlands). Grading and equipment traffic may compact soil, reducing porosity and percolation rates, which could result in increased runoff potential.

Grading of the construction right-of-way and ETWSs may be required in areas where the proposed pipeline route crosses steep slopes. Steep slopes often need to be graded down to a gentler slope to accommodate pipe bending limitations and provide level working areas to safely operate construction equipment. In such areas, the slopes will be cut away, and, after the pipeline is installed, reconstructed to their original contours during restoration.

Lowman has sized its construction workspace and ETWS to accommodate safe installation of the pipeline while minimizing the area resulting in soil disturbance and ultimately requiring restoration. Lowman assumes that the majority of the areas identified within the construction area and depicted on the maps in Appendix A will be disturbed by construction activities.

Sequence of Events

Pipeline construction occurs in a linear fashion and at any one time during the Project any of the activities below may be occurring. The typical sequence of construction activities for the Project is as follows:

- Stake the workspace boundaries and utilities;
- Clearing of construction area;
- Install temporary erosion and sediment controls
- Grade and stump removal, if necessary;
- Segregation of topsoil, where necessary;
- Pipe delivery, bending, and welding;
- Trenching;
- Pipe installation;
- Backfilling excavations;
- Cleanup and final grading;
- Soil compaction treatment, where necessary;
- Stone removal, where necessary;
- Within 14 days of stopping construction work (i.e., final grading or, after soil compaction treatment or stone removal, if needed) in an area, remove temporary erosion and sediment controls and install any necessary non-vegetative stabilization measures; and
- Vegetative stabilization for final stabilization.

Schedule

Construction of the Project is scheduled to begin on March 1, 2021. Restoration of the temporary construction area will commence immediately following the installation of the pipeline. Lowman anticipates that the Project will be operational in December 2021.

1.4 Receiving Waters

Construction of the pipeline will not result in distinguishable point source discharges or new outfalls to waterbodies and wetlands. Construction activities and grading of the right-of-way are generally considered temporary. The areas graded as a result of construction activities will be returned to their previous contours to the extent practicable following installation of the pipeline. Construction of the pipeline will not result in distinguishable point source discharges or new outfalls to waterbodies or wetlands. Appendix C contains complete tables of waterbodies and wetlands that may receive discharges from the Project area.

Lowman anticipates that impacts to waterbodies and wetlands as a result of construction activities will be short-term and temporary. Appropriate BMPs will be utilized as necessary to prevent sediments from leaving the project site and entering waterbodies and wetlands. The banks of each crossing will be reshaped, mulched, and, if required, seeded in accordance with Lowman's general Revegetation Plan to stabilize the crossing until permanent erosion control is implemented.

1.5 Potential Sources of Pollution

The primary potential pollutant source is disturbed soil from the construction area. Another potential pollutant source includes spillage of petroleum products as a result of equipment breakage. Refer to Lowman's SPCC Plan (Appendix B) and Section 3.0, below, for handling of hazardous materials such as fuels and lubricants and discussion of the construction site pollutants that may occur on site. Lowman does not anticipate that significant volumes of hazardous materials will be stored overnight within the construction area.

2.0 EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES

Lowman will ensure that erosion and sediment transport is minimized. Lowman will implement BMPs for erosion and sediment control, both structural and non-structural as described in this CBMPP to minimize run-off of sediments from the construction area. Lowman will use perimeter control around the Project area (e.g., filter berms, silt fences, etc.). BMPs are intended to reduce or eliminate any possible water quality impacts from stormwater flowing through the construction site. BMPs will be used to minimize erosion and sediment transport during construction of the project. BMPs will be selected and properly installed and maintained in accordance with specifications discussed below. BMPs are to be installed in accordance with manufacturer specifications.

BMPs will be designed to divert flows from exposed soils, filter runoff, or otherwise reduce sediment-laden runoff from entering surface water or stormwater conveyance systems (e.g., road ditches, grassed waterways). As stated, Lowman plans to use a combination of BMPs during the course of the Project to provide the best prevention and control of sediment erosion during construction related activities. Lowman will maintain BMPs in effective working condition and deficient BMPs noted during required site inspections will be addressed as soon as possible or immediately. It is the responsibility of the contractor to select best management practices appropriate to the location of the installation.

Temporary erosion and sediment control devices (ECDs) include, but are not limited to slope breakers, sediment barriers, stormwater diversions, mulch, and revegetation (See Appendix A for typical drawings). The goal of ECDs is to minimize wind and water erosion onsite, and prevent construction-related sediment from migrating offsite into sensitive resource areas such as streams (dry or flowing), wetlands, lakes, or cultural resource sites. The Contractor will, at all times, maintain erosion and sediment control structures as required in the project construction documents and as required by applicable permits. ECDs will be installed as necessary and in accordance with applicable permit conditions after initial clearing but before disturbance of the soil, and will be replaced by permanent ECDs, where applicable, as restoration is completed.

2.2 Buffers

The most effective erosion control BMP is the minimization of soil disturbance. Therefore, the Project has been designed to minimize the area that will be disturbed to the extent practicable, and has been sited

away from waterbodies. To the extent practicable, Lowman will leave a 25-foot natural riparian vegetative buffer adjacent to waterbodies crossed by the Project. At waterbodies where it is not practical to maintain a 25-foot natural riparian buffer, Lowman will supplement the crossing with additional erosion and sediment controls, combined, will achieve the sediment load reduction equivalent to a 25-foot natural buffer.

2.3 Structural Practices

Sediment controls are designed to divert flows from exposed soils, filter runoff, or otherwise reduce sediment-laden runoff from entering surface waters or stormwater conveyance systems (e.g., road ditches).

2.3.1 Erosion Controls

Lowman or its contractor will install erosion control blankets or mats on slopes greater than 30 percent or where necessary to minimize erosion upslope of sensitive areas (e.g., waterbodies and wetlands). Erosion control blankets, matting, and/or rip rap appropriately designed for the expected flows will also be installed on stream banks disturbed during construction and within defined stormwater conveyances (e.g., road ditches). The contractor will select erosion control blanket products suitable to the location of installation and the duration which the product is intended to perform. Installation of erosion control mats will be in accordance with the manufacturer's specifications.

Lowman will also implement measures necessary to minimize dust from leaving the project area to the extent practical. Lowman's contractors will implement dust suppression BMPs as necessary to prevent nuisance conditions and to prevent significant particle or dust generation resulting from construction activities. Lowman's general dust suppression methods include stabilization of temporary stockpiles, spraying of water on the construction right-of-way in areas of active construction, use of chemical suppressants (e.g., calcium chloride) on public or private roads, and enforcing a 30 mile-per-hour speed limit on unimproved roads.

2.3.1 Sediment Controls

BMPs to be used as sediment controls include silt fence, straw bales, mulch logs, and storm sewer inlet protection. These sediment controls are designed to keep sediment from flowing off the construction work area and into places where it may harm the environment. Lowman will install sediment controls around the perimeter of the Project construction area. Lowman will also install controls at the base of slopes adjacent to ditches, drainage channels, and other stormwater conveyance systems, if applicable, to prevent impact to adjacent environmental resources.

Temporary ECDs include, but are not limited to slope breakers, sediment barriers, stormwater diversions, trench breakers, mulch, and gravel. The goal of ECDs is to minimize wind and water erosion onsite, and prevent construction-related sediment from migrating offsite into sensitive resource areas such as streams (dry or flowing), wetlands, lakes, or cultural resource sites. The Contractor will, at all times, maintain erosion and sediment control structures as required in this CBMPP. ECDs will be installed as necessary and in accordance with site conditions after initial clearing but before disturbance of the soil, and will be replaced by permanent ECDs as restoration is completed.

In general, temporary sediment barriers will be installed at the edge of the construction area as needed, and/or in other areas determined by Lowman to prevent sediments from entering waterbodies and wetlands, if any. The actual layout of the silt fence to be installed in the field by the contractor will vary in accordance with the site-specific conditions present. Installation of BMPs will be overseen by Lowman's inspection staff to ensure that wetlands and waterbodies, if any, are adequately protected from runoff based upon the conditions present (e.g., slope, soil types).

Use of silt fence is preferred as the primary sediment barrier unless site-specific conditions (e.g., rock or stony soil) prevent proper installation. Temporary sediment barriers will typically be installed and maintained at side slope and downslope boundaries of the construction area adjacent to wetlands and waterbodies and at other locations as directed by Lowman's inspection staff. These locations may include the base of slopes adjacent to road ditches, stormwater conveyance systems (e.g., road ditches, grass waterways, inlets), along the edge of the approved work area, or other stormwater conveyances that are directly adjacent to the approved work area. Heavy duty silt fence is available for locations which are subject to high stormwater flows. Velocity dissipation devices (e.g., riprap, straw bales) must be installed at discharge locations as necessary to provide a non-erosive flow velocity between the structure and receiving waterbody.

A description of each BMP, installation method, and maintenance requirements are provided below.

Silt Fence

Installation

- Fence should be installed downslope of the Project;
- Silt fence stakes should be installed every 6 feet (maximum) and should be on the downslope side of the fence.
- Bottom of the fence should be trenched-in (typically 6 inches). Typically, the fencing material has a colored line indicating the depth that should be buried.
- The trenched-in silt fence should be backfilled.
- No gaps between the silt fence and the ground should be present.
- The joints of the silt fence should be wrapped with material so no gap exists between the joints.

Maintenance

- Sediment should be removed when it reaches one-half the height of the silt fence.
- Any fence that has fallen down or torn should be replaced.
- Where silt fence is failing due to the volume of captured sediment, straw bales may be installed behind the silt fence as reinforcement.
- A slope breaker may be installed upslope of the silt fence.
- Mulch should be installed on the exposed ground to reduce the sediment loss upslope of the silt fence.

Straw Bales

Installation

- Bales should be installed 4 inches below the surface grade.
- Bales should be staked properly, with one stake installed at a 45-degree angle into the abutting bale to eliminate gaps between the bales.
- Bale strings should be parallel to the ground.
    - The end bales should be angled upslope.

Maintenance

- Disintegrating bales should be replaced.
- Bales that have fallen apart may be broken up and used as mulch on the construction area (except in wetlands).
- Restake bales where gaps occur.
- Sediment should be removed when it reaches one-half the height of the bales.
- Where bales are not effective to contain sediment, this structure may be replaced with silt fence; or soil stabilization (e.g., mulch or erosion control blankets) may be installed upslope of the structure and if necessary, additional slope breakers at a closer spacing will be installed.

Mulch Logs

Installation

- Mulch logs should be installed 1 inch below the surface grade.
- Mulch logs should be staked properly and should not be able to be moved by lifting one end.
- The end of the mulch log should be angled upslope (e.g., like a smile).

Maintenance

- Mulch logs should be replaced when they begin falling apart.
- If the mulch log is being undermined by water flow; ensure the log is trenched in appropriately, if necessary, decreasing the spacing of the logs to reduce the velocity of the water flow.
- Sediment should be removed when it reaches one-third the height of the mulch log.

At tie-in locations and bore entrance and exit sites where excavations and spoil storage are necessary, excavated material must be placed in such a manner that if a storm event was to occur, the sediment would flow into the excavation. BMPs will be installed on the down slope side of the excavations to contain the sediment within the project area. The material storage should not impede any existing drainage, including curb gutters or storm drains.

Lowman will install additional sediment barriers (silt fence, straw bales, berms, or temporary seed) around spoil piles at perennial waterbodies. Where feasible, and as needed at ephemeral/intermittent drainages spoil piles that are to be left overnight, sediment barriers (e.g., silt fence) will be installed downslope of the spoil pile and/or the spoil pile will be covered using sheets of plastic or tarps that are securely fastened to the ground to contain the spoil. It is expected silt fence, earthen berms and straw bales will be used in most cases. Sediment barriers will be inspected daily in areas of active construction and repaired as needed throughout construction to maintain functionality. Sediment barriers shall be cleaned, repaired, and/or replaced as required (e.g., when sediment reaches one-half the height of the silt fence) and within 24 hours of discovery (refer to Section 6.0).

Construction dewatering may occur during construction activities. Discharges will be directed to well-vegetated upland areas and filtered as necessary to prevent silt-laden waters from entering wetland and waterbodies to the maximum extent practicable.

4.3.2 Sediment Track-Out

Sediment control BMPs will be installed to minimize soil disturbance and any sediment leaving the construction site. If necessary, a combination of crushed stone access pads, matting, and culverts will also be installed at ingresses and egresses to the construction site to minimize the tracking of sediments onto

paved roads. If sediment is tracked onto a paved road, street sweeping or scraping will be performed as necessary to minimize sediment leaving the construction site.

2.4 Use of Treatment Chemicals

Hazardous and potentially hazardous materials will be stored, handled, and transported in accordance with applicable laws, regulations, rules, or permits. Hazardous waste materials shall be stored in properly labeled containers. Each label will identify the contents in the container, indicate if the material is hazardous, and include a waste code and date of accumulation. The use of polymers, flocculants, or other treatment chemicals in the project area are provided within Lowman's SPCC Plan. Chemicals will not be stored and concrete coating activities will not be performed within 100 feet of wetlands or waterbodies. Refer to Lowman's SPCC Plan (Appendix B) for additional requirements pertaining to use and storage of chemical treatments.

Personnel who will have a role in handling, storing or otherwise managing hazardous waste will have training in accordance with applicable regulatory requirements and the manufacturer's recommendations. Personnel will be familiar with the hazards associated with particular wastes and appropriate safety procedures. Appropriate emergency response and spill equipment will be kept in an accessible area in accordance with Lowman's SPCC Plan (Appendix B).

2.5 Stabilization Practices

Stabilization practices include temporary and permanent measures designed to prevent erosion and sediment from leaving the construction site. This includes revegetation, installation of mulch and/or erosion control blankets, and preserving natural vegetation within the construction area to the extent possible.

Temporary stabilization is intended to minimize erosion of soil from wind and water. Installation of temporary seeding, mulch, and erosion control mats/blankets may be required by Lowman in site-specific locations if there are construction delays and/or there is a high potential for erosion to occur. The Contractor may be required by Lowman to install temporary stabilization materials based on site conditions. Temporary stabilization measures will be implemented to minimize erosion and for sediment control.

Lowman's contractor will initiate revegetation of temporarily disturbed areas as soon as soil conditions permit seedbed preparation and seed germination following installation of the pipeline.

- The Project area will be considered to have met the requirements for final stabilization if both of the following criteria are met:
- Seeded or planted areas will be monitored by Lowman until the ROW at all areas disturbed during construction activities, has achieved vegetative cover with a density of 85% of the pre-existing vegetation conditions on the ROW prior to the project construction phase; and
- In addition to seeding or planting areas to be stabilized, to the extent necessary to prevent erosion on the seeded or planted area, the Contractor must select, design, and install erosion control devices approved by the company Environmental inspection employee to insure sufficient erosion control during the pending warranty period.

Lands used for agricultural purposes (e.g., pipelines across crop or range land, staging areas for highway construction) that were disturbed during construction and that are restored to their reconstruction agricultural use are not subject to these final stabilization criteria.

Deadlines for Initiating and Completing Stabilization

Lowman will immediately initiate soil stabilization measures whenever earth-disturbing activities have permanently or temporarily ceased on any portion of the Project area. As soon as practicable, but no later than 14 calendar days after the initiation of soil stabilization measures Lowman will commence vegetative stabilization or will install or apply a non-vegetative measure.

Exceptions to the deadlines for initiating and completing stabilization may apply when drought-stricken areas exist on the Project. This includes extended time for establishment of vegetation.

3.0 GOOD HOUSEKEEPING BMPS

3.1 Material Handling and Waste Management

3.1.1 Solid Waste Disposal and Good Housekeeping

Non-hazardous wastes generated during construction will be containerized and properly disposed of off-site in compliance with state and federal requirements. Non-hazardous construction wastes include human waste, trash, pipe banding and spacers, waste from coating products, welding rods, timber skids, cleared vegetation, stumps, and rock. All wastes not native to the construction site will be disposed off-site at a licensed waste disposal facility.

Site inspections will include surveying the site for refuse, which will be disposed of as soon as possible. The contractor will not permit paper from wrapping or coating products or lightweight items to be scattered by the wind. Upon final stabilization, all synthetic erosion and sediment control structures will be removed from the Project area.

The contractor will provide portable, self-contained toilets during construction operations. Wastes from these units shall be collected for disposal at licensed and approved facilities. Portable toilets must be properly secured to prevent tipping by vandals or blowing over in wind events.

3.1.2 Hazardous Materials Handling

Secondary containment will be provided for any hazardous materials, including oil, fuels, coolants, and paint temporarily stored on the construction area. Safety Data Sheets (SDSs) for all hazardous materials will be maintained on site (refer to SPCC Plan in Appendix B). All employees dealing with hazardous materials will be informed of proper handling procedures.

In the event that hazardous wastes are generated during construction activities, such wastes will be stored and disposed of in compliance with state and federal regulations. Lowman will follow the procedures in its SPCC Plan for handling of hazardous materials such as fuels and lubricants (refer to Appendix B). Lowman does not anticipate that significant volumes of hazardous materials will be stored overnight within the construction area.

3.2 Concrete Washout and Related Waste

Concrete wash water has a high pH and contains high-levels of chromium which could pollute surface waters and/or groundwater. Concrete wash waters, grindings, slurry, or other related wastes may be produced as a result of construction activities. Lowman anticipates that use of uncured concrete during construction activities will be limited to the installation of piers and footings, etc. associated with installation at pump stations. Lowman does not anticipate that concrete coating of pump station joints or the manufacturing of concrete set-on weights will be conducted within the construction area.

The discharge of concrete washout or uncured concrete wastes to wetlands, waterbodies or storm drains is prohibited. Lowman's contractor will designate concrete washout facilities where pouring of concrete is planned. The contractor must post signs to identify the washout facilities. Washout facilities may include prefabricated watertight containers or facilities constructed on site such as bermed earthen structures or sumps lined with plastic sheeting. Concrete washout facilities should be sized to accommodate the amount of concrete wastes both liquid and solid to be generated at the site. The structure should also be sized with adequate freeboard to prevent overflow during discharge or following precipitation events.

Concrete washout facilities should be designed and sized to promote evaporation of liquids and curing of the concrete wastes prior to disposal. Facilities constructed on site should be constructed of multiple layers of thick plastic sheeting to prevent leaks and puncturing of the barrier. Washout facilities should be covered when precipitation is imminent to prevent precipitation collecting and intermingling with wastes or prolonging the curing of solids. Concrete washout and associated wastes are to be treated as a hazardous waste until all solids have cured. Once cured, the concrete solids may be disposed of as solid waste. Concrete washout facilities must be located at least 100 feet away from waterbodies and wetlands unless approved by Lowman.

3.3 Vehicle and Equipment Maintenance

Maintenance of vehicles and equipment will be conducted at contractor yards to the extent practicable. Lowman does not anticipate that vehicle or equipment maintenance will be conducted in the construction area, except in situations where the equipment is immobile and cannot be transported to a yard for maintenance or repairs. All repairs or maintenance will be conducted in accordance with Lowman's SPCC Plan which requires maintenance or repairs to be conducted at least 100 feet from wetlands and waterbodies unless approved by Lowman. Lowman's approval of each exception would be after consideration of the site conditions and additional measures or precautions that could be taken to contain potential pollutants. No wastes from vehicle or equipment repair or maintenance will be stored on the construction area.

5.3.5 Construction Spill Prevention and Reporting

The following practices will be followed during the course of the Project for spill prevention. To protect against accidental release of lubricant, coolant, or fuel; equipment will have catch pans and absorbing pads. The contractor will have equipment and materials on-site needed to prevent and/or contain an accidental spill. Equipment will be inspected each morning before work starts and frequently during the workday to check for leaks and to repair or replace hoses or connections that are in danger of failure.

Lowman will follow the procedures in its SPCC Plan when refueling equipment and storing hazardous liquids on the construction area (refer to Appendix B).

Fuels and Hazardous Materials Handling

- Refueling of equipment or hazardous material transfer will occur in designated areas only.
- No refueling or hazardous material transfer will occur within 100 feet of wetlands, waterbodies, springs, or wells, if any.
- Hazardous materials, including oils, fuels, and lubricants, will be stored 100 feet away from wetlands and waterbodies, if any. Construction equipment will also be staged 100 feet away from waterbodies and wetlands when parked/stored overnight.
- Lowman's approval of each exception would be after consideration of the site conditions and additional measures or precautions that could be taken to contain potential pollutants. For example, where conditions require that construction equipment (e.g., pumps used in trench dewatering) be refueled within 100 feet of state surface waters, sufficient oil and fuel containment booms, and absorbent materials will be on-hand to allow for rapid containment and recovery of a spill.

In the event of a spill, Lowman will follow procedures outlined in its SPCC Plan (Appendix B). Lowman will perform any necessary notifications to federal and state agencies following construction related spills as required by permits or applicable regulations. Soils contaminated by construction related spills will be removed from the construction site in accordance with federal and state regulations. If temporary storage of contaminated soils is required onsite, stockpiled soil will be covered with plastic sheeting to prevent potential contact with storm water.

3.2 Spill Prevention, Control, and Management

All spill prevention and response procedures have been incorporated into the SPCC Plan. Refer to the SPCC Plan in Appendix B.

3.3 Non-Stormwater Discharge Management

Allowable non-stormwater discharges include construction area dewatering, hydrostatic test water, water used to control dust, and waters used to wash vehicles and equipment, which will occur during the construction of the Project. Construction dewatering and dust control discharges could occur along any portion of the Project's disturbance area. To avoid pollutants from being discharged into surface waters, to the extent feasible, Lowman will minimize the generation of dust through dust suppression techniques. Waters used to wash vehicles and equipment will occur at designated areas. No vehicle or equipment washing using detergents or degreasers will be performed on the construction area. Cleaning of equipment and vehicles to prevent the spread of undesirable species may be required on the construction area to limit the spread of undesirable or invasive species. Lowman will construct an equipment cleaning station away from waterbodies and wetlands. Runoff from vehicle and equipment washing be allowed to enter waterbodies and wetlands.

4.0 INSPECTION, MAINTENANCE, AND CORRECTIVE ACTION

4.1 Inspections Personnel and Procedures

A pre-construction site inspection will be conducted prior to the placement of any BMPs and the commencement of land disturbing activities. Daily observations will be made where active construction is taking place across the Project, and site inspections will be performed by a qualified inspector at least once every **seven** (7) calendar days during construction activities at waterbody crossings until final stabilization has been achieved. For any portion of the site that discharges to a sediment or nutrient impaired water, inspection frequency is altered. In addition, where the Project is not located within a waterbody, inspections will occur at least once every 30 calendar days, and within 24 hours after precipitation events of 0.75 inches or greater within any 24-hour period. Inspections will be completed no later than **five** (5) days following the qualifying precipitation event. An inspection report will be filled out in its entirety after each inspection summarizing the scope of the inspection, the name of the inspector, the date of the inspection, any damages observed, and repairs made to any BMP. The completed inspection forms will be kept with the field copy CBMPP and forwarded to the Stormwater Team where each report must be signed and certified to be considered complete. The inspection will include the following actions:

- All controls will be inspected to ensure proper installation and placement;
- All site entrances and exits will be checked to ensure no off-site tracking of sediment. Sediments tracked onto public roads will be shoveled or swept off the road as soon as possible, but no later than end of the day;
- All inspection reports will be maintained for a minimum of 3 years after permit termination; and
- In addition to inspection reports, records will be kept of the following:
    - Dates when major grading activities occur;
    - Dates when construction activities cease in an area, temporarily or permanently; and
    - Dates when an area is stabilized either temporarily or permanently.

The following records will be maintained for at least 3 years following the completion of the project:

- CBMPP;
- Inspection records; and
- Operation and maintenance agreements (i.e., rights-of way, contracts, covenants, and other requirements for maintenance).

5.0 CORRECTIVE ACTION

All BMPs will be maintained in good working order. A copy of the inspection and corrective action form is located within Appendix D. The reports will be maintained by Lowman, in the event ADEM requests the report and all reports must be signed and certified to be considered complete. Within 24 hours of discovery, installation of a new or modified control, or repair will be completed, but no later than **five** (5) calendar days from the time of discovery. If the installation or repair cannot be completed within 5

calendar days, the inspector will document why it was infeasible within the given timeframe and make it operational as soon as practicable after 5 days. Lowman will promptly take all reasonable steps to remove, to the maximum extent practical, pollutants deposited offsite or in any waterbody or wetland.

Where corrective actions result in changes to controls or procedures within the CBMPP, Lowman will modify the CBMPP accordingly after completing the corrective action task.

6.0 STAFF TRAINING

The personnel responsible for the following activities, at a minimum, will receive training:

- Responsible for the design, installation, maintenance, and/or repair of all stormwater controls;
- Responsible for the application and storage of treatment chemicals;
- Responsible for conducting inspections; and
- Responsible for taking corrective actions.

All training will be documented and recorded by Lowman, and will conducted in accordance with ADEM's NPDES GP.

7.0 DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS

All documentation for compliance with other Federal requirements is retained by Lowman and available upon request.

Appendix F

SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN

Lowman Energy Pipeline Holdings
Lowman Pipeline Project

Spill Prevention, Control and Countermeasure Plan

Prepared by:

EDGE Engineering & Science

July 2020

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1.0 GENERAL DESCRIPTION OF SPILL PREVENTION, CONTROL AND PLAN

Lowman Energy Pipeline Holdings (Lowman) is committed to meeting or exceeding applicable federal, state, and local environmental requirements during the planning, construction, and operation of the Lowman Pipeline Project (hereby referred to as the Project).

This Spill Prevention, Control and Countermeasure (SPCC) Plan was developed to establish basic procedures to prevent the discharge of hazardous or regulated materials during construction of the Project. The Spill Plan is a guideline that sets forth minimum standards for the prevention of spills (handling and storing regulated substances) and for the minimization of impacts resulting from spills of fuels, petroleum products, or other regulated substances as a result of pipeline construction should a spill occur. This document is not a complete summary of all requirements.

The provisions of this Spill Plan will be implemented by project personnel during the construction of Project. The Contractors (i.e. pipeline construction general contractor and reclamation contractor) are responsible for understanding and complying with all applicable federal, state, and local requirements related to all aspects of work on the Project, including the transportation, storage, and disposal of polluting and hazardous materials.

This plan identifies:

- Measures taken for spill preparedness and prevention
- Emergency response procedures describing the actions that Lowman and Contractor personnel will take in response to leaks, spills, or discharges of oil and hazardous substances/materials
- Designated emergency coordinator(s) and his/her responsibilities
- Spill incident reporting procedures
- Contact numbers for the local police and fire departments, hospitals, and state and local emergency planning committees

Prior to the start of construction in an area, the Contractor shall designate storage, refueling, loading, and unloading locations that minimize the environmental and safety impacts associated with releases of fuel, lubricants, or hazardous substances. These areas will be designated using the following guidelines.

- Refueling shall not occur within 100 feet (ft) of a waterbody or in an upland area less than 100 ft from a wetland boundary without Lowman Environmental Inspector coordination and approval.
- Hazardous materials, including chemicals, fuels, and lubricating oils, shall not be stored within 100 ft of a wetland, waterbody, or designated municipal watershed area without Lowman Environmental Inspector coordination and approval.
- Refueling and storage of hazardous materials, including chemicals, fuels, and lubricating oils is prohibited within 200 ft of private wells and 500 ft of community and municipal wells.
- No potentially hazardous materials, other than essential equipment fuels (gasoline, diesel, etc.) or standard lubricants (engine oils, grease, etc.) shall be transported into the right-of-way or construction area without Lowman Environmental Inspector coordination and approval.

CONTRACTOR will be required to comply with all applicable requirements of 40 CFR 112, Oil Pollution Prevention, for any facility set up for the storage of fuel, oil, or other hydrocarbons, or refueling of vehicles and equipment, if the facility triggers compliance with the rule. This would include the development and implementation by CONTRACTOR of a Spill Prevention, Control, and Countermeasures (SPCC) Plan if necessary.

2.0 SPILL AND LEAK PREVENTION AND PREPAREDNESS

2.1 PREVENTION AND PREPAREDNESS

The Contractor will take the following precautions to prevent a spill from occurring and to be prepared in the event that a spill does occur.

2.1.1 Containers

- All containers shall be stored on pallets and surrounded with temporary containment.
  - Small cans of gasoline, diesel, solvents, etc., should be stored within the temporary containment when not in use.
  - No incompatible materials shall be stored in the same containment area.
- Containment areas shall be capable of containing 110% of the volume of the largest container in the storage area plus sufficient freeboard for rainfall.
  - All container storage areas shall be inspected daily for leaks and deterioration.
- Leaking or deteriorated containers shall be replaced as soon as the condition is first detected.
- Container storage areas shall be secured during non-working hours.
- Any accumulated rainwater in the containment areas shall be inspected for sheens and indications of any other hazardous materials prior to release to the ground, and if a sheen or hazardous substance is detected, Lowman will properly dispose of the rainwater.

2.1.2 Tanks

- The contractor shall operate only those tanks for fuel and material storage that meet the approval of Lowman. Single wall tanks shall be provided with temporary containment as described in Section
  2.1.1 for Containers.
- Self-supporting tanks shall be constructed of carbon steel or other materials compatible with the contents of each tank.
- All tanks and storage areas shall be inspected daily for leaks and deterioration.
- Vehicle mounted tanks shall be equipped with flame/spark arrestors on all vents to ensure that self- ignition does not occur.
- Tanks will not be used to store incompatible materials in sequence unless first thoroughly decontaminated.

2.1.3 Loading/Unloading Areas

- Transferring of liquids and refueling shall only occur in pre-designated locations at least 100 feet from all waterbodies and wetlands, 200 feet from any water well, and 500 feet from municipal or community water supply wells unless prior approval is obtained from the Lowman Environmental Inspector.
- All loading/unloading areas will be inspected for spills prior to and immediately after each use and closely monitored during use to prevent leaks and spills, and ensure immediate response in the event of a spill.
- All hose connections shall be inspected for leaks. If leaks should occur, the operation shall cease until the leak is repaired or a containment pan is placed under the leaking connection.

2.1.4 Equipment

- Contractor is to ensure that all equipment operating on the project is in good working order and free of any leaks.
- The Environmental Inspector has the authority to require the contractor to remove a piece of equipment from the project if it is found to be leaking hazardous fluids on the ground and is not repaired by the contractor.

2.1.5 Spill Response Kits

- Any service vehicle used to transport lubricants and fuel must be equipped with an oil spill response kit adequately stocked to respond to a minor oil/fuel spill event.
- Chemical spill response kits, adequately stocked to respond to a minor chemical spill event, shall be available in areas where appropriate.
- Additionally, spill response kits shall be available on the right-of-way and on or near operating equipment as deemed appropriate by the Lowman Environmental Inspector.
- Equipment such as hydraulic track hoes and hydraulic pumps that could fail and cause a reportable spill must be equipped with an oil spill response kit adequately stocked to respond to a minor oil/fuel spill event.

2.2 EMPLOYEE TRAINING

All personnel involved in the construction of the proposed facilities will be trained on the contents of the SPCC Plan. Training briefings will be conducted by the Contractor Superintendent or his designee and the Lowman Environmental Inspector on the job site.

2.3 SPILL RESPONSE EQUIPMENT

The construction project will have adequate manpower and equipment necessary to divert any spill from reaching water bodies and wetland areas. Emergency equipment may include, but is not limited to, shovels, backhoes, dozers, front-end loaders, oil absorbent booms, pillows, socks and/or mats and chemical absorbent pulp, pillows, socks and/or mats.

3.0 INITIAL SPILL RESPONSE PROCEDURES

This section provides a description of spill response procedures to be performed to address spills that occur during this construction project.

3.1 COMPANY AND CONTRACTOR RESPONSIBILITIES

The Contractor and Lowman on-site personnel have responsibilities for spill prevention and response. **In addition to the oversight of initial spill response activities, Lowman's Environmental Inspector and Environmental Project Manager will determine if state and/or Federal notifications are required and make notification accordingly.**

The Contractor will have a designated Environmental Coordinator for the site. The Contractor's Environmental Coordinator will be responsible for the Contractor's initial spill response activities. The responsibilities of the Contractor and Lowman will be as follows:

3.1.1 Contractor Responsibilities

- The Contractor will be responsible for taking immediate action to safely control and contain any spills or releases of oil, petroleum products, and hazardous substances/materials.
- All spills or releases, including any sheen created on water or releases to the atmosphere, must be reported immediately to the Lowman Environmental Inspector.
- The Contractor shall supply necessary manpower and equipment to control, contain, and clean up all spills and releases resulting from their operations.

3.1.2 Lowman Environmental Inspector Responsibilities

- Lowman's Environmental Inspector or his designee will be responsible for making notifications to the Environmental Project Manager and Construction Manager upon identification of a spill and release.
- Lowman will be responsible for the oversight of the initial spill response activities.
- Lowman will provide supporting personnel and equipment to address releases as required.
- In the event of a spill, the Environmental Inspector shall obtain as much information as possible regarding the cause of the event, the type and amount of material spilled or released, and corrective measures or response activities being taken.
- Consult the Lowman Environmental Project Manager immediately and determine if the spill or release is a reportable event. The Environmental Inspector will also notify the Lowman Field Construction Office for releases of:
  - one pound or more of a solid material
  - five gallons or more of a liquid material
  - any spill to water, including any sheen on water
- Obtain a copy of the Contractor's written spill report as soon as it is available and forward a copy to the Environmental Project Manager.

3.1.3 Lowman Environmental Project Manager Responsibilities

- Upon receiving spill information from the Environmental Inspector, determine if the release requires reporting to any Federal, state, or local regulatory agencies. At a minimum, the following agency shall be notified immediately upon detection of a spill:
  - Alabama Department of Environmental Management
- If reporting is required, direct the Environmental Inspector to notify the appropriate regulatory

agencies. This includes both verbal and any follow-up written reports.

- Contact outside remediation services if necessary, in coordination with the Lowman Environmental Inspector, to assist with incidents that require additional resources.

3.1.4 Reporting Requirements

The Alabama Department of Environmental Quality requires notification for the following conditions:

- When in doubt about the reportable nature of a release, call the Alabama Department of Environmental Management's (ADEM) 24-hour spill hotline at 251.450.3400.
- Complete a Discharge Reporting Form to document information related to the discharge.
- Petroleum Based Spills
  - Spills into or involving state waterways (any amount)
  - Spills greater than 25 gallons (or potential > 25 gallons)
  - Spills requiring any state/Federal notifications or assistance
  - Chemical spills
  - All SARA/EHS/CERCLA Releases
  - All spills threatening population or the environment
  - All spills requiring evacuation
- Weather
  - Any incident associated with weather phenomena involving possible or actual damage to property or persons (i.e. wind damage, tornadoes, lightning strikes, flooding)
- Transportation
  - Incidents involving major thoroughfare closures
  - All aircraft incidents
  - All railroad incidents
  - Incidents involving mass casualties
  - All major incidents involving commercial vehicles/vessels
- Fire
  - Major forest fires
  - Fires involving chemicals or significant amounts of petroleum products
  - Large or multiple structure fires
- General
  - Sinkholes
  - Public water source contamination
  - National security
  - Medical waste
  - Immigration issues
  - Potential/actual dam failures
  - Incidents with potential effects to adjacent countries/states
  - Incidents requiring assistance from state/Federal agencies
  - Incidents with a prolonged effect on public utilities
  - Incidents involving potential or actual evacuations

3.2 UNPLANNED AND PLANNED NATURAL GAS RELEASES

3.2.1 Unplanned Natural Gas Releases

Unplanned natural gas releases may be reportable events in Alabama; depending on the quantity of natural gas that is released. In the event that an unplanned release of natural gas occurs during activities related to the project the Project Manager will immediately be notified of the event. If a reportable quantity of natural gas is released, Lowman will submit a report to the Alabama Department of Environmental Quality (ADEM) in accordance with all applicable regulations.

3.2.2 Planned Natural Gas Releases

In Alabama, planned releases of natural gas to the atmosphere, such as blowdowns, prior notification and/or approval are generally not required. In the event that a planned release of natural gas is scheduled to occur during activities related to the project the Project Manager shall contact the Lowman Environmental Inspector a minimum of two weeks prior to the event and confirm that the release is documented and recorded according to applicable state regulations.

3.3 SPILL CLEAN-UP AND WASTE DISPOSAL

Spill clean-up and subsequent waste disposal of contaminated media will be the responsibility of the Contractor subject to the approval of the Lowman Environmental Project Manager.

4.0 KEY EMERGENCY CONTACTS

The key personnel who will be contacted in the event of an emergency or spill incident include the following: **(Information to be provided prior to construction.)**

1) Lowman Emergency Contacts

Lowman Emergency Coordinator: **TBD**

Field Construction Office: **TBD**

Environmental Project Manager: **TBD**

Area Office (in case of pipeline liquid spills): **TBD**

2) Contractor Emergency Contact

Contractor Emergency Coordinator: **Contractor Superintendent**

3) Local Authorities

Department	Phone
Alabama State Police	256.353.0631
ADEM	251.450.3400
Local Police	TBD

LOWMAN Pipeline

Non-Emergency

July 2020

Local Fire Department

Hospital

Ambulance

THIS TABLE TO BE COMPLETED BY LOWMAN PRIOR TO CONSTRUCTION

Appendix G

HORIZONTAL DIRECTIONAL DRILL AND CONTINGENCY PLAN

Lowman Pipeline Project

Horizontal Directional Drill Contingency Plan

REVISED JULY 2020

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ACRONYMS

ADEM	Alabama Department of Environmental Management
CI	Chief Inspector
CM	Construction Manager
EI	Environmental Inspector
HDD	Horizontal Directional Drilling
IR	Inadvertent Return
Project or Lowman Project	Lowman Pipeline Project
PC	Permit Coordinator

1.0 INTRODUCTION

Horizontal Directional Drilling ("HDD") is a trenchless excavation method that is accomplished in three phases. The first phase consists of drilling a small diameter pilot hole along a designed directional path. The second phase consists of enlarging the pilot hole to a diameter suitable for installation of the pipe. The third phase consists of pulling the pipe into the enlarged hole. HDD is accomplished using a specialized horizontal drilling rig with ancillary tools and equipment. A properly executed HDD crossing will allow for the pipeline to be installed in a minimally invasive manner.

The HDD method is proposed for NextEra Energy Resources' (NextEra) Lowman Pipeline Project (Project) at multiple locations in Choctaw and Washington Counties, Alabama.

The inadvertent return ("IR") of drilling lubricant is a potential concern when HDD methods are utilized. The HDD procedure for these crossings will utilize bentonite for drilling lubricant. In general, IRs can occur because of existing rock fractures, low density soils, or unconsolidated geology. There is a potential for inadvertent returns to directly impact surface and ground waters via existing or enhanced fracture zones or if there is a release upland which flows over ground into wetlands or streams.

The purpose of this HDD Contingency Plan is to:

- Minimize the potential for an IR associated with HDD activities
- Provide for the timely detection of an IR.
- Protect areas that are considered environmentally sensitive (streams, wetlands, other biological resources, cultural resources).
- Provide an organized, timely, and "minimum-impact" response in the event of an IR.
- Provide that all appropriate notifications are made to the appropriate regulatory agencies, and that documentation is completed.
- Provide an alternative crossing method if the HDD is deemed unsuccessful.

Table 1 - Proposed HDD Locations

Crossing Name	Pipeline Diameter (inches)	Approximate Entry Milepost	Approximate Exit Milepost	Total Length (feet)	Subsurface Material
Project Component Name					
Bogueloosa Creek	16	5.9	6.4	2763	**Geotechnical Bores Pending
S2037 (Okatuppa Creek)	16	16.6	16.9	1313	Sandy Elastic Silt
S2091 (Souwilpa Creek)	16	19.1	19.4	1500	Elastic Silt with Sand
S1065 (Turkey Creek)	16	22	22.5	2517	Fat Clay/Silty Sand/Silt

S1040 (Santa Bogue Creek)	16	32.7	32.9	1000	Sand/Sandy Elastic Silt
S2028 (Elias Creek)	16	35.6	35.8	1110	Sandy Elastic Silt/Silty Clayey Sand
Tauler Creek	16	39.7	40	1627	Silty Clayey Sand/Elastic Silt/Fat Clay/Sandy Elastic Silt
Railroad/Lowman Pond	16	53.4	53.8	2450	Sandy Fat Clay/Silty Sand

2.0 PERSONNEL AND RESPONSIBILITIES

The actions in this HDD Plan are to be implemented by the following personnel:

Construction Project Manager – A Construction Project Manager (CM) has authority over all aspects of the field work during construction. The Chief Inspector reports directly to the CM and the CM has final approval over all field decisions for the project.

Chief Inspector – The Project will designate a Chief Inspector ("CI") for the Project. The CI has overarching authority over all inspection activities occurring throughout the Project and works directly with the contractor.

Environmental Inspector – The Project will designate a minimum of one Environmental Inspector ("EI") to monitor HDD activities. The EI(s) will monitor the HDD alignment for IRs and other signs of environmental impact (such as sinkhole development or subsidence over the alignment). The EI is in the same peer group with all other inspectors and reports directly to the CI. The EI has authority to stop any activities which are out of compliance with the Project 404/401 Water Quality Certification (if applicable), other applicable permits, or landowner requirements. Additionally, the EI can order corrective action.

HDD Superintendent – The HDD contractor's senior representative on-site is the HDD Superintendent. It is the HDD Superintendent's responsibility to implement this HDD Plan on the contractor's behalf. The HDD Superintendent must be familiar with all aspects of the drilling activities, the contents of this HDD Plan and the conditions of approval under which the activity is permitted. The HDD Superintendent will maintain a copy of this HDD Plan on all drill sites and distribute, as appropriate, to construction personnel. The HDD Superintendent ensures that workers are properly trained and familiar with the necessary response procedures to implement should there be an inadvertent release.

HDD Operator – The HDD operator is employed by the HDD contractor to operate the drilling rig, driller and fluid pumps. The HDD Operator is responsible for monitoring circulation through entry and exit locations as well as annular pressures during the drilling of the pilot-hole. Should circulation loss or higher than expected annular pressures occur, the HDD Operator must communicate the relevant details of this event to the HDD Superintendent and HDD contractor field crews as well as the on-site Project inspection

staff. The HDD Operator is responsible for stopping or changing the drilling program in the event of observed or anticipated inadvertent returns.

HDD Contractor Personnel – During HDD installation, field crews and the Project's field representatives will be responsible to monitor the HDD alignment. Field crews will coordinate with the EI and are responsible for timely notifications and responses to observed releases in accordance with this HDD Plan. The EI ultimately must sign off on corrective action plans mitigating releases.

Permit Coordinator (PC) – Company individual(s) that is accountable for all permit approvals and communication with respective agencies for the project.

3.0 PRE-CONSTRUCTION ACTIVITIES

Prior to implementation of the HDD, the Project and the contractor will identify the potential for inadvertent releases at the HDD location. The review will include a visual review of entry and exit points, and entire HDD drill path. The contractor will review the Project's HDD Geotechnical Investigations Report, which may include descriptions of subsurface conditions, laboratory testing, design recommendations, and construction recommendations.

In addition, private water supplies within 150 feet, if identified, will be protected by implementing the following measures:

- The drilling contractor will review the site conditions prior to the start of work.
- Construction limits will be clearly marked.
- Barriers will be erected between the bore site and nearby sensitive resources prior to drilling as per the Project-specific Erosion and Sediment Control Plan.
- On-site briefings will be conducted for the workers to identify and locate sensitive resources at the site.
- Provide that all field personnel understand their responsibility for timely reporting of IRs.
- Maintaining necessary response equipment on-site and in good working order.

The primary areas of concern for IRs occur at the entrance and exit points where the drilling equipment is generally at their shallowest depths. The likelihood of an IR decreases as the depth of the pipe increases.

To minimize the potential extent of impacts from an IR, HDD operations will be continuously monitored to look for observable IR conditions or lowered pressure readings on the drilling equipment. Early detection is essential to minimizing the area of potential impact.

3.1 Training

Prior to the start of construction, the Site Supervisor/Foreman will ensure that the crew members receive training on the following:

- The provisions of this Contingency Plan.
- Inspection procedures for IR prevention and containment equipment materials.
- Contractor/crew obligation to immediately stop the drilling operation upon first evidence of the occurrence of an IR and to immediately report any IRs to the Project's Environmental Inspector and Environmental Coordinator.
- Contractor/crew member responsibilities in the event of an IR.
- Operation of release prevention and control equipment and the location of release control materials, as necessary and appropriate.
- Protocols for communication with agency representatives who might be on site during the clean-up effort.
- Copies of this Contingency Plan and the contractor's site-specific contingency plan will always be maintained at the HDD entry and exit sites in a visible and accessible location.

3.2 Site Inspection

The Project will inspect each drill path prior to construction. Any site-specific condition(s) that impedes the ability to conduct the visual and pedestrian field inspection of any portion of a drill path will be identified, and a site-specific modification to the proposed inspection routine will be developed for that location. The Project will incorporate modifications into site-specific HDD crossing plans, as applicable, prior to construction and communicate these modifications to HDD contractors as part of the initial environmental training. If necessary, the Project will also file updated HDD crossing plans within its implementation plan or within a variance request should modifications be required outside of certificated workspace areas.

Appropriate monitoring and reporting protocols include:

- If circulation is lost or annular fluid pressure increase is observed that is not within the normal pressure variations the HDD Operator will immediately notify the HDD Superintendent and field crews of the event and approximate position of the tooling;
- Where it is possible to safely do so, field crew personnel will visually inspect the ground surface near cutting head location;
- If an inadvertent release is observed, the following chain of command and associated procedures should be implemented:
    - Field crew will immediately notify the HDD Operator;
    - The HDD Operator will stop pumping drilling fluid and notify the HDD Superintendent, EI and CI;
    - The CI/EI notifies the CM and PC and they formulate a response;

  - The PC will notify the appropriate regulatory authorities (see Section 3.4) as necessary relaying relevant details of the event, the proposed response and required documentation within 24 hours;
  - The PC will immediately notify the applicable state agency, VADEQ or NCDEQ, (see Section 3.4) of any inadvertent drilling fluid returns within wetlands, waterbodies, or regulated wetland adjacent areas, and;
- The PC will prepare a report summarizing the incident, the response and outcome.

3.3 Landowner Notification Procedures

The Project will notify landowners (via mail, phone or direct contact) where HDD activities will occur a minimum of 48 hours prior to the commencement of drilling. In addition, the Project will request written access permission for limited pedestrian surveys outside of the approved workspace areas to facilitate monitoring of the HDD activities and identification of and response to potential IRs. Copies of these permissions will be included within the final HDD Contingency Plan.

3.4 Agency Notification Procedures

The PC will notify the appropriate regulatory authorities of the event as soon as possible and within 24 hours of identification of the release, to coordinate site-specific response procedures.

NextEra Energy Resources Environmental Team:

Ms. Michelle LaMartina
Associate Environmental Specialist 561-691-7361 (office)
561-373-6861 (cell)

Mr. John Tessier
Environmental Permitting Manager 561-694-4131 (office)
561-309-9407 (cell)

Ms. Kathy Salvador
Sr. Director - Environmental Permitting 561-691-7054 (office)
561-289-9801 (cell)

Include the following information:

- Time the spill was first identified
- Description of where the spill occurred – Project MP/Station
- Latitude and Longitude of spill
- Size of spill and control measures in place
- Name of affected water resource (if known/applicable)

- Photographs of spill area and corrective measures – when available. (Do not wait to notify the Project until pictures are available. Photo documentation should begin immediately upon detection and continued throughout the duration of the cleanup).

Regulatory authorities that will be contacted in the event of a release include the following:

1. *U.S. Army Corps of Engineers – Mobile District (USACE)*

   First Call: Elizabeth Hamilton, Project Manager – 251-694-3781
   Alternate if no response from first call: USACE-Mobile Main Office – 251-690-2658

2. *Alabama Department of Environmental Management (ADEM)*

   First Call: ADEM Mobile Field Office 24-hour spill hotline – 251-450-3400
   Alternate if no response from first call: Shelane Bergquist, Construction Stormwater Permits - TBD

4.0 DOCUMENTATION

A copy of this HDD Contingency Plan will be provided within the environmental compliance binders that are developed for construction, and copies will also be kept at each HDD location as well as at the contractor field offices. Additional documentation that will be maintained by the Project for each HDD location and includes, but is not limited to the following:

- Records of employee training detailing when training was conducted, material covered and employees in attendance. This training may coincide with the overall environmental training for the Project;
- Logs of HDD visual and pedestrian monitoring events – these may coincide with the daily environmental inspection reports;
- Drilling fluid composition – the contractor will maintain a log of drilling fluid physical properties such as mud weight, viscosity, sand content and pH during drilling activities; and
- Records of communication with landowners and applicable regulatory agencies that occur during HDD activities. These records may include inquiries and comments as well as Project response actions.

5.0 DRILLING FLUID MANAGEMENT

During the HDD process drilling fluid consisting of bentonite clay and water is maintained in drilling pits within the construction work area and used for continuous pumping into the boring. Drilling fluid is a slurry composed of water and bentonite clay, usually approximately 95 percent fresh water, intended to maintain the stability of the drilling hole, lubricate the drilling head and reduce soil friction. Bentonite clay (sodium montmorillonite) is a naturally occurring and extremely hydrophilic; it can absorb up to ten times its weight in water.

The HDD Contractor strives to maintain the integrity of the fluid by continuously sampling, testing and recording its properties throughout drilling operations. Analysis of samples allows for adjustments to be made to the slurry which helps maintain the most efficient drilling fluid flow adaptable to various geological conditions.

Bentonite is not hazardous nor is it toxic to aquatic ecosystems. The formulation of drilling fluids and its engineering properties are specified and tested to ensure their suitability for the given subsurface conditions encountered along the alignment and at each individual HDD location.

The slurry is designed to:

- Stabilize the hole against collapse;
- Lubricate, cool, and clean the cutters;
- Transport cuttings by suspension and flow to entry and exit points; and
- Reduce soil friction and required pull loads during pilot hole, reaming, and carrier pipe installation.

5.1 Drilling Fluid Additives

Small amounts of additives (typically less than one percent) may be mixed with the drilling fluids to improve drilling performance, or in response to excessive fluid loss. If any additives are necessary, the Project's goal is to utilize only water soluble and non-hazardous substances. The following is a narrative of the drilling fluids, materials, and additives that may be incorporated into a unique drill, depending upon subsurface and other conditions.

Anticipated or Typical Drilling Mud Ingredients

1. Water - This is the largest component. It may be used in its natural state or salts may be added to change filtrate reactivity with the formation.
2. Weighting Agents - These are added to control down-hole fluid pressure. Sodium barite is most common agent.
3. Clay - Most commonly, bentonite is used to provide viscosity and create a filter cake on the bore-hole wall to control fluid loss. Clay can be replaced by organic colloids such as biopolymers, cellulose polymers or starch.
4. Polymers - These are used to reduce filtration, stabilize clays, flocculate drilled solids and increase cuttings-carrying capacity. Cellulosic, polyacrylic and natural gum polymers are used to help maintain hole stability and minimize dispersion of the drill cuttings.
5. Thinners - These are added to the mud to reduce its resistance to flow. They are typically plant tannins, polyphosphates, lignitic materials, lignosulfonates.
6. Surfactants - These agents serve as emulsifiers, foamers and defoamers, wetting agents, detergents, lubricators and corrosion inhibitors.
7. Inorganic chemicals - A variety of inorganic chemicals are added to mud to carry out various functions. Typical chemicals: calcium hydroxide, sodium hydroxide and potassium hydroxide

(caustic soda and caustic potash) are used to increase mud pH; sodium carbonate (soda ash) to remove hardness, sodium chloride for inhibition and sodium chloride to increase salinity and density.

8. Bridging Materials - Calcium carbonate or cellulose fibers are added to build-up a filler cake on the borehole wall and help reduce filtrate loss.
9. Lost Circulation Materials -These are used to block large openings in the borehole. These include walnut shells, mica and xanthum and cellulose.

There are several manufacturers that focus on products specifically for deep well drilling and/or shallow HDDs as they are similar processes. HDD contractors typically have preferred manufacturers that they use depending upon the specifics of each drill location. Technical data sheets for the more typical benign and environmentally friendly products that are approved for use by the Project are included in Appendix A. Manufacture substitutions, for like in kind products are acceptable, however, proprietary blends will be avoided, and no materials will be allowed on site without current Material Safety Data Sheets being approved in advance. Specific Material Safety Data Sheets for products selected by the HDD contractor(s) must be submitted to the Project for approval, prior to use.

5.2 Drilling Fluid Physical Properties

The contractor shall submit a daily log at the end of each day. The Project shall provide the current version of the requested form which shall include at a minimum; the total length of drill or ream, average penetration rate, average mud flow rate, annular pressure, and basic mud properties (i.e. pH, funnel viscosity, density and sand content). Mud samples and drill statistics shall be recorded a minimum of three (3) times per shift with no less than two (2) hours between each record. If a Mud Engineer is on site, the daily log shall also include rheometer readings to determine plastic viscosity and yield point as well as gel strength. The Mud Engineer shall also supply filter press data in the form of API fluid loss and filter cake thickness. These measurements do not need to meet the three (3) times per shift quota.

5.3 Drilling Fluid Disposal

Disposal of excess drilling fluid will be the responsibility of the selected HDD contractor. Prior to beginning HDD operations, the contractor will be required to submit their proposed drilling fluid disposal procedures to the Project for approval. In some instances, a list of approved disposal sites will be provided to the contractor. The Project will review these procedures and verify that they comply with all environmental regulations, right-of-way and workspace agreements, and permit requirements.

Should, after the removal of cutting, bentonite slurry remains, it may be re-used (recycled) in the active HDD process. The method of disposal applied to each crossing will be dependent upon applicable regulations. Potential disposal methods include transportation to a remote disposal site and land farming on the construction right-of-way or an adjacent property. Land farming involves distributing the excess drilling fluid evenly over an open area and mechanically incorporating it into the soil. Where land farming

is employed, the condition of the land farming site will be governed by the Project's standard clean up and site restoration specifications and applicable permits required by the State of Alabama.

6.0 HDD OPERATIONAL CONDITIONS AND RESPONSE ACTIONS

6.1 Drilling Procedures

Drilling pressures will be closely monitored so they do not exceed those needed to penetrate the formation. Pressure levels will be monitored continuously by the operator. Pressure levels will be set at a minimum level to reduce the risk of IRs. Cutters and reamers will be pulled back into previously drilled sections after each joint of pipe is added. The Project's HDD contractor will provide and maintain the following during the drilling process: instrumentation which will accurately measure the torsional loads, and the drilling fluid discharge rate and pressure. In addition to mud pump pressure monitoring. Additionally, the Project's HDD contractor will provide a means of measuring and monitoring annular pressure during pilot hole operations. Annular pressure monitoring will be required during reaming as well depending on whether pressure-sensitive situations were discovered during the pilot process. The Project will have access to instruments and their readings at all times.

Entry and exit pits will be enclosed by sediment barriers as specified in the Project-specific Erosion and Sediment Control Plan and straw bales. A spill kit will be on-site and used if an IR occurs. Except as noted below, a vacuum truck will be readily available on-site prior to and during all drilling operations. Per the Project's Spill Prevention, Control, and Countermeasure plan, containment materials (straw, fabric filter fence, sand bags, spill kits, boom and turbidity curtain, etc.) will be staged on-site at a location where they are readily available and easily mobilized for immediate use in the event of an IR. Filter Fence or Filter Sock will be installed between the bore sites and the edge of water sources prior to drilling.

The Site Supervisor will verify that:

- All equipment and vehicles are inspected and maintained daily to prevent leaks of hazardous materials.
- Spill kits and spill containment materials are available on-site at all times and that the equipment is in good working order.
- Equipment required to contain and clean up an IR is available at the bore sites during drilling activities.

*NOTE: It is the drilling contractor's responsibility to provide any IR containment materials that are necessary to respond to the release of drill fluids. The materials listed in this contingency plan are not to be considered inclusive and may require additional equipment depending on site conditions.

If the site of the IR is not able to be accessed by a vacuum truck, a pump with sufficient power to convey the released drill fluid to a containment area will be used instead. Along with the pump, an adequate amount of hose, several filter bags, straw bales, sand bags, and 18" Fabric Filter Fence (or Compost Filter Sock) will be kept on site to create a containment area on site. Water containing mud, silt, drilling fluid, or other

materials from equipment washing or other activities, will not be allowed to enter a lake, flowing stream, or any other water source.

6.2 Monitoring and Pedestrian Surveys

6.2.1 Drilling Fluid Monitoring Protocol

The drilling fluid monitoring protocol to be applied will vary depending upon the following operational conditions.

- Condition 1: Full Circulation
- Condition 2: Loss of Circulation
- Condition 3: Inadvertent Returns

Monitoring Protocol for Condition 1 – Full Circulation

When HDD operations are in progress and full drilling fluid circulation is being maintained at one or both of the HDD endpoints, the following monitoring protocol will be implemented.

- Utilization of an annular pressure monitoring tool during pilot hole operations
- The presence of drilling fluid returns at one or both of the HDD endpoints will be periodically documented.
- Land-based portions of the drilled alignment will be regularly walked, visually inspected and documented by HDD contractor and environmental inspector to achieve early detection of inadvertent releases of drilling fluid as well as surface heaving and settlement. This will occur throughout the daytime and will continue to occur whenever night time operations are being undertaken. Waterways will be visually inspected from the banks for a visible drilling fluid plume.
- Constant communication between experienced driller and mud system operator to assist in the observation of fluid loss.
- Proper mud pumping volume and pressures to be managed for the ground conditions encountered.
- Swabbing of the borehole to assist in cuttings removal and maintaining circulation when drilling conditions allow.
- Proper mud properties to be maintained for the conditions encountered. A drilling fluid specialist may be consulted if any changes to mud properties are required.
    - Mud properties that will be monitored include mud weight, viscosity, sand content and pH.

- The monitoring of mud properties will occur every 3 hours during drilling operations.
- A drilling fluid specialist will be consulted if the following scenarios are encountered:
    - if there is a fluid spike in the annular pressure tool during pilot hole drilling;
    - if cuttings are not being removed from the hole during pilot hole drilling and/or reaming;
    - if there is a total loss of drilling fluid circulation; or
    - if high torque or pull back forces are encountered during any of the drilling phases.

- Electronic monitoring of the mud tank level will be utilized. Drilling fluid products present at the jobsite will be documented.

If an IR is detected during routine monitoring, the monitoring protocol associated with condition 3 will immediately be implemented. *Monitoring Protocol for Condition 2 – Loss of Circulation*

When HDD operations are in progress and drilling fluid circulation to the HDD endpoints is lost or severely diminished, the following monitoring protocol will be implemented. It should be noted that lost circulation is common and anticipated during HDD installation and does not necessarily indicate that drilling fluid is inadvertently returning to a point on the surface.

- Immediate stoppage of fluid pumps after any noticed loss of drilling fluids, followed by an immediate surface walk to look for any fluids that may have reached the surface.
- The Project and its HDD contractor will implement a protocol of conducting terrestrial walks along accessible drill pathway locations to monitor for surface returns whenever a loss of downhole pressure is detected. At a minimum, accessible locations will be monitored once per hour when operating under Condition 2. For less accessible locations an aerial drone or marine craft may be utilized to conduct monitoring for surface returns.
- The Project's environmental inspector will notify the Environmental Project Manager that drilling fluid circulation to the HDD endpoints has been lost or severely diminished.
- The Project's environmental and HDD inspectors will document steps taken by the HDD contractor to restore circulation. Should the contractor fail to comply with the requirements of the HDD Specification, the Project's environmental and HDD inspectors will notify the Environmental Project Manager and the Project Manager so that appropriate actions can be taken.
- If circulation is regained, the Project's environmental inspector will inform the Environmental Project Manager and resume the monitoring protocol associated with Condition 1.
- If circulation is not re-established, the Project's environmental inspector will increase the frequency of visual inspection along the drilled path alignment as appropriate. Additionally, the Project's environmental inspector will document periods of contractor downtime (during which no drilling fluid is pumped) and the contractor's drilling fluid pumping rate in case it should become necessary to estimate lost circulation volumes.

Monitoring Protocol for Condition 3 – Inadvertent Returns

If an inadvertent return of drilling fluids is detected, the following monitoring protocol will be implemented.

- The Project's environmental inspector will inform the Construction Project Manager that an inadvertent drilling fluid return has occurred and provide documentation with respect to the location, magnitude, and potential impact of the return.
- If the inadvertent return occurs on land, the Project's environmental inspector will document steps taken by the HDD contractor to contain and collect the return. Should the contractor fail to comply with the requirements of the HDD Specification, the Project's environmental inspector will notify the Construction Project Manager so that appropriate actions can be taken.
- If the inadvertent return occurs in a waterway, the Project, in consultation with appropriate parties, will determine if the return poses a threat to the environment or public health and safety.
- If it is determined that the return does not pose a threat to the environment or public health and safety, HDD operations will continue. the Project's environmental inspector will monitor and document the inadvertent return as well as periods of contractor downtime and the contractor's drilling fluid pumping rate in case it should become necessary to estimate inadvertent return volumes.
- If it is determined that the return does pose a threat to the environment or public health and safety, drilling operations will be suspended until containment measures can be implemented by the contractor. Documentation of any containment measures employed will be provided by the Project's environmental inspector. Once adequate containment measures are in place, the contractor will be permitted to resume drilling operations subject to the condition that drilling operations will again be suspended immediately should the containment measures fail. the Project's environmental inspector will periodically monitor and document both the inadvertent return and the effectiveness of the containment measures. Periods of contractor downtime and the contractor's drilling fluid pumping rate will also be documented in case it should become necessary to estimate inadvertent return volumes. Upon completion of the HDD installation, the Project will ensure that the inadvertent drilling fluid returns are cleaned up to the satisfaction of governing agencies and any affected parties.

7.0 RESPONDING TO INADVERTENT RELEASES

Throughout the HDD process there is a loss of drilling fluid into the geologic formation through which the drill passes. In some cases, the drilling fluid may be forced to the surface resulting in what is commonly referred to as an inadvertent return. Therefore, while the intent of the HDD method is to avoid surface disturbance, surface disturbance may occur when there is an inadvertent return of drilling fluid.

It is extremely important to note that a loss of drilling fluid into the formation is not necessarily an indication that an inadvertent return has occurred or is about to occur. It is normal to lose a significant amount of fluid

into the formation without ever having an inadvertent return. In fact, in very soft ground formations or in highly fractured formations it is normal to lose all the drill fluid pumped into the borehole without an inadvertent return occurring. Drill fluid pumping rates can be as high as 750 gallons per minute.

An inadvertent return cannot occur unless drill fluid escapes from the borehole into the formation. Hence preventing and managing such escapes will in turn prevent and manage inadvertent returns. Drilling fluid releases are typically caused by pressurization of the drill hole beyond the containment capability of the overburden soil material. In some cases, an inadvertent return of drilling fluid can be caused by existing conditions in the geologic materials (e.g., fractures) even if the down hole pressures are low.

Drill fluid pressures are generally the highest during the pilot hole process and hence it is this process that presents the greatest risk for an inadvertent return. If an inadvertent return occurs during the pilot hole it opens a path through the ground formation for drill fluid to escape during the subsequent processes. Hence inadvertent returns are likely, at the same location during the hole opening and pullback process. Similarly, if the pilot hole process can be completed without an inadvertent return then it is likely that the entire installation can also be completed without an inadvertent return.

The Project will conduct IR response activities in accordance with applicable regulatory requirements and will seek environmental and cultural resource clearances / approvals as necessary prior to the commencement of response activities. Therefore, the Project does not anticipate additional restrictions for equipment use and clearing to access and clean up IRs that may occur.

Considerations for managing inadvertent returns are described below.

7.1 Terrestrial Release Procedures

- Stop work immediately.
- The bore stem will be pulled back to relieve pressure on the IR.
- Isolate the area with hay bales, sand bags, filter sock, or silt fencing to surround and contain the drilling mud.
- Determine and document the following to the extent reasonably possible:
    - Quantity (gallons) of material released
    - Distance (feet) to the nearest waterbody
    - Name of the waterbody affected, if any
- Immediately contact the appropriate parties as listed in the “Required Notifications” section at the end of this document.
- A mobile vacuum truck (or pump if in an inaccessible area) will be used to pump the drilling mud from the contained area and into either a return pit or (if using a pump) into a filter bag surrounded by 18” Fabric Filter Fence or Compost Filter Sock.

- Once excess drilling mud is removed, the area will be seeded and/or replanted using species similar to those in the adjacent area or allowed to re-grow from existing vegetation.
- When there is no visible indication of flow at the IR location, the IR will be considered stabilized.

After the IR is stabilized, document the IR from discovery through post-cleanup conditions with photographs and prepare an IR incident report describing time, place, actions taken to remediate IR, and measures implemented to prevent recurrence. The incident report will be provided to the Project Environmental Coordinator within 24 hours of the occurrence.

7.2 Aquatic Release Procedures

- Stop work immediately.
- The bore stem will be pulled back to relieve pressure on the IR.
- Isolate the area with hay bales, sand bags (cofferdam), plastic sheeting, filter sock, silt fence or other appropriate containment structure to surround and contain the IR;
- Immediately contact the appropriate parties as listed in the "Required Notifications" section at the end of this document.
- Utilize clean water pumps to establish a pump around to convey upstream flow around the IR;
- Turbidity curtains may be deployed (depending on site conditions at time of IR);
- Determine and document the following to the extent reasonably possible:
  - Quantity (gallons) of the IR
  - Quantity (gallons) that was released to the waterbody
  - Distance (feet) the material traveled down the waterbody
  - Name of the affected waterbody
- A mobile vacuum truck (or pump if in an inaccessible area) will be used to pump the drilling mud from the contained area and into either a return pit or (if using a pump) into a filter bag surrounded by 18" Fabric Filter Fence or Compost Filter Sock.
- Drilling mud will be collected and typically recycled through the drilling mud reclaimer, reused or disposed of at a licensed disposal facility.
- When there is no visible indication of flow at the IR location, the IR will be considered stabilized.

After the IR is stabilized, document the IR from discovery through post-cleanup conditions with photographs and prepare an IR incident report describing time, place, actions taken to remediate IR, and measures implemented to prevent recurrence. The incident report will be provided to the Project Environmental Coordinator within 24 hours of the occurrence.

If an IR impacts a private drinking water supply, the Southgate Project will supply temporary drinking water supply in accordance with the Project's Water Resources Identification and Testing Plan immediately after the problem is discovered. The temporary water would be supplied until testing confirms that the water quality of the water supply returns to baseline. Additional long-term measures will be employed in accordance with the Water Resources Identification and Testing Plan if necessary, including the installation of permanent treatment, connection to a secondary water source, or establishment of a new on-site source.

7.3 Wetland Release Procedures

The Project intends the final designs of the HDDs to minimize the potential for inadvertent releases at resource crossing locations. However, inadvertent releases are still possible. Should one occur, the following measures will be employed:

1. Estimate the amount of release to conclude if containment structures would effectively contain the release.
2. Implement necessary containment measures to contain and recover the slurry unless one of the following conditions is present:
    a. The sensitivity of wetland areas may result in containment and recovery efforts causing additional disturbance due to travel of equipment and personnel, possibly offsetting any benefit gained from containing and removing the slurry.
    b. Should the amount of the slurry be too small to allow practical collection from the affected area, the fluid will be diluted with fresh water or allowed to dry and dissipate naturally.
3. Suspend drilling operations if the release cannot be controlled or contained until appropriate containment can be installed.
4. Remove contained fluids by either a vacuum truck or by pumping to a location where a vacuum truck can access them.
5. Conduct final clean-up once HDD installation is complete.

7.4 Cultural Resources Release Procedures

The Project intends the final designs of the HDDs to minimize the potential for inadvertent releases at cultural resource crossing locations. However, inadvertent releases are still possible. Should one occur, the following measures will be employed:

- Prior to construction activities related to drilling, a detailed Treatment and Contingency Data Recovery Plan will be prepared that delineates priority areas for emergency data recovery fieldwork. These Data Recovery Plans will be prepared for each archaeological site that will be avoided by drilling, and will be appended to the Avoidance Plan prepared for the project. The preparation of the Treatment and Contingency Data Recovery Plans will not delay the 404 Permit Application.

- The Treatment and Contingency Data Recovery Plan will be submitted to USACE and AHC for review and comment prior to construction in applicable sites.
- Fieldwork activities in the event of an inadvertent return will include the following, and will be presented in detail in the Treatment and Contingency Data Recovery Plan specific to each potentially affected site:
    - If an inadvertent return occurs, construction activity is to be stopped until a safe work environment for archaeological staff can be assured.
    - The extent of the impact from the inadvertent return will be mapped using a GPS receiver with sub-meter accuracy.
    - The area will be photographed, and any exposed artifacts will be documented.
    - Notes will be taken to describe how the situation did or did not affect cultural deposits.
    - Once a safe environment for archaeological work is present, sediments within the site can be troweled or screened using ¼ inch mesh.
    - As defined in the Treatment and Contingency Data Recovery Plan, significant portions of the archaeological site which contribute to NRHP eligibility as well as the affected area will be excavated to mitigate further damage to the site, in the event of a recurring inadvertent return or other construction failure in additional attempts to complete the drill.
    - Any necessary travel lane(s) needed by construction crews to access the inadvertent return location that cross an archaeological site will be established by the monitor in coordination with the environmental inspector and construction foreman.
    - If needed, any cultural resources with an undetermined NRHP status or NRHP-eligible, in the vicinity of the inadvertent return, will be flagged for avoidance to allow for work site access.
    - Activities associated with clean-up or post-construction maintenance will be monitored.
- Data recovery results will be presented in an addendum Mitigation Report which will be submitted to the reviewing agencies while construction is ongoing or after construction is completed.
- After construction is completed, the Treatment and Contingency Data Recovery Plan will remain on file and will be enacted concurrently with the deployment of construction crews in the event of any necessary future pipe maintenance.

7.5 Accessing Releases Off Right-of-Way and in Inaccessible Areas

Prior to the commencement of HDD activities, the Project will attempt to acquire written permission from landowners crossed by the HDDs to allow for pedestrian monitoring and/or IR cleanup activities. The permission will allow for biological and cultural resource surveys as necessary as well as for limited equipment access for cleanup / restoration should an IR to surface

or within a wetland / waterbody occur. Should an IR occur outside of approved workspaces or require a workspace variance for access to allow for cleanup / restoration, the Project will obtain the necessary environmental and/or cultural clearances and submit a request for variance to the USACE for review and approval, as needed, prior to the initiation of any activity outside of those approved workspaces.

8.0 RESTORATION

The Project will restore areas affected by IRs to pre-construction conditions and surface elevations to the extent practicable. Upland areas will be restored through standard right-of-way restoration procedures as detailed within the Project Erosion & Sediment Control (or BMP) Plan and applicable regulatory clearances and approvals. Restoration of wetlands and waterbodies will be conducted in accordance with applicable regulatory clearances and approvals.

9.0 CONTINGENCY PLANNING

9.1 Alternate Crossing Measures

If the HDD installation is unsuccessful and the Southgate Project determines abandonment of the HDD is necessary, the Project's proposed alternative is to use the Contingency Plan. The Contingency Plan includes implementation of an open cut wet or dry ditch crossing method (scenario dependent). This alternative crossing method would require USACE and other environmental permitting approvals.

9.2 Abandonment

Should an HDD fail, and the drill hole needs to be abandoned to allow for a secondary attempt or an alternative construction method, the Project will, if necessary, seal the drill hole with grout to a point approximately five feet from the surface. The remainder of the annulus will be filled with soil and compacted as necessary to meet the density of the surrounding soil. Abandonment procedures will be completed in accordance with applicable regulatory requirements.

10.0 REFERENCES

This Contingency Plan was adapted from the following websites:

http://www.blm.gov/pgdata/etc/medialib/blm/wy/information/NEPA/cfodocs/greencore.Par.0871.File.dat/P ODappH.pdf

https://www.csx.com/index.cfm/library/files/customers/property-real-estate/permitting/sample-fraction-mitigation-plan/

http://www.energy.ca.gov/sitingcases/smud/documents/applicants_files/Data_Response_Set-1Q/APPENDIX_C_FRAC_OUT_PLAN3.PDF

Appendix H

GOPHER TORTOISE BURROW SURVEY AND SCOPING REPORT

GOPHER TORTOISE (*GOPHERUS POLYPHEMUS*) BURROW SURVEY AND SCOPING ALONG THE PROPOSED LOWMAN PIPELINE IN CHOCTAW AND WASHINGTON COUNTIES, ALABAMA

20 May 2020

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1.0 Introduction

1.1 Project Description

NextEra Energy Resources' (NextEra) proposed Lowman Pipeline (Project) comprises approximately 82 kilometers (51 mi) of 41-centimeter (16-in) intrastate natural gas pipeline in Choctaw and Washington counties, Alabama (Appendix A, Figure 1). The Project facilitates natural gas conversion of the existing coal-fired PowerSouth Lowman Power Plant in Washington County, Alabama. In addition to the pipeline, the Project includes construction of one new compressor station, four-meter stations, and a launcher/receiver facility.

The proposed Project is within the range of the federally threatened gopher tortoise (*Gopherus polyphemus*). Environmental Solutions & Innovations, Inc. (ESI) was contracted by Edge Engineering and Science (Edge) on behalf of NextEra to address potential Project impacts to the species.

1.2 Agency Coordination

Edge compiled a species list using the U.S. Fish and Wildlife (USFWS) Information, Planning and Conservation System (IPaC). Findings were submitted to USFWS Alabama Ecological Services Field Office on 16 October 2019. Correspondence received from USFWS on 5 December 2019 verified IPaC findings and supported Edge's proposal indicating a need for gopher tortoise surveys along the proposed Project alignment (Appendix B).

This report provides the gopher tortoise survey/scoping methods and results for this Project.

1.3 Scientific Collection Permits

Field studies are carried out under USFWS Federal Fish and Wildlife Permit TE49506D-0.

2.0 Methods

Soils along the Project's limits of disturbance (LOD) are mapped using U.S. Department of Agriculture Natural Resource Conservation Service's (NRCS) Soil Survey data (Appendix A, Figure 2). Information is used to identify potentially suitable gopher tortoise habitat for the Project. Per the NRCS Gopher Tortoise Soil Suitability guide (NRCS 2013), the following criteria are used to determine potential suitability:

depth of excavatable material, depth to restrictive layer, ponding, flooding, depth to water table, and slope. If one criterion is deemed “Not Suited”, habitat is classified as unsuitable. If none of the criteria are deemed as such, habitat is considered potentially suitable, even if marginal.

A gopher tortoise burrow survey is completed along the entirety of the Project’s 91-meter (300-ft) survey corridor including workspaces and along proposed access roads. Additional survey effort is expended in areas identified by the NRCS soil review as potentially suitable gopher tortoise habitat.

The condition of each documented burrow is evaluated using the following criteria:

- Potentially Occupied:
    - Active Burrow: Burrow is in good condition, exhibits half-moon shaped entrance, and appears actively used by a gopher tortoise. Active burrows typically contain loose soil and are void of vegetation;
    - Inactive Burrow: Burrow is in good condition but does not appear recently used by a gopher tortoise. The half-moon shaped entrance is present, but soil is typically compacted, with some vegetation or loose leaves present. Gopher tortoises occasionally reoccupy inactive burrows;
- Abandoned:
    - Burrow is clearly not used by a gopher tortoise, is typically dilapidated/collapsed, and often partially filled with soil or leaves.

Burrows identified and surrounding areas exhibiting optimal habitat are photographed and marked in the field using Global Positioning Systems (GPS). Burrow data sheets and representative photographs are included in Appendices C and D, respectively.

Following documentation, each burrow is scoped using a gopher tortoise burrow camera system (Environmental Management Systems, Canton, Georgia) to determine potential occupancy. The camera is guided into the burrow to its terminus and contents are documented.

3.0 Results

Results of NRCS soil review revealed approximately 215.9 hectares (533.5 ac) of potentially suitable gopher tortoise habitat and 80.6 hectares (199.1 ac) of unsuitable gopher tortoise habitat (Appendix E). Field efforts on 11 and 12 May 2020, revealed sixteen gopher tortoise burrows. Burrows were documented, evaluated, and scoped to determine condition and potential occupancy (Table 1; Appendix A, Figure 2). Four burrows were classified as Potentially Occupied-Active with gopher tortoises

observed in three. Seven burrows were classified as Potentially Occupied-Inactive and five were classified as abandoned. No burrows were observed in areas identified by the NRCS soil review as unsuitable.

Table 1. Gopher tortoise burrows scoped on the Lowman Pipeline Project.

Burrow ID	Burrow Condition	Latitude DD	Longitude DD	Ambient Temperature °C*	NRCS Soil Type**
1	Abandoned	(b)(7)f, Preliminary pipeline location(s)		25	BnE2
2	Potentially Occupied – Inactive			28	BnE2
3	Abandoned			24	SmD
4	Potentially Occupied – Inactive			16	McC
5	Occupied			17	McC
6	Potentially Occupied – Inactive			18	McC
7	Occupied			20	McC
8	Potentially Occupied – Inactive			20	McC
9	Potentially Occupied – Inactive			20	BsF
10	Abandoned			22	BsF
11	Potentially Occupied – Inactive			23	MaA
12	Potentially Occupied – Inactive			23	BsF
13	Potentially Occupied - Active			23	BsF
14	Occupied			23	BsF
15	Abandoned			21	BsF
16	Abandoned			22	BsF

*Ambient temperature at the time of burrow scoping. The nearest NOAA station was in Mobile, Alabama, thus Weather Underground stations were used due to proximity to the Project: (Burrows 1-3: Pennington, AL [station Id: Kalpenni1]; Burrows 4-16: Lowman Power Plant, Leroy, AL [station ID: Kalleroy2]).
__BnE2__ = Boykin-Luverne-Smithdale complex, 15 to 35 percent slopes, eroded; **BsF = Boykin-Luverne-Smithdale complex, 15 to 35 percent slopes, eroded; **MaA** = Malbis fine sandy loam, 0 to 2 percent slopes; **McC** = Mattaponi-Peawick complex, 8 to 15 percent slopes; **SmD** = Smithdale loamy fine sand, 5 to 15 percent slopes.

Within 48 hours of discovery, the USFWS (Alabama Ecological Field Office) was notified regarding three gopher tortoise observations.

3.1 GT-Burrow-1

GT-Burrow-1 was classified as abandoned. The burrow was primarily collapsed, and no gopher tortoise was observed during scoping. Although characteristically flatter, the burrow's shape was more rounded at the bottom of the entrance and the rest of the tunnel indicating recent use by a mammal. Habitat comprised young upland forest with a closed canopy dominated by loblolly pine (*Pinus taeda*) and sweetgum (*Liquidambar styraciflua*). Burrow dimensions measured 14 centimeters (5.5 in) high, 14 centimeters (5.5 in) wide, and 200 centimeters (78 in) long. Subcanopy was closed, comprising lower branches of canopy trees and saplings, and the ground surrounding the burrow was moderately covered with herbaceous vegetation.

3.2 GT-Burrow-2

GT-Burrow-2 was classified as Potentially Occupied-Inactive. The burrow entrance was in good condition, but scattered dead vegetation was observed and the ground surrounding the burrow was densely covered with herbaceous vegetation. No gopher tortoise was observed during scoping. Habitat consisted of an open canopy dominated

by various shrub species and *Rubis* species. Burrow height was 14 centimeters (5.5 in), width was 27 centimeters (10.6 in) and the length was 35 centimeters (13.7 in).

3.3 GT-Burrow-3

GT-Burrow-3 was classified as abandoned. The burrow was collapsed, and the scope did not extend beyond the entrance. Habitat comprised closed canopy young upland forest dominated by loblolly pine. The burrow height was 10 centimeters (3.9 in) and width was 25 centimeters (9.8 in). Subcanopy clutter was moderate, comprising lower branches of canopy trees, saplings, and shrubs, and the ground surrounding the burrow was moderately covered with herbaceous vegetation.

3.4 GT-Burrow-4

GT-Burrow-4 was classified as Potentially Occupied-Inactive. The burrow entrance was in good condition, but scattered dead vegetation was observed and thick webs crossed the opening. No gopher tortoise was observed during scoping. Habitat comprised a closed canopy young upland forest dominated by loblolly pine. The burrow height was 15 centimeters (5.9 in), width was 30 centimeters (11.8 in), and the length was 6.43 meters (21 ft). The subcanopy was moderately cluttered with lower branches of canopy trees and saplings, and the ground surrounding the burrow was moderately cluttered with herbaceous vegetation. GT-Burrow-4 is next to a dirt access road traversing the young pine stand.

3.5 GT-Burrow-5

GT-Burrow-5 was classified as Occupied. The scope revealed an adult gopher tortoise at the burrow's terminus. Habitat comprised young upland forest with a moderate canopy dominated by loblolly pine. The burrow height was 25 centimeters (9.8 in), width was 35 centimeters (13.7 in), and the length was 4.26 meters (14 ft). The subcanopy was moderately cluttered with lower branches of canopy trees and saplings, and the ground surrounding the burrow was moderately cluttered with herbaceous vegetation.

3.6 GT-Burrow-6

GT-Burrow-6 was classified as Potentially Occupied-Inactive. The burrow entrance was in good condition, but scattered dead vegetation was observed and thick webs crossed the opening. No gopher tortoise was observed during scoping. Habitat comprised young upland forest with a moderate canopy dominated by loblolly pine. The burrow height was 15 centimeters (5.9 in), width was 28 centimeters (11 in), and the length was 2.44 meters (8 ft). The subcanopy was moderately cluttered with lower branches of canopy trees and saplings, and the ground surrounding the burrow was moderately covered with herbaceous vegetation.

3.7 GT-Burrow-7

GT-Burrow-7 was classified as Occupied. A sub-adult individual was observed with the scope; however, whether the gopher tortoise was positioned at the burrow's terminus

could not be determined. Habitat comprised young upland forest with moderate canopy cover dominated by loblolly pine. The burrow height was 15 centimeters (5.9 in), width was 22 centimeters (8.6 in), and the length was 2.50 meters (8.2 ft). Subcanopy clutter was closed with lower branches of canopy trees and saplings, and the ground surrounding the burrow was moderately covered with herbaceous vegetation.

3.8 GT-Burrow-8

GT-Burrow-8 was classified as Potentially Occupied-Inactive. The burrow entrance was in good condition, but scattered dead vegetation was observed and thick webs crossed the opening. No gopher tortoise was observed during scoping. Habitat comprised young upland forest with a moderate canopy dominated by loblolly pine. The burrow height was 15 centimeters (5.9 in), width was 30 centimeters (11.8 in), and the length was 2.82 meters (9.2 ft). The subcanopy was moderately cluttered with lower branches of canopy trees, saplings, and shrubs, and the ground surrounding the burrow was moderately covered with herbaceous vegetation.

3.9 GT-Burrow-9

GT-Burrow-9 was classified as Potentially Occupied-Inactive. The burrow entrance was in moderately good condition, but scattered dead vegetation was observed and thick webs crossed the opening. No gopher tortoise was observed during scoping. Habitat comprised young upland forest with a closed canopy dominated by loblolly pine. The burrow height was 14 centimeters (5.5 in), width was 28 centimeters (11 in), and the length was 4.38 meters (14.3 ft). Subcanopy clutter was closed with lower branches of canopy trees, saplings, and shrubs, and the ground surrounding the burrow was moderately covered by herbaceous vegetation.

3.10 GT-Burrow-10

GT-Burrow-10 was classified as abandoned. The burrow was primarily collapsed, and no gopher tortoise was observed with the scope. The burrow was observed in a debris pile consisting of discarded pieces of metal. Habitat comprised mature upland forest with a closed canopy dominated by loblolly pine and tulip poplar (*Liriodendron tulipifera*). The burrow height was 17 centimeters (6.6 in), width was 28 centimeters (11 in), and the length was 55 centimeters (21 in). The subcanopy was moderately cluttered with lower branches of canopy trees and saplings, and the ground surrounding the burrow was sparsely covered with herbaceous vegetation.

3.11 GT-Burrow-11

GT-Burrow-11 was classified as Potentially Occupied-Inactive. The burrow entrance was in moderately good condition but partially blocked with dirt and scattered debris. No gopher tortoise was observed during scoping. The burrow was observed on a mowed access path next to a transmission line right-of-way (ROW). Habitat comprised young upland forest with moderate canopy cover dominated by sweetgum. The burrow height was 23 centimeters (9 in), width was 23 centimeters (9 in), and the length was 3.05 meters (10 ft). The subcanopy near the burrow was moderately cluttered with

lower branches of canopy trees, saplings, and shrubs, and the ground surrounding the burrow was sparsely covered with herbaceous vegetation.

3.12 GT-Burrow-12

GT-Burrow-12 was classified as Potentially Occupied-Inactive. The burrow entrance was in good condition, but scattered dead vegetation was observed and thick webs crossed the opening. No gopher tortoise was observed during scoping. The burrow is located within a transmission line ROW. Habitat comprised mature upland forest with open canopy dominated by loblolly pine at the edges of the ROW. The burrow height was 16 centimeters (6.2 in), width was 32 centimeters (12.5 in), and the length was 3.10 meters (10.2 ft). Subcanopy was open with no trees immediately proximate the burrow, and the ground surrounding the burrow was moderately covered with herbaceous vegetation.

3.13 GT-Burrow-13

GT-Burrow-13 was classified as Potentially Occupied-Active. No gopher tortoise was observed during scoping; however, signs of recent activity were noted. The burrow's entrance was clear of obstruction, and the sandy apron extended far beyond the entrance. The burrow was within a transmission line ROW, almost directly under a power line tower. Habitat comprised mature upland forest with an open canopy dominated by loblolly pine at the edges of the ROW. The burrow height was 19 centimeters (7.4 in), width was 42 centimeters (16.5 in) and the length was 5.72 meters (18.7 ft). As no trees were present in the immediate vicinity of the burrow, the subcanopy was open. The ground surrounding the burrow was moderately covered with herbaceous vegetation.

3.14 GT-Burrow-14

GT-Burrow-14 was classified as Occupied. An adult individual was observed with the scope; however, whether the gopher tortoise was positioned at the burrow's terminus could not be determined. The burrow was within a transmission line ROW, almost directly under a tower. Habitat comprised mature upland forest with an open canopy, no trees immediately proximate the burrow, and edges of the ROW dominated by loblolly pine. The burrow height was 14 centimeters (5.5 in), width was 29 centimeters (11 in), and the length was 2.07 meters (6.7 ft). As the burrow was in a cleared ROW, the subcanopy was open, and the ground surrounding the burrow was moderately covered with herbaceous vegetation.

3.15 GT-Burrow-15

GT-Burrow-15 was classified as abandoned with the entrance primarily covered by dead vegetation. The burrow was mostly collapsed, and no gopher tortoise was observed during scoping. Habitat comprised mature upland forest with closed canopy dominated by loblolly pine and tulip poplar. The burrow height was 19 centimeters (7.4 in), width was 25 centimeters (9.8 in), and the length was 86 centimeters (33 in). The subcanopy was moderately cluttered with lower branches of canopy trees and

saplings, and the ground surrounding the burrow was sparsely covered with herbaceous vegetation.

3.16 GT-Burrow-16

GT-Burrow-16 was classified as abandoned with the entrance primarily covered by dead vegetation. The burrow was mostly collapsed, and no gopher tortoise was observed during scoping. Habitat comprised mature upland forest with moderate canopy dominated by loblolly pine and tulip poplar. The burrow height was 14 centimeters (5.5 in), width was 28 centimeters (11 in), and the length was 105 centimeters (41 in.). The subcanopy was moderately cluttered with lower branches of canopy trees and saplings, and the ground surrounding the burrow was sparsely covered with herbaceous vegetation.

4.0 Discussion and Recommendations

Sixteen gopher tortoise burrows (7 Potentially Occupied–Inactive, 4 Potentially Occupied–Active, and 5 Abandoned) were documented during field efforts completed on 11 and 12 May 2020. Three gopher tortoises were observed during burrow scoping (GT-Burrow-5, GT-Burrow-7, and GT-Burrow-14). A standard gopher tortoise burrow protection buffer includes habitat within 7.62 meters (25 ft; in each direction) of the burrow entrance (protecting the structural integrity of the burrow and providing gopher tortoises access to foraging habitat). To avoid impacts to gopher tortoises and potentially occupied burrows (active and inactive), ESI recommends mechanically excavating burrows in, and within 7.62 meters (25 ft) of, the LOD. Recommended excavations include GT-Burrow-2, GT-Burrow-4, GT-Burrow-5, GT-Burrow-6, GT-Burrow-7, GT-Burrow-8, and GT-Burrow-12.

Excavated gopher tortoises are relocated within the Project area to predetermined areas outside the LOD in suitable habitat with appropriate soil types. Approval for translocation areas prior to excavation is obtained through consultation with USFWS. Gopher tortoises are relocated following USFWS *Gopher Tortoise Trapping and Translocation Guidelines*.

GT-Burrow-13 and GT-Burrow-14 are approximately 6.10 meters (20 ft) from the LOD; however, both are located within a transmission line ROW and under two poles. In lieu of mechanical excavation, ESI recommends a slight reduction of the LOD in this area to provide a 7.62-meter (25-ft) protection buffer for each burrow. Additionally, to prevent gopher tortoises from entering active construction, installation of a silt fence is recommended along the edge of the LOD.

No further action is recommended for Potentially Occupied – Inactive burrows greater than 7.62 meters (25 ft) from the LOD or abandoned burrows including GT-Burrow-1, GT-Burrow-3, GT-Burrow-9, GT-Burrow-10, GT-Burrow-11, GT-Burrow-15, and GT-Burrow-16.

5.0 Request for Agency Concurrence

ESI respectfully requests concurrence with the gopher tortoise survey, burrow scoping results, and proposed relocation recommendations.

6.0 Literature Cited

NRCS. 2013. Gopher tortoise soil suitability. U.S. Department of Agriculture, Natural Resources Conservation Service, Washington, D.C. 3 p.

7.0 Contact Information

Mr. Daniel Judy, Certified Wildlife Biologist
Environmental Solutions & Innovations, Inc.
2250 Lucien Way, Suite 302
Maitland, FL 32751
djudy@envsi.com

Mr. Timothy Brust, Herpetologist
Environmental Solutions & Innovations, Inc.
8 Bettys Ln.
Scott Depot, WV 25560
tbrust@envsi.com

APPENDIX A
FIGURES

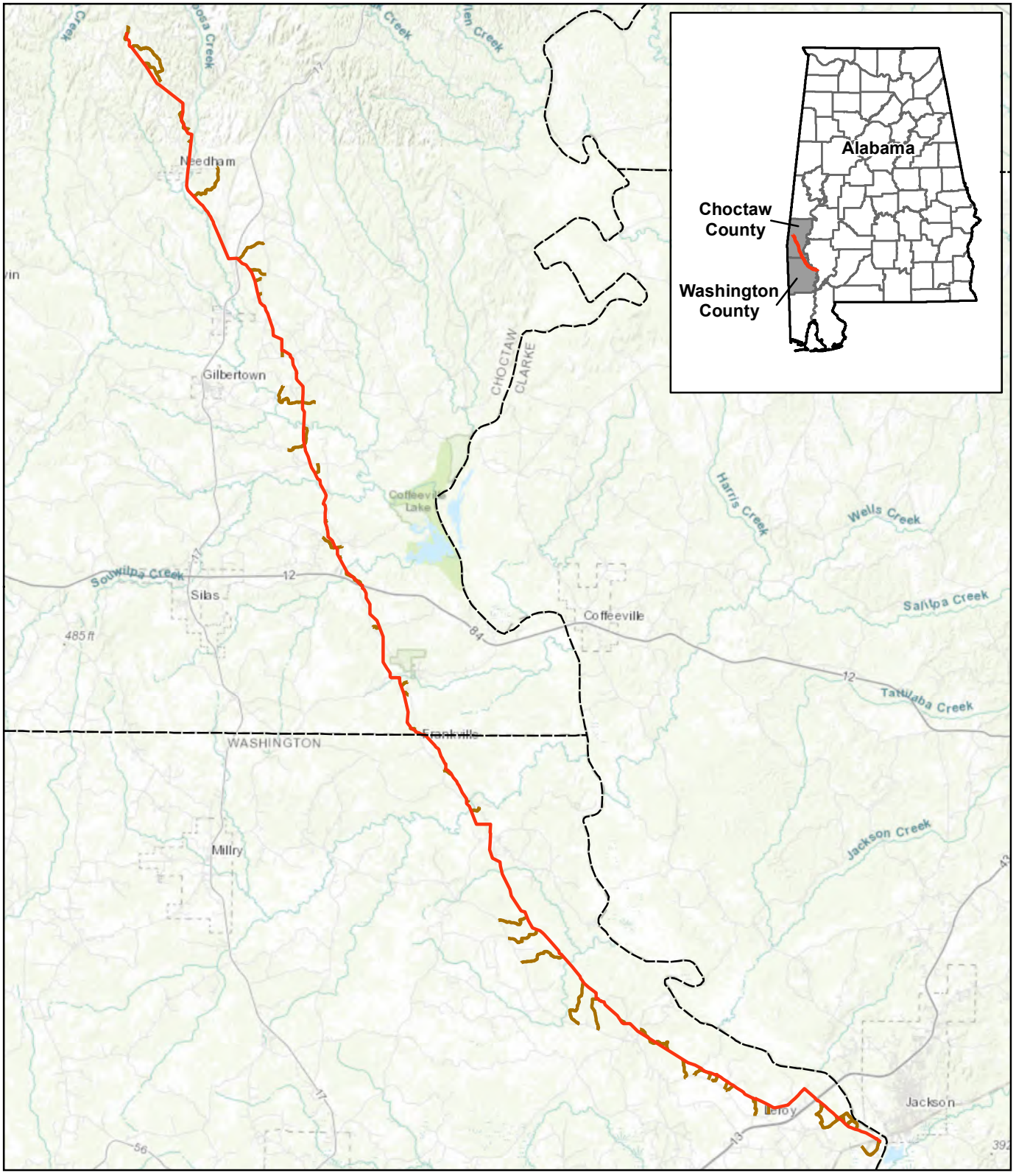


Figure 1. Location of the proposed Lowman Pipeline Project in Choctaw and Washington counties, Alabama.

N
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Project No: 1461.02

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Base Map: ESRI USGS Topographic Map

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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Pages 13 through 73 redacted for the following reasons:
- -
(b)(7)f, preliminary pipeline locations

APPENDIX B
AGENCY COORDINATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1208-B Main Street
Daphne, Alabama 36526

DEC 05 2019

IN REPLY REFER TO:
2020-TA-0086

Mr. Andrew Grammer
Edge Engineering and Science, LLC.
16285 Park Ten Place, Suite 400
Houston, TX 77084

Dear Mr. Grammer:

Thank you for your letter dated October 16, 2019, requesting review on the behalf of NextEra Energy Resources (NextEra), for the proposed Lowman Pipeline Project in Choctaw and Washington counties, Alabama. We understand NextEra has contracted Edge Engineering and Science, LLC to provide environmental consulting support and is seeking a Nationwide Permit 12 – Utility Line Activities through the U.S. Army Corps of Engineers. Following is the Service's list of species concerning this project as it relates to the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

Federally Listed Species
Our records and information provided in your report indicate that habitat exists in the project area and the following endangered and threatened species may occur in the immediate project area:

- Wood Stork *Mycteria americana* Threatened
- Gopher Tortoise *Gopherus polyphemus* (West of Mobile and Tombigbee Rivers) Threatened
- Black Pine Snake *Pituophis melanoleucus lodingi* Threatened
- Inflated Heelsplitter *Potamilus inflatus* Threatened
- Southern Clubshell *Pleurobema decisum* Endangered

Based on the proposed pipeline route provided via email on November 18, 2019, we have no concerns for the Atlantic sturgeon, *Acipenser oxyrhynchus oxyrchynchus*.

Species Surveys
Please be aware that "take", as defined under section 3 of the ESA, "means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" and is prohibited without a permit issued under section 10 of the ESA. Individuals conducting surveys for federally threatened or endangered species must possess federal recovery permits as described under section 10(a)(1)(A) of the ESA and implementing regulations found at 50 CFR 17.22 and 17.32, along with State scientific collection permits. Furthermore, survey plans

should be submitted to our office for review prior to being carried out. Please acquire proper state and federal permits or coordinate with permitted biologists if you intend to conduct surveys for threatened and endangered species.

We support your plans to conduct pedestrian surveys to evaluate suitable habitat and presence/probably absence of gopher tortoise burrows and the site list provided in your letter for aquatic habitat assessment/surveys species. Please acquire the proper federal and state permits and provide this office a copy of the survey plans for approval prior to conducting burrow occupancy and instream surveys. If surveys indicate that listed species occur within the proposed project area and proposed work cannot be altered to avoid take as defined by the ESA, formal consultation would be recommended.

To provide the Service with the necessary information in a burrow survey report, please provide the following: survey design, survey dates, ambient temperature, maps of survey area including total number of miles, locations of gopher tortoise burrows including maps, photos of the burrows if found, if the burrows are active or inactive, and maps of burrow locations. The aquatic survey report should include a detailed description of the site including species and substrates present, survey methods, area surveyed and surveyor(s) credentials. We also recommend the report include a description of stream habitat and water quality.

For further discussion, please contact Mrs. Jennifer Grunewald of my staff at (205) 247-3726. Please refer to the reference number located at the top of this letter in future phone calls or written correspondence.

Sincerely,

William J. Pearson
Field Supervisor
Alabama Ecological Services Field Office

APPENDIX C
GOPHER TORTOISE BURROW DATA SHEETS

2020

Property of: Environmental Solutions & Innovations, Inc.
4525 Este Avenue. Cincinnati, OH 45232 (Phone: 513-451-1777)

GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/11/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Choctaw

Burrow ID	Latitude	Longitude
GT-Burrow-1	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 14 cm Burrow Width: 14 cm Burrow Length: 200 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Acer rubrum
Liquidambar styraciflua	

Estimated dbh range: Lg: 5 Sm: 1 Estimated dbh range: Lg: 2 Sm: 1

Relative abundance of dominant vs. subdominant (ratio): 3:1

Estimated canopy closure: ☑ Closed ☐ Moderate ☐ Open

Subcanopy clutter: ☑ Closed ☐ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees & Saplings

Common Subcanopy Species: Sassafras albidum Acer rubrum

Check all that apply:

☐ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☑ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☑ Moderate ☐ Dense

NOTES

2020

Property of: Environmental Solutions & Innovations, Inc.
4525 Este Avenue. Cincinnati, OH 45232 (Phone: 513-451-1777)

GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Choctaw

Burrow ID	Latitude	Longitude
GT-Burrow-2	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 14 cm Burrow Width: 27 cm Burrow Length: 35 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Estimated dbh range: Lg: Sm:	Estimated dbh range: Lg: Sm:

Relative abundance of dominant vs. subdominant (ratio):

Estimated canopy closure: ☐ Closed ☐ Moderate ☑ Open

Subcanopy clutter: ☐ Closed ☐ Moderate ☑ Open

Subcanopy consists largely of: Shrubs

Common Subcanopy Species: _____ _____ _____

Check all that apply:

☐ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other Overgrown ROW
☐ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☐ Moderate ☐ Dense

NOTES

No trees, all shrubs and rubis

2020

Property of: Environmental Solutions & Innovations, Inc.
4525 Este Avenue. Cincinnati, OH 45232 (Phone: 513-451-1777)

GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/11/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County:

Burrow ID	Latitude	Longitude
GT-Burrow-3	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 10 cm Burrow Width: 25 cm Burrow Length: cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Pinus taeda

Estimated dbh range: Lg: 10 Sm: 6 Estimated dbh range: Lg: 6 Sm: 2

Relative abundance of dominant vs. subdominant (ratio): 2:1

Estimated canopy closure: ☐ Closed ☐ Moderate ☑ Open

Subcanopy clutter: ☐ Closed ☑ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees Saplings & Shrubs

Common Subcanopy Species: Pinus taeda

Check all that apply:

☐ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☑ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☑ Moderate ☐ Dense

NOTES

Property of: Environmental Solutions & Innovations, Inc.
4525 Este Avenue. Cincinnati, OH 45232 (Phone: 513-451-1777)

GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-4	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 15 cm Burrow Width: 30 cm Burrow Length: 643 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Pinus taeda

Estimated dbh range: Lg: 10 Sm: 5 Estimated dbh range: Lg: 5 Sm: 2.5

Relative abundance of dominant vs. subdominant (ratio):5:1

Estimated canopy closure: ☐ Closed ☑ Moderate ☐ Open

Subcanopy clutter: ☐ Closed ☑ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees & Saplings

Common Subcanopy Species: Pinus taeda

Check all that apply:

☐ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☑ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☑ Moderate ☐ Dense

NOTES

All pines near burrow

2020

Property of: Environmental Solutions & Innovations, Inc.
4525 Este Avenue. Cincinnati, OH 45232 (Phone: 513-451-1777)

GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-5	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 25 cm Burrow Width: 35 cm Burrow Length: 426 cm

BURROW SCOPING

☑ Tortoise Observed ☐ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Pinus taeda

Estimated dbh range: Lg: 20 Sm: 10 Estimated dbh range: Lg: 5 Sm: 2.5

Relative abundance of dominant vs. subdominant (ratio):4:1

Estimated canopy closure: ☐ Closed ☑ Moderate ☐ Open

Subcanopy clutter: ☐ Closed ☑ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees & Saplings

Common Subcanopy Species: Pinus taeda

Check all that apply:

☐ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☑ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☑ Moderate ☐ Dense

NOTES

All young pines near burrow

2020

Property of: Environmental Solutions & Innovations, Inc.
4525 Este Avenue. Cincinnati, OH 45232 (Phone: 513-451-1777)

GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-6	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 15 cm Burrow Width: 28 cm Burrow Length: 244 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Pinus taeda

Estimated dbh range: Lg: 17 Sm: 8 Estimated dbh range: Lg: 5 Sm: 3

Relative abundance of dominant vs. subdominant (ratio):3:1

Estimated canopy closure: ☐ Closed ☑ Moderate ☐ Open

Subcanopy clutter: ☐ Closed ☑ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees & Saplings

Common Subcanopy Species: Pinus taeda

Check all that apply:

☐ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☑ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☑ Moderate ☐ Dense

NOTES

All pines near burrow

2020

Property of: Environmental Solutions & Innovations, Inc.
4525 Este Avenue. Cincinnati, OH 45232 (Phone: 513-451-1777)

GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-7	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 15 cm Burrow Width: 22 cm Burrow Length: 250 cm

BURROW SCOPING

☑ Tortoise Observed ☐ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Pinus taeda

Estimated dbh range: Lg: 15 Sm: 7 Estimated dbh range: Lg: 5 Sm: 3

Relative abundance of dominant vs. subdominant (ratio):3:1

Estimated canopy closure: ☐ Closed ☑ Moderate ☐ Open

Subcanopy clutter: ☑ Closed ☐ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees & Saplings

Common Subcanopy Species: Pinus taeda

Check all that apply:

☐ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☑ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☑ Moderate ☐ Dense

NOTES

All pines near burrow

2020

Property of: Environmental Solutions & Innovations, Inc.
4525 Este Avenue. Cincinnati, OH 45232 (Phone: 513-451-1777)

GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-8	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 15 cm Burrow Width: 30 cm Burrow Length: 282 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	

Estimated dbh range: Lg: 5 Sm: 2 Estimated dbh range: Lg: Sm:

Relative abundance of dominant vs. subdominant (ratio):

Estimated canopy closure: ☐ Closed ☐ Moderate ☑ Open

Subcanopy clutter: ☐ Closed ☑ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees Saplings & Shrubs

Common Subcanopy Species: _____ _____ _____

Check all that apply:

☐ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☑ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☑ Moderate ☐ Dense

NOTES

Multiple paths inside burrow; left chamber approximately 250cm; few trees near burrow

2020

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GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-9	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 14 cm Burrow Width: 28 cm Burrow Length: 438 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Pinus taeda

Estimated dbh range: Lg: 12 Sm: 6 Estimated dbh range: Lg: 5 Sm: 3

Relative abundance of dominant vs. subdominant (ratio):4:1

Estimated canopy closure: ☐ Closed ☑ Moderate ☐ Open

Subcanopy clutter: ☑ Closed ☐ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees Saplings & Shrubs

Common Subcanopy Species: Pinus taeda

Check all that apply:

☐ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☑ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☑ Moderate ☐ Dense

NOTES

G-09; under shrub

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Property of: Environmental Solutions & Innovations, Inc.
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GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-10	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 17 cm Burrow Width: 28 cm Burrow Length: 55 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Liquidambar styraciflua
Liriodendron tulipifera	Acer rubrum

Estimated dbh range: Lg: 50 Sm: 35 Estimated dbh range: Lg: 25 Sm: 15

Relative abundance of dominant vs. subdominant (ratio): 2:3

Estimated canopy closure: ☑ Closed ☐ Moderate ☐ Open

Subcanopy clutter: ☐ Closed ☑ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees & Saplings

Common Subcanopy Species: Cornus florida

Check all that apply:

☑ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☐ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☑ Mature LowLand	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☑ Sparse ☐ Moderate ☐ Dense

NOTES

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GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-11	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 23 cm Burrow Width: 23 cm Burrow Length: 305 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Liquidambar styraciflua	Pinus taeda

Estimated dbh range: Lg: 24 Sm: 10 Estimated dbh range: Lg: 10 Sm: 5

Relative abundance of dominant vs. subdominant (ratio): 1:6

Estimated canopy closure: ☐ Closed ☐ Moderate ☑ Open

Subcanopy clutter: ☐ Closed ☑ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees Saplings & Shrubs

Common Subcanopy Species: Liquidambar styraciflua

Check all that apply:

☐ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☑ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☑ Sparse ☐ Moderate ☐ Dense

NOTES

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GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-12	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 16 cm Burrow Width: 32 cm Burrow Length: 310 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	

Estimated dbh range: Lg: 60 Sm: 30 Estimated dbh range: Lg: 30 Sm: 10

Relative abundance of dominant vs. subdominant (ratio):3:1

Estimated canopy closure: ☐ Closed ☐ Moderate ☑ Open

Subcanopy clutter: ☐ Closed ☐ Moderate ☑ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees & Saplings

Common Subcanopy Species: Liquidambar styraciflua

Check all that apply:

☑ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☐ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☑ Moderate ☐ Dense

NOTES

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GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-13	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 19 cm Burrow Width: 42 cm Burrow Length: 572 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☐ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Liquidambar styraciflua

Estimated dbh range: Lg: 50 Sm: 25 Estimated dbh range: Lg: 20 Sm: 8

Relative abundance of dominant vs. subdominant (ratio): 3:1

Estimated canopy closure: ☐ Closed ☐ Moderate ☑ Open

Subcanopy clutter: ☐ Closed ☐ Moderate ☑ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees & Saplings

Common Subcanopy Species: Liquidambar styraciflua

Check all that apply:

☑ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☑ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☑ Moderate ☐ Dense

NOTES

Power lines directly overhead

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GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-14	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 14 cm Burrow Width: 29 cm Burrow Length: 207 cm

BURROW SCOPING

☑ Tortoise Observed ☐ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Liquidambar styraciflua

Estimated dbh range: Lg: 55 Sm: 30 Estimated dbh range: Lg: 20 Sm: 8

Relative abundance of dominant vs. subdominant (ratio): 3:1

Estimated canopy closure: ☐ Closed ☐ Moderate ☑ Open

Subcanopy clutter: ☐ Closed ☐ Moderate ☑ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees & Saplings

Common Subcanopy Species: Liquidambar styraciflua

Check all that apply:

☑ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☑ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☐ Mature LowLand Forest	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☐ Sparse ☑ Moderate ☐ Dense

NOTES

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GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-15	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 19 cm Burrow Width: 25 cm Burrow Length: 86 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Liquidambar styraciflua
Liriodendron tulipifera	Acer rubrum
	Cornus florida

Estimated dbh range: Lg: 50 Sm: 35 Estimated dbh range: Lg: 25 Sm: 15

Relative abundance of dominant vs. subdominant (ratio): 2:3

Estimated canopy closure: ☑ Closed ☐ Moderate ☐ Open

Subcanopy clutter: ☐ Closed ☑ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees & Saplings

Common Subcanopy Species: Cornus florida Liquidambar styraciflua

Check all that apply:

☑ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☐ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☑ Mature LowLand	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☑ Sparse ☐ Moderate ☐ Dense

NOTES

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GOPHER TORTOISE BURROW ASSESSMENT

Client's Company Name: NextEra Energy Project #:1461.02 Date: 05/12/2020

Project Name: Lowman Pipeline

Permitted Biologist: Daniel Judy Federal Permit #: TE49506D-0

Other Field Staff: Nick Gikas State: Alabama County: Washington

Burrow ID	Latitude	Longitude
GT-Burrow-16	(b)(7)f, preliminary pipeline locations	

BURROW CHARACTERISTICS:

Burrow Height: 14 cm Burrow Width: 28 cm Burrow Length: 105 cm

BURROW SCOPING

☐ Tortoise Observed ☑ No Tortoise Observed ☐ Unable to determine

Commsenals Observed ☐ Yes ☑ No If Yes, List Species if Possible below:

VEGETATION:

Dominant Canopy Species (> 40 cm/16" dbh)	Subdominant Canopy Species (< 40 cm/16" dbh)
Pinus taeda	Liquidambar styraciflua
Liriodendron tulipifera	Acer rubrum

Estimated dbh range: Lg: 50 Sm: 35 Estimated dbh range: Lg: 25 Sm: 15

Relative abundance of dominant vs. subdominant (ratio): 2:3

Estimated canopy closure: ☐ Closed ☐ Moderate ☐ Open

Subcanopy clutter: ☐ Closed ☑ Moderate ☐ Open

Subcanopy consists largely of: Lower Branches of Canopy Trees & Saplings

Common Subcanopy Species: Cornus florida

Check all that apply:

☑ Mature Upland Forest	☐ Recently Logged Forest	☐ Crop/Pasture Land	Other
☐ Young Upland Forest	☐ Forest Edge	☐ Stream/River	
☑ Mature LowLand	☐ Woodlot	☐ Vernal Pool	
☐ Young LowLand Forest	☐ Old Field	☐ Deepwater Lake/Pond	
☐ Pine Plantation	☐ Emergent Wetland	☐ Shrub Scrub Swamp	

Herbaceous Cover: ☑ Sparse ☐ Moderate ☐ Dense

NOTES

APPENDIX D
REPRESENTATIVE PHOTOGRAPHS



GT-Burrow-1: Abandoned



GT-Burrow-2: Potentially Occupied - Inactive



GT-Burrow-3: Abandoned



GT-Burrow-4: Potentially Occupied - Inactive



GT-Burrow-5: Occupied



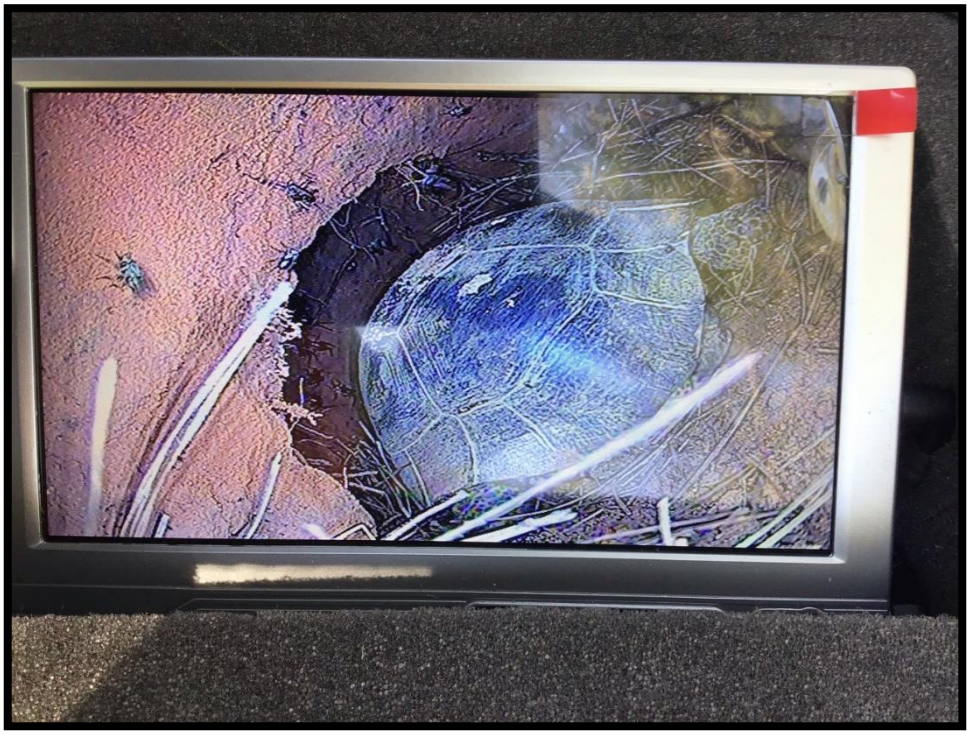
GT-Burrow-5: Gopher Tortoise



GT-Burrow-6: Potentially Occupied - Inactive



GT-Burrow-7: Occupied



GT-Burrow-7: Gopher Tortoise



GT-Burrow-8: Potentially Occupied - Inactive



GT-Burrow-9: Potentially Occupied - Inactive



GT-Burrow-10: Abandoned



GT-Burrow-11: Potentially Occupied - Inactive



GT-Burrow-12: Potentially Occupied - Inactive



GT-Burrow-14: Occupied



GT-Burrow-13: Potentially Occupied - Active



GT-Burrow-14: Gopher Tortoise



GT-Burrow-15: Abandoned



GT-Burrow-16: Abandoned

APPENDIX E
NRCS GOPHER TORTOISE SOIL DATA

Appendix E: NRCS Gopher Tortoise Soil Data.

Soil Unit	Soil Unit Name	Acreage in Limits of Disturbance	Slope[1]	Depth of Excavatable Material[2]	Depth to Restrictive Layer[3]	Depth to Water Table[4]	Frequency of Ponding[5]	Frequency of Flooding[6]
AaA	Annemaine fine sandy loam, 0 to 2 percent slopes, rarely flooded	2.7	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Somewhat Suited
AcD	Annemaine-Cahaba complex, 5 to 12 percent slopes, occasionally flooded	0.1	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Not Suited
ArF	Arundel-Cantuche complex, 25 to 60 percent slopes	29.8	Somewhat Suited	Less Suitable	Somewhat Suited	Well Suited	Well Suited	Well Suited
ArG	Arundel-Cantuche complex, 25 to 60 percent slopes, stony	1.6	Not Suited	Less Suitable	Somewhat Suited	Well Suited	Well Suited	Well Suited
AwE	Arundel-Williamsville complex, 15 to 35 percent slopes	2.7	Somewhat Suited	Less Suitable	Somewhat Suited	Well Suited	Well Suited	Well Suited
BaA	Bama fine sandy loam, 0 to 2 percent slopes	23.6	Well Suited	Highly Suitable	Well Suited	Well Suited	Well Suited	Well Suited
BaB	Bama fine sandy loam, 2 to 5 percent slopes	8.7	Well Suited	Highly Suitable	Well Suited	Well Suited	Well Suited	Well Suited
BaC	Bama fine sandy loam, 5 to 8 percent slopes	1.3	Well Suited	Highly Suitable	Well Suited	Well Suited	Well Suited	Well Suited
BbA	Bibb-luka complex, 0 to 1 percent slopes, frequently flooded	12.5	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Not Suited
BiA	Bibb-luka complex, 0 to 2 percent slopes, frequently flooded	6.2	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Not Suited
BJK	Bibb, Johnston and Kinston soils, 0 to 1 percent slopes, frequently flooded	2.6	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Not Suited
BnB	Blanton loamy fine sand, 0 to 5 percent slopes	3.2	Well Suited	Highly Suitable	Well Suited	Somewhat Suited	Well Suited	Well Suited
BnC	Blanton loamy fine sand, 5 to 8 percent slopes	1.6	Well Suited	Highly Suitable	Well Suited	Somewhat Suited	Well Suited	Well Suited
BnE2	Boykin-Luverne-Smithdale complex, 15 to 35 percent slopes, eroded	87.4	Somewhat Suited	Moderately Suitable	Well Suited	Well Suited	Well Suited	Well Suited
BoD2	Boswell fine sandy loam, 5 to 12 percent slopes, eroded	0.2	Well Suited	Less Suitable	Well Suited	Well Suited	Well Suited	Well Suited
BrE2	Brantley-Okeelala complex, 15 to 35 percent slopes, eroded	1.1	Somewhat Suited	Moderately Suitable	Well Suited	Well Suited	Well Suited	Well Suited
BrF	Brantley-Okeelala complex, 35 to 60 percent slopes	4.7	Not Suited	Highly Suitable	Well Suited	Well Suited	Well Suited	Well Suited
BsF	Boykin-Luverne-Smithdale complex, 15 to 35 percent slopes	15.3	Somewhat Suited	Highly Suitable	Well Suited	Well Suited	Well Suited	Well Suited
ByB	Brantley-Okeelala complex, 2 to 5 percent slopes	25.3	Well Suited	Less Suitable	Well Suited	Well Suited	Well Suited	Well Suited
ByD2	Buse-Vienna loams, 12 to 18 percent slopes, eroded	28.3	Well Suited	Less Suitable	Well Suited	Well Suited	Well Suited	Well Suited
ByF2	Brantley-Okeelala complex, 15 to 35 percent slopes, eroded	20.5	Somewhat Suited	Less Suitable	Well Suited	Well Suited	Well Suited	Well Suited

Soil Unit	Soil Unit Name	Acreage in Limits of Disturbance	Slope[1]	Depth of Excavatable Material[2]	Depth to Restrictive Layer[3]	Depth to Water Table[4]	Frequency of Ponding[5]	Frequency of Flooding[6]
ByG	Brantley-Okeelala complex, 35 to 60 percent slopes	3.7	Not Suited	Less Suitable	Well Suited	Well Suited	Well Suited	Well Suited
CaA	Cahaba fine sandy loam, 0 to 2 percent slopes, rarely flooded	0.7	Well Suited	Less Suitable	Well Suited	Well Suited	Well Suited	Well Suited
DSA	Daleville and Smithton soils, 0 to 1 percent slopes, occasionally flooded	2.7	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Not Suited
FrA	Freest fine sandy loam, 0 to 2 percent slopes	2.3	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Not Suited
FrB	Fruitdale sandy loam, 2 to 5 percent slopes	0.1	Well Suited	Moderately Suitable	Well Suited	Somewhat Suited	Well Suited	Well Suited
FtD	Fruitdale-Toinette-Rutan complex, 5 to 15 percent slopes	0.9	Well Suited	Moderately Suitable	Well Suited	Somewhat Suited	Well Suited	Well Suited
GrB	Gritney fine sandy loam, 2 to 5 percent slopes	2.9	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Well Suited
IgC	Irvington fine sandy loam, 5 to 8 percent slopes	0.5	Well Suited	Moderately Suitable	Not Suited	Not Suited	Well Suited	Well Suited
IhA	Izagora fine sandy loam, 0 to 2 percent slopes, rarely flooded	1.2	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Somewhat Suited
IzA	Izagora fine sandy loam, 0 to 2 percent slopes, rarely flooded	48.6	Well Suited	Moderately Suitable	Well Suited	Somewhat Suited	Well Suited	Somewhat Suited
LdC2	Lauderdale-Arundel complex, 2 to 10 percent slopes, stony, eroded	10.3	Well Suited	Less Suitable	Not Suited	Well Suited	Well Suited	Well Suited
LdD2	Lauderdale-Arundel complex, 2 to 10 percent slopes, stony, eroded	3.0	Well Suited	Less Suitable	Not Suited	Well Suited	Well Suited	Well Suited
LeA	Leeper silty clay loam, 0 to 1 percent slopes, frequently flooded	2.8	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Not Suited
LnB	Luverne sandy loam, 1 to 5 percent slopes	7.9	Well Suited	Less Suitable	Well Suited	Well Suited	Well Suited	Well Suited
LnD2	Luverne sandy loam, 5 to 15 percent slopes, eroded	16.8	Well Suited	Less Suitable	Well Suited	Well Suited	Well Suited	Well Suited
LuA	Lucedale sandy loam, 0 to 2 percent slopes	1.1	Well Suited	Moderately Suitable	Well Suited	Well Suited	Well Suited	Well Suited
MaA	Malbis fine sandy loam, 0 to 2 percent slopes	20.2	Well Suited	Moderately Suitable	Well Suited	Somewhat Suited	Well Suited	Well Suited
MaB	Malbis fine sandy loam, 2 to 5 percent slopes	6.3	Well Suited	Less Suitable	Well Suited	Somewhat Suited	Well Suited	Well Suited
MaD	Malbis fine sandy loam, 5 to 12 percent slopes	0.2	Well Suited	Less Suitable	Well Suited	Somewhat Suited	Well Suited	Well Suited
MbC	Maubila-Olla-Rattlesnake Forks complex, 2 to 8 percent slopes	10.5	Well Suited	Less Suitable	Well Suited	Somewhat Suited	Well Suited	Well Suited
MbF2	Maubila-Olla-Rattlesnake Forks complex, 8 to 35 percent slopes, moderately eroded	21.2	Somewhat Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Well Suited
McC	Mattaponi-Peawick complex, 8 to 15 percent slopes	3.5	Well Suited	Moderately Suitable	Well Suited	Well Suited	Well Suited	Well Suited

Soil Unit	Soil Unit Name	Acreage in Limits of Disturbance	Slope[1]	Depth of Excavatable Material[2]	Depth to Restrictive Layer[3]	Depth to Water Table[4]	Frequency of Ponding[5]	Frequency of Flooding[6]
MdA	McCrory-Deerford complex, 0 to 2 percent slopes, occasionally flooded	18.7	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Not Suited
MnB	McLaurin fine sandy loam, 2 to 5 percent slopes	3.2	Well Suited	Moderately Suitable	Well Suited	Well Suited	Well Suited	Well Suited
MW	Miscellaneous Water	0.8	-	-	-	-	-	-
OKA	Ochlockonee, Kinston, and luka soils, 0 to 1 percent slopes, frequently flooded	19.3	Well Suited	Moderately Suitable	Well Suited	Somewhat Suited	Well Suited	Not Suited
PoB	Poarch loamy fine sand, 2 to 5 percent slopes	0.8	Well Suited	Moderately Suitable	Well Suited	Somewhat Suited	Well Suited	Well Suited
PsD	Prim-Suggsville-Hannon complex, 2 to 10 percent slopes	11.5	Well Suited	Less Suitable	Not Suited	Well Suited	Well Suited	Well Suited
PsF	Prim-Suggsville-Hannon complex, 10 to 40 percent slopes	31.4	Somewhat Suited	Less Suitable	Not Suited	Well Suited	Well Suited	Well Suited
RbD2	Rayburn silt loam, 5 to 15 percent slopes, eroded	6.9	Well Suited	Less Suitable	Somewhat Suited	Somewhat Suited	Well Suited	Well Suited
RpD2	Rayburn silt loam, 5 to 15 percent slopes, eroded	0.3	Well Suited	Less Suitable	Somewhat Suited	Somewhat Suited	Well Suited	Well Suited
RrA	Riverview fine sandy loam, 0 to 2 percent	3.9	Well Suited	Moderately Suitable	Well Suited	Well Suited	Well Suited	Not Suited
RuB	Rutan sandy loam, 2 to 5 percent slopes	2.1	Well Suited	Moderately Suitable	Well Suited	Well Suited	Well Suited	Well Suited
RuD	Rutan sandy loam, 5 to 15 percent slopes	1.5	Well Suited	Moderately Suitable	Well Suited	Well Suited	Well Suited	Well Suited
SaB	Savannah silt loam, 2 to 5 percent slopes	6.1	Well Suited	Less Suitable	Somewhat Suited	Not Suited	Well Suited	Well Suited
SmB	Smithdale sandy loam, 2 to 5 percent slopes	90.7	Well Suited	Moderately Suitable	Well Suited	Well Suited	Well Suited	Well Suited
SmD	Smithdale loamy fine sand, 5 to 15 percent slopes	39.8	Well Suited	Moderately Suitable	Well Suited	Well Suited	Well Suited	Well Suited
StD2	Sumter-Maytag complex, 8 to 15 percent slopes, eroded	7.6	Well Suited	Less Suitable	Somewhat Suited	Well Suited	Well Suited	Well Suited
ToC2	Toxey-Brantley-Hannon complex, 3 to 8 percent slopes, eroded	0.3	Well Suited	Less Suitable	Well Suited	Well Suited	Well Suited	Well Suited
Ut	Urban land-anthroportic udorthents complex, 0 to 8 percent slopes, industrial	4.8	-	-	-	-	-	-
UuB	Urbo-Mooreville-Una complex, 0 to 3 percent slopes, frequently flooded	21.5	Well Suited	Less Suitable	Well Suited	Not Suited	Well Suited	Not Suited
W	Water	0.1	-	-	-	-	-	-
WaB	Wadley loamy fine sand, 0 to 5 percent slopes	9.1	Well Suited	Highly Suitable	Well Suited	Well Suited	Well Suited	Well Suited
WbD	Wadley-Boykin-Smithdale complex, 5 to 15 percent slopes	0.1	Well Suited	Highly Suitable	Well Suited	Well Suited	Well Suited	Well Suited

Soil Unit	Soil Unit Name	Acreage in Limits of Disturbance	Slope[1]	Depth of Excavatable Material[2]	Depth to Restrictive Layer[3]	Depth to Water Table[4]	Frequency of Ponding[5]	Frequency of Flooding[6]
WbF	Wadley-Boykin-Smithdale complex, 15 to 35 percent slopes	0.6	Somewhat Suited	Highly Suitable	Well Suited	Well Suited	Well Suited	Well Suited
WmC	Williamsville fine sandy loam, 2 to 8 percent slopes	5.5	Well Suited	Less Suitable	Well Suited	Well Suited	Well Suited	Well Suited

[1]**Slope:** Well Suited: <15%; Somewhat Suited: >= 15 to 35%; Not Suited: >=35%;
[2]**Depth of Excavatable Material:** Highly suitable: >=102 cm (40 in.); Moderately Suitable: >=51-102 cm (20-40 in.); Less Suitable: < 51 cm (20 in.);
[3]**Depth to Restrictive Layer:** Well Suited: >=200 cm (79 in); Somewhat Suited: >=50-200 cm (20-79 in.); Not Suited: <50 cm (20 in.);
[4]**Depth to Water Table:** Well Suited: >=200 cm (79 in.); Somewhat Suited: >=50-200 cm (20-79 in.); Not Suited: <50 cm (20 in.);
[5]**Frequency of Ponding:** Well Suited: None; Somewhat Suited: Rare; Not Suited: Occasional, Common, Frequent;
[6]**Frequency of Flooding:** Well Suited: None, Very Rare; Somewhat Suited: Rare; Not Suited: Occasional, Common, Frequent, Very Frequent.

Appendix I

FRESHWATER MUSSEL SURVEY

Lowman Pipeline

Freshwater Mussel Survey

Choctaw and Washington Counties, Alabama

Prepared for:

NEXTera ENERGY

30 July 2020

Prepared by:

EDGE ENGINEERING & SCIENCE *further insight.*

Edge Engineering and Science, LLC
Cincinnati, Ohio

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LIST OF ACRONYMS

ADI	Area of Direct Impact
DSB	Downstream Buffer
EDGE	Edge Engineering and Science, LLC
ES	Endangered Species
GPS	Global Positioning Systems
LDB	Left Descending Bank
LTB	Lateral Buffer
LDB	Left Descending Bank
NextEra	NextEra Energy Resources
Project	Lowman Pipeline
RDB	Right Descending Bank
ROW	Right-of-Way
USB	Upstream Buffer
USFWS	U.S. Fish and Wildlife Service
WVMSP	West Virginia Mussel Survey Protocol

1.0 PROJECT BACKGROUND

The NextEra Energy Resources' (NextEra) proposed Lowman Pipeline (Project) comprises approximately 86.5 kilometers (53.75 mi) of 41-centimeter (16-in) intrastate natural gas pipeline in Choctaw and Washington counties, Alabama. The Project construction will facilitate the conversion of the existing coal fired PowerSouth Lowman Energy Center in Washington County, Alabama to a natural gas facility. In addition to the pipeline, the Project includes construction of one new compressor station, four-meter stations, and a launcher/receiver facility.

The proposed Project traverses watersheds with potential to harbor state and federally listed freshwater mussel species. In particular, federally endangered inflated heelsplitter (*Potamilus inflatus*) and southern clubshell (*Pleurobema decisum*) are known from tributaries to the Tombigbee River. Edge Engineering and Science, LLC (EDGE) was contracted by NextEra to conduct mussel surveys at predetermined waterbodies along the Project.

2.0 METHODS

Mussel survey efforts were conducted by state and federally permitted malacologists and Project-specific survey protocols were derived the WVMSP (West Virginia Mussel Survey Protocol) (March 2018) for Group 2 streams where federally protected species are likely to occur. Desktop analysis concluded the Project right-of-way (ROW) traverses 12 perennial streams that warranted surveys. Bogueloosa Creek, Folsoms Creek, and Elias Creek are each crossed at multiple locations for a total of 17 survey areas. A summary of all waterbody crossings are provided in Table 1.

Table 1. Perennial stream crossings warranting freshwater mussel surveys along the proposed Lowman Pipeline Project in Choctaw and Washington counties, Alabama.

Stream Name	County	Stream ID[2]	Water Depth[2] (in)	OHWM[1,2] Width (ft)	Appendix B: Map (1 of 15)
Bogueloosa Creek - Upper	Choctaw	S1324	8	30	1
Bogueloosa Creek - Middle	Choctaw	S1324	8	30	2
Bogueloosa Creek - Lower	Choctaw	S2195	8	30	3
Buck Creek	Choctaw	S1270	1	20	4
Okatuppa Creek	Choctaw	S2037A	72	62	5
Souwilpa Creek	Choctaw	S2091	6	62	6
Black Creek	Choctaw	S1064	62	15	7
Turkey Creek	Choctaw	S1065	62	55	8
Santa Bogue Creek	Washington	S1040	56	40	9
Elias Creek	Washington	S2028	48	18	10
Elias Creek [AR]	Washington	S2028AR	48	18	10
Tauler Creek*	Washington	na	36	33	11
Folsoms Creek (Upstream) [AR]	Washington	S2137AR	12	9	12
Folsoms Creek (Downstream) [AR]	Washington	S1153AR	24	20	13
UNT to Folsoms Creek	Washington	S2036	4	12	14
UNT to Tombigbee River	Washington	S1107	12	25	15
UNT to Tombigbee River [AR]	Washington	S1107AR	12	25	15

1. OHWM = ordinary high water mark

2. Stream measurements and IDs derived from the most recent jurisdictional waterbody delineation data

*. Streams lacking initial survey data at time of study plan preparation

[AR]. Stream crossings on access roads potentially containing freshwater mussels

2.1 Timed Search Surveys

Project boundaries are established in the field using sub-meter global positioning system (GPS) coordinates, survey stakes, and maps. Timed search surveys follow a modified version of the WVMSP guidelines for waterline/pipeline corridor disturbance and include a 50-meter (164-ft) upstream buffer (USB) and a 50-meter (164-ft) downstream buffer (DSB) of the pipeline centerline. Timed search mussel surveys encompass a 100-meter (328-ft) total stream reach to quantify the local mussel assemblage.

Depending on water depth, snorkeling (<1 meter [3.28 ft] deep) or SCUBA/surface supply air (>1 meter [3.28 ft] deep) are used to survey for mussels. Surveyors use their hands and fingertips to fan the top level of substrate and rake loose sediments to search for embedded mussels. Location, species counts, survey method (i.e. snorkel, scuba, surface supply), and search time are recorded for each site. All live and deadshell mussels are recorded on standardized datasheets and representative photographs of each species are taken and appended to the report. Habitat in the form of substrate percent composition and water depth is recorded for each site.

2.2 Endangered Species

In the event an endangered species (ES) (i.e., live or fresh/recent deadshell) is encountered within the survey extent, the U.S. Fish and Wildlife Service (USFWS) (Alabama Ecological Field Office) is contacted within 24 hours (or by the next business day). At the time of capture, the live individual is photographed and measured before being returned to the water at the exact capture location with a sub-meter GPS coordinate.

3.0 RESULTS

Freshwater mussel surveys occurred between May 25th and July 28th at 13 pipeline and 4 access road stream crossings in Choctaw and Washington counties, Alabama. Twelve (12) of the 17 stream crossings that were surveyed and traversed by the Project contained Unionid mussel resources (live and/or deadshell).

3.1 Choctaw County

Eight streams were sampled in Choctaw County for freshwater mussels and sites specific results are summarized below.

3.1.1 Bogueloosa Creek (Upper)

Stream ID	S1324
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	7/27/20
Survey Time	80 min.
Catch Per Unit Effort	2.28 individuals / hr.
Surveyors	G. Dinkins, A. Prewitt, T. Brust, D. Ford, M. Kriege
Visibility	60 cm.
Substrate	90% Sand, 5% Bedrock, 5% Gravel
Mussel Species Found	*Villosa lienosa* (3)
Comments	Limited suitable habitat. Dominated by unconsolidated shifting sand

The Project traverses Bogueloosa Creek in three locations. The upper (upstream most) crossing is dominated with sand substrate that transitioned to cobble and gravel moving downstream to the lower (downstream most) crossing. Surveys from the three crossings on Bogueloosa creek resulted in collection 23 live individuals of three species. No notable habitat or significant mussel concentrations were observed from either of the three stream reaches.

3.1.2 Bogueloosa Creek (Middle)

Stream ID	S1324
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	7/27/2020
Survey Time	120 min.
Catch Per Unit Effort	9 individuals / hr.
Surveyors	G. Dinkins, A. Prewitt, T. Brust, D. Ford, M. Kriege
Visibility	46 cm.
Substrate	80% Sand, 10% Silt, 10% Bedrock
Mussel Species Found	*Strophitus radiatus* (7), *Villosa lienosa* (11)
Comments	Mussels found in the silty banks

3.1.3 Bogueloosa Creek (Lower)

Stream ID	S2195
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	7/27/2020
Survey Time	100 min.
Catch Per Unit Effort	1.2 individuals / hr.
Surveyors	G. Dinkins, A. Prewitt, T. Brust, D. Ford, M. Kriege
Visibility	60 cm.
Substrate	25% Bedrock, 25% Gravel, 25% Cobble, 25% Sand
Mussel Species Found	*Villosa vibex* (1), *Villosa lienosa* (1)
Comments	

3.1.4 Buck Creek

Stream ID	S1270
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	5/26/2020
Survey Time	105 min.
Catch Per Unit Effort	0.0 individuals / hr.
Surveyors	G. Dinkins, M. Kriege, D. Foltz, D. Ford
Visibility	30 cm.
Substrate	75% Sand, 15% Gravel, 10% Cobble
Mussel Species Found	No live mussels present
Comments	Abundance of large woody debris

3.1.5 Okatuppa Creek

Stream ID	S2037A
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	7/28/2020
Survey Time	150 min.
Catch Per Unit Effort	0.0 individuals / hr.
Surveyors	G. Dinkins, A. Prewitt, T. Brust, D. Ford, M. Kriege
Visibility	30 cm.
Substrate	90% Sand, 10% Gravel
Mussel Species Found	No live mussels present
Comments	Unconsolidated shifting sand / Sand Rills

3.1.6 Souwilpa Creek

Stream ID	S2091
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	5/26/2020
Survey Time	210 min.
Catch Per Unit Effort	0.57 individuals / hr.
Surveyors	G. Dinkins, M. Kriege, D. Foltz, D. Ford
Visibility	100 cm.
Substrate	90% Sand, 10% Large Woody Debris (in pools)
Mussel Species Found	*Villosa vibex* (1), WD *Villosa lienosa* (1)
Comments	Very poor habitat. Dominated by unconsolidated shifting sand

Mussel surveys along Souwilpa Creek resulted in collection of a single live individual and weathered dead shell of a second species. Substrate was predominantly sand with limited mussel resources throughout the stream reach.

3.1.7 Black Creek

Stream ID	S1064
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	7/7/2020
Survey Time	80 min.
Catch Per Unit Effort	0.0 individuals / hr.
Surveyors	G. Dinkins, A. Prewitt, T. Brust, D. Ford
Visibility	46 cm.
Substrate	50% Sand, 40% Gravel, 10% Cobble
Mussel Species Found	No live mussels present
Comments	Lots of mobile sand and gravel. *Corbicula fluminea* found at site.

3.1.8 Turkey Creek

Stream ID	S1065
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	7/7/2020
Survey Time	120 min.
Catch Per Unit Effort	0.0 individuals / hr.
Surveyors	G. Dinkins, A. Prewitt, T. Brust, D. Ford
Visibility	12.7 cm.
Substrate	50% Sand, 40% Bedrock, 5% Gravel, 5% Cobble
Mussel Species Found	No live mussels present
Comments	Small oxbow and riffle at the bottom of site. Site on RDB was all mobile sand and LDB was all bedrock.

3.2 Washington County

Nine streams were sampled in Washington County for freshwater mussels and sites specific results are summarized below.

3.2.1 Santa Bogue Creek

Stream ID	S1040
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	7/27/2020
Survey Time	320 min.
Catch Per Unit Effort	1.26 individuals / hr.
Surveyors	G. Dinkins, A. Prewitt, T. Brust, D. Ford, M. Kriege
Visibility	30 cm.
Substrate	70% Sand, 20% Gravel, 10% Cobble
Mussel Species Found	*Villosa lienosa* (2), *Tritogonia verrucosa* (4), *Cyclonaias asperata* (1)
Comments	Mussels sparse but present

Santa Bogue Creek provided excellent tree cover and suitable mussel habitat in the form of stable clay and gravel substrate deposits. Unionids were sparsely distributed at the crossing, eight individuals representing three species were collected. This included four live pistolgrip, a species rarely recorded in the southern Tombigbee watershed. This site is notable due to the collection of pistolgrip and Alabama orb, two species not prevalent to this watershed.

3.2.2 Elias Creek

Stream ID	S2028
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	5/25/2020
Survey Time	135 min.
Catch Per Unit Effort	3.54 individuals / hr.
Surveyors	G. Dinkins, M. Kriege, D. Foltz, D. Ford
Visibility	100 cm.
Substrate	80% Sand 20% Large Woody Debris
Mussel Species Found	*Utterbackia imbecillis* (4), *Villosa lienosa* (4)
Comments	1 *Campaloma sp* snail, large black rat snake

3.2.3 Elias Creek AR

Stream ID	S2028AR
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	5/25/2020
Survey Time	180 min.
Catch Per Unit Effort	1.66 individuals / hr.
Surveyors	G. Dinkins, M. Kriege, D. Foltz, D. Ford
Visibility	100 cm.
Substrate	80% Sand, 20% Silt
Mussel Species Found	*Villosa vibex* (1), Fresh dead *Uniomerus tetralasmus* (1), *Utterbackia imbecillis* (2), *Villosa lienosa* (1)
Comments	Anoxic areas of mud. Lots of large woody debris

3.2.4 Tauler Creek

Stream ID	No stream ID available
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	7/8/2020
Survey Time	160 min.
Catch Per Unit Effort	0.0 individuals / hr.
Surveyors	G. Dinkins, A. Prewitt, T. Brust, D. Ford
Visibility	38 cm.
Substrate	100% Detritus
Mussel Species Found	No live mussels present
Comments	Substrate choked by detritus.

3.2.5 Folsoms Creek AR (Upstream)

Stream ID	S1153AR
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	5/25/2020
Survey Time	165 min.
Catch Per Unit Effort	5.8 individuals / hr.
Surveyors	G. Dinkins, M. Kriege, D. Foltz, D. Ford
Visibility	50 cm.
Substrate	80% Sand/Silt, 20% Gravel (in pockets)
Mussel Species Found	*Villosa lienosa* (16)
Comments	

3.2.6 Folsoms Creek AR (Downstream)

Stream ID	S2028AR
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	5/29/2020
Survey Time	180 min.
Catch Per Unit Effort	6 individuals / hr.
Surveyors	G. Dinkins, M. Kriege, D. Foltz, D. Ford
Visibility	50 cm.
Substrate	90% Sand, 10% Gravel
Mussel Species Found	*Villosa lienosa* (18)
Comments	Concrete rubble present. Mussels observed along overhanging roots

3.2.7 UNT to Folsoms Creek

Stream ID	S2036
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	5/25/2020
Survey Time	140 min.
Catch Per Unit Effort	0.0 individuals / hr.
Surveyors	G. Dinkins, M. Kriege, D. Foltz, D. Ford
Visibility	100 cm.
Substrate	50% Sand, 25% Gravel, 15% Cobble, 10% Bedrock/Hardpan
Mussel Species Found	No live mussels present
Comments	Steep (downcut) streambanks

3.2.8 UNT to Tombigbee River AR

Stream ID	S1107AR
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	5/27/2020
Survey Time	90 min.
Catch Per Unit Effort	48.66 individuals / hr.
Surveyors	G. Dinkins, M. Kriege, D. Foltz, D. Ford
Visibility	5 cm.
Substrate	60% Sand, 30% Silt/Detritus, 10% Gravel
Mussel Species Found	*Toxolasma sp. (2)*, *Uniomerus tetralasmus* (60), *Villosa lienosa* (11)
Comments	Painted devil crayfish present. All mussels found downstream of crossing

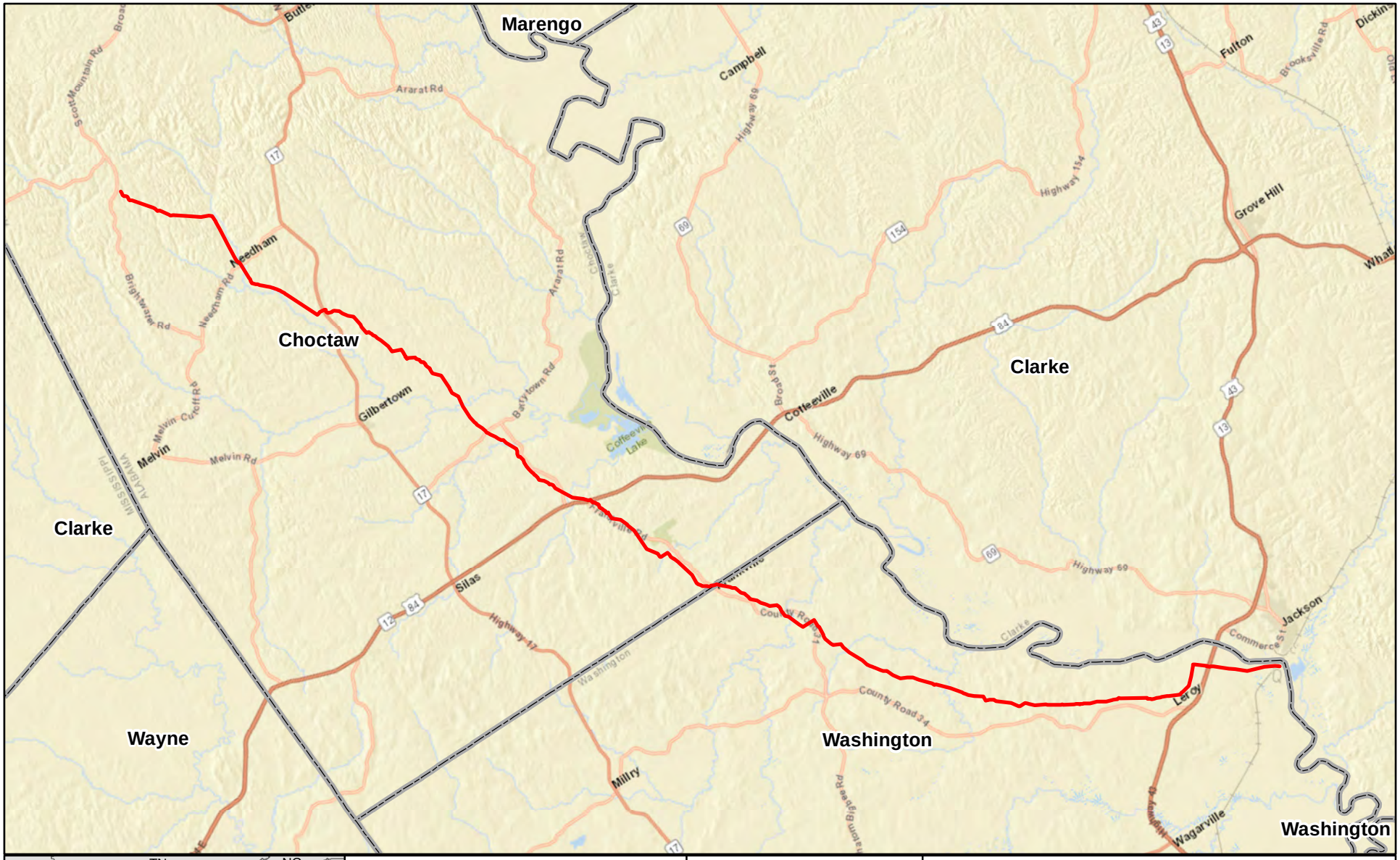
Survey buffers were adjacent to one another for the mainline and access road crossings of UNT to Tombigbee River. Although the stream was turbid during survey efforts, the substrate was predominantly firm silt/mud, offering excellent tactile survey conditions. Mussels were abundant but highly localized in each survey area. The lower survey buffer of the access road and upper survey buffer of the mainline crossing (see Appendix C maps) offered the largest area of suitable habitat. Substrate upstream of the proposed access road crossing and downstream of the mainline crossing were unstable and predominantly silt.

Pondhorn were extremely plentiful (combined abundance *n*=100) at both sites. Little spectaclecase (*n*=11) were only collected at the access road site. The *Toxolasma* species present at both sites is part of a common but understudied species complex and likely represents a species new to science (likely to be split from *Toxolasma parvum*), however it does not carry any state or federal protection designations.

3.2.9 UNT to Tombigbee River

Stream ID	S1107
Coordinates	(b)(7)f, Preliminary pipeline location(s)
Date Surveyed	5/27/2020
Survey Time	100 min.
Catch Per Unit Effort	24 individuals / hr.
Surveyors	G. Dinkins, M. Kriege, D. Foltz, D. Ford
Visibility	5 cm.
Substrate	90% Silt, 10% Large Woody Debris
Mussel Species Found	*Toxolasma sp* (1), *Uniomerus tetralasmus* (39)
Comments	

Figure 1 Project Vicinity Map, Choctaw and Washington counties, Ohio



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4.0 CONCLUSIONS AND REQUEST FOR AGENCY CONCURRENCE

In total, EDGE malacologists conducted surveys at 17 stream crossings along the proposed Lowman Pipeline Project. Survey efforts yielded 199 live unionids representing eight species. Stream substrates were dominated by unsuitable, shifting sand and heavy streambank erosion. Mussels were sparse or locally abundant in small patches.

Mussel survey efforts were completed to alleviate concerns that the Project may disturb federally protected inflated heelsplitter and/or southern clubshell**. No state or federally listed species were recorded as live or deadshell specimens at stream crossings in the Project Area.** EDGE respectfully requests concurrence that mussel survey efforts have fulfilled the USFWS requirements along NextEra's proposed Lowman Pipeline Project in Choctaw and Washington counties, Alabama.

If you have any questions or require additional information, please contact me at (304) 633-5808 or cdswecker@edge-es.com.

Sincerely,

Casey Swecker



Protected Species Practice Lead
Edge Engineering and Science, LLC

5.0 LITERATURE CITED

West Virginia Division of Natural Resources. West Virginia Mussel Survey Protocols (WVMSP). 2018. Elkins, West Virginia. 29 pp.

Appendix A

MUSSEL DATA AND DATASHEETS

Bogueloosa Creek (Upper)					
Area	Species name	Common Name	Length (mm)	Sex	Condition
	Villosa lienosa	little spectaclecase	60	M	
	Villosa lienosa	little spectaclecase	54	M	
	Villosa lienosa	little spectaclecase	48	F	

Bogueloosa Creek (Upper)					
Area	Species name	Common Name	Length (mm)	Sex	Condition
	Strophitus radiatus	rayed creekshell	56		
	Strophitus radiatus	rayed creekshell	60		
	Strophitus radiatus	rayed creekshell	62		
	Strophitus radiatus	rayed creekshell	60		
	Strophitus radiatus	rayed creekshell	70		
	Strophitus radiatus	rayed creekshell	78		
	Strophitus radiatus	rayed creekshell	50		
	Villosa Lienosa	little spectaclecase	57	M	
	Villosa Lienosa	little spectaclecase	56	M	
	Villosa Lienosa	little spectaclecase	60	M	
	Villosa Lienosa	little spectaclecase	54	M	
	Villosa Lienosa	little spectaclecase	50	F	
	Villosa Lienosa	little spectaclecase	50	F	
	Villosa Lienosa	little spectaclecase	44	F	
	Villosa Lienosa	little spectaclecase	54	F	
	Villosa Lienosa	little spectaclecase	48	F	
	Villosa Lienosa	little spectaclecase	50	F	
	Villosa Lienosa	little spectaclecase	47	F	

Bogueloosa Creek (Upper)					
Area	Species name	Common Name	Length (mm)	Sex	Condition
	Villosa vibex	southern rainbow	63.5		
	Villosa lienosa	little Spectaclecase	53.6	M	

Souwilpa Creek					
Area	Species name	Common Name	Length (mm)	Sex	Condition
	Villosa vibex	southern rainbow	60		

Santa Bogue Creek					
Area	Species name	Common Name	Length (mm)	Sex	Condition
	Tritogonia verrucosa	pistolgrip	75	F	
	Tritogonia verrucosa	pistolgrip	63.7	F	
	Tritogonia verrucosa	pistolgrip	100.8	M	
	Tritogonia verrucosa	pistolgrip	103.8	M	
	Villosa lienosa	little spectaclecase	61.5	M	
	Villosa lienosa	little spectaclecase	54.1	F	
	Villosa lienosa	little spectaclecase		F	WD
	Cyclonaias asperata	Alabama orb	48		

Elias Creek					
Area	Species name	Common Name	Length (mm)	Sex	Condition
	Villosa vibex	southern rainbow	60.5		
	Uniomerus tetralasmus	pondhorn			FD
	Utterbackia imbicillis	paper pondshell	49.2		
	Utterbackia imbicillis	paper pondshell	64.6		
	Villosa lienosa	little spectaclecase	60.6	F	

Elias Creek AR					
Area	Species name	Common Name	Length (mm)	Sex	Condition
	Utterbackia imbecillis	paper pondshell	33.9		
	Utterbackia imbecillis	paper pondshell	73.1		
	Utterbackia imbecillis	paper pondshell	67.2		
	Utterbackia imbecillis	paper pondshell	57		
	Villosa lienosa	little spectaclecase	57.4	F	
	Villosa lienosa	little spectaclecase	52.5	F	
	Villosa lienosa	little spectaclecase	68.4	F	
	Villosa lienosa	little spectaclecase	72.5	M	

Folsoms Creek (Upstream)					
Area	Species name	Common Name	Length (mm)	Sex	Condition
US	Villosa lienosa	little spectaclecase	40.1		M
US	Villosa lienosa	little spectaclecase	45.6		F
US	Villosa lienosa	little spectaclecase	48.2		F
US	Villosa lienosa	little spectaclecase	36.2		F
US	Villosa lienosa	little spectaclecase	40.9		F
US	Villosa lienosa	little spectaclecase	39.9		F
DS	Villosa lienosa	little spectaclecase	52.2		M
DS	Villosa lienosa	little spectaclecase	45.6		M
DS	Villosa lienosa	little spectaclecase	37.4		M
DS	Villosa lienosa	little spectaclecase	39.1		M
DS	Villosa lienosa	little spectaclecase	45.4		M
DS	Villosa lienosa	little spectaclecase	31.4		M
DS	Villosa lienosa	little spectaclecase	41		F
DS	Villosa lienosa	little spectaclecase	49.4		F
DS	Villosa lienosa	little spectaclecase	33.5		F
DS	Villosa lienosa	little spectaclecase	43.7		F

Folsoms Creek (Downstream)					
Area	Species name	Common Name	Length (mm)	Sex	Condition
	Villosa lienosa	little spectaclecase	40	F	
	Villosa lienosa	little spectaclecase	45.1	F	
	Villosa lienosa	little spectaclecase	48.8	F	
	Villosa lienosa	little spectaclecase	46	F	
	Villosa lienosa	little spectaclecase	50.2	F	
	Villosa lienosa	little spectaclecase	28	F	
	Villosa lienosa	little spectaclecase	35.3	F	
	Villosa lienosa	little spectaclecase	41.3	F	
	Villosa lienosa	little spectaclecase	43.4	F	
	Villosa lienosa	little spectaclecase	38	F	
	Villosa lienosa	little spectaclecase	40.1	M	
	Villosa lienosa	little spectaclecase	52.5	M	
	Villosa lienosa	little spectaclecase	42.4	M	
	Villosa lienosa	little spectaclecase	59	M	
	Villosa lienosa	little spectaclecase	45.1	M	
	Villosa lienosa	little spectaclecase	44	M	
	Villosa lienosa	little spectaclecase	50.3	M	
	Villosa lienosa	little spectaclecase	46	M	

UNT Tombigbee River					
Area	Species name	Common Name	Length (mm)	Sex	Condition
DS	Toxolasma sp.	N/A	23.1		
DS	Toxolasma sp.	N/A	25.8		
DS	Villosa lienosa	little spectaclecase	38.1	F	
DS	Villosa lienosa	little spectaclecase	38.6	F	
DS	Villosa lienosa	little spectaclecase	37.7	F	
DS	Villosa lienosa	little spectaclecase	35.4	F	
DS	Villosa lienosa	little spectaclecase	42.3	M	
DS	Villosa lienosa	little spectaclecase	42.9	M	
DS	Villosa lienosa	little spectaclecase	40.9	M	
DS	Villosa lienosa	little spectaclecase	20.7	M	
DS	Villosa lienosa	little spectaclecase	43.9	M	
DS	Villosa lienosa	little spectaclecase	42.7	M	
DS	Villosa lienosa	little spectaclecase	38.9	M	
DS	Uniomerus tetralasmus	pondhorn	30.4		
DS	Uniomerus tetralasmus	pondhorn	53.8		
DS	Uniomerus tetralasmus	pondhorn	77.9		
DS	Uniomerus tetralasmus	pondhorn	85.8		
DS	Uniomerus tetralasmus	pondhorn	91.1		
DS	Uniomerus tetralasmus	pondhorn	78.4		
DS	Uniomerus tetralasmus	pondhorn	73.6		
DS	Uniomerus tetralasmus	pondhorn	91.5		
DS	Uniomerus tetralasmus	pondhorn	78.3		
DS	Uniomerus tetralasmus	pondhorn	79.2		
DS	Uniomerus tetralasmus	pondhorn	83.1		
DS	Uniomerus tetralasmus	pondhorn	81.2		
DS	Uniomerus tetralasmus	pondhorn	78.3		
DS	Uniomerus tetralasmus	pondhorn	81.5		
DS	Uniomerus tetralasmus	pondhorn	44		
DS	Uniomerus tetralasmus	pondhorn	87.3		
DS	Uniomerus tetralasmus	pondhorn	78.8		
DS	Uniomerus tetralasmus	pondhorn	75.4		
DS	Uniomerus tetralasmus	pondhorn	56.6		
DS	Uniomerus tetralasmus	pondhorn	73.2		
DS	Uniomerus tetralasmus	pondhorn	63.8		
DS	Uniomerus tetralasmus	pondhorn	38.6		
DS	Uniomerus tetralasmus	pondhorn	47.7		
DS	Uniomerus tetralasmus	pondhorn	64.5		
DS	Uniomerus tetralasmus	pondhorn	42.9		
DS	Uniomerus tetralasmus	pondhorn	74.9		
DS	Uniomerus tetralasmus	pondhorn	53.7		
DS	Uniomerus tetralasmus	pondhorn	70.5		
DS	Uniomerus tetralasmus	pondhorn	93.8		
DS	Uniomerus tetralasmus	pondhorn	81.6		
DS	Uniomerus tetralasmus	pondhorn	87.7		
DS	Uniomerus tetralasmus	pondhorn	71.3		

UNT Tombigbee River continued			
DS	Uniomerus tetralasmus	pondhorn	59.2
DS	Uniomerus tetralasmus	pondhorn	50.3
DS	Uniomerus tetralasmus	pondhorn	42.7
DS	Uniomerus tetralasmus	pondhorn	40
DS	Uniomerus tetralasmus	pondhorn	73.8
DS	Uniomerus tetralasmus	pondhorn	91.3
DS	Uniomerus tetralasmus	pondhorn	76.8
DS	Uniomerus tetralasmus	pondhorn	81.7
DS	Uniomerus tetralasmus	pondhorn	81.9
DS	Uniomerus tetralasmus	pondhorn	90.4
DS	Uniomerus tetralasmus	pondhorn	75.9
DS	Uniomerus tetralasmus	pondhorn	104.8
DS	Uniomerus tetralasmus	pondhorn	87.9
DS	Uniomerus tetralasmus	pondhorn	71.8
DS	Uniomerus tetralasmus	pondhorn	79.2
DS	Uniomerus tetralasmus	pondhorn	62.3
DS	Uniomerus tetralasmus	pondhorn	88.7
DS	Uniomerus tetralasmus	pondhorn	81.8
DS	Uniomerus tetralasmus	pondhorn	69.5
DS	Uniomerus tetralasmus	pondhorn	87.4
DS	Uniomerus tetralasmus	pondhorn	71.7
DS	Uniomerus tetralasmus	pondhorn	68.1
DS	Uniomerus tetralasmus	pondhorn	78.9
DS	Uniomerus tetralasmus	pondhorn	61.3
DS	Uniomerus tetralasmus	pondhorn	50.8
DS	Uniomerus tetralasmus	pondhorn	51.8
DS	Uniomerus tetralasmus	pondhorn	46.4
DS	Uniomerus tetralasmus	pondhorn	42.5
DS	Uniomerus tetralasmus	pondhorn	37.1

UNT Tombigbee River AR					
Area	Species name	Common Name	Length (mm)	Sex	Condition
	Toxolasma sp.	N/A	25.9		
	Uniomerus tetralasmus	pondhorn	106.6		
	Uniomerus tetralasmus	pondhorn	74.7		
	Uniomerus tetralasmus	pondhorn	90.8		
	Uniomerus tetralasmus	pondhorn	68.4		
	Uniomerus tetralasmus	pondhorn	96.7		
	Uniomerus tetralasmus	pondhorn	70.9		
	Uniomerus tetralasmus	pondhorn	84.8		
	Uniomerus tetralasmus	pondhorn	79.6		
	Uniomerus tetralasmus	pondhorn	86.9		
	Uniomerus tetralasmus	pondhorn	41.5		
	Uniomerus tetralasmus	pondhorn	86.4		
	Uniomerus tetralasmus	pondhorn	89.4		
	Uniomerus tetralasmus	pondhorn	60		
	Uniomerus tetralasmus	pondhorn	85.5		
	Uniomerus tetralasmus	pondhorn	89.8		
	Uniomerus tetralasmus	pondhorn	79.6		
	Uniomerus tetralasmus	pondhorn	68.9		
	Uniomerus tetralasmus	pondhorn	74.1		
	Uniomerus tetralasmus	pondhorn	74.5		
	Uniomerus tetralasmus	pondhorn	76.5		
	Uniomerus tetralasmus	pondhorn	75.6		
	Uniomerus tetralasmus	pondhorn	79.4		
	Uniomerus tetralasmus	pondhorn	86		
	Uniomerus tetralasmus	pondhorn	86.3		
	Uniomerus tetralasmus	pondhorn	76.3		
	Uniomerus tetralasmus	pondhorn	97		
	Uniomerus tetralasmus	pondhorn	89.5		
	Uniomerus tetralasmus	pondhorn	86.8		
	Uniomerus tetralasmus	pondhorn	84.3		
	Uniomerus tetralasmus	pondhorn	89.4		
	Uniomerus tetralasmus	pondhorn	52.2		
	Uniomerus tetralasmus	pondhorn	91.1		
	Uniomerus tetralasmus	pondhorn	81.3		
	Uniomerus tetralasmus	pondhorn	85.2		
	Uniomerus tetralasmus	pondhorn	90.5		
	Uniomerus tetralasmus	pondhorn	60.3		
	Uniomerus tetralasmus	pondhorn	85.7		
	Uniomerus tetralasmus	pondhorn	50		
	Uniomerus tetralasmus	pondhorn	86.3		

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Mussel Habitat Assessment

Project Info

Project Name: Loman Pipeline
State: AL County: Choctaw Stream Name: Boogalosa - Upper site
Latitude: _____ Longitude: _____

Survey Info

Surveyor names: G. Dinkins A. Prewitt M. Kriege T Brust D. Ford
Date Surveyed: 7/27/20 Distance Surveyed: 100m
Total time Surveyed (min x people): 80 min Permit numbers: _____
Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): grubbing

Habitat Discription

Water Temp: 68 Air Temp: 75 Visibility: 2 feet
Max depth: 3 ft Average Depth: 1 ft Stream width: 10-15 m

Substrate Types (in Percent): 90 sand 5 bedrock 5 gravel
Morphology (In Percent): Riffle _____ Run 20 Pool 80 Glide _____

Results

Evidence of mussels (Yes, No, Deadshell Only): _____
Species Found: ~~A. [illegible]~~ V. lienosa

Survey Comments: Limited suitable habitat. Dominated by bedrock & mobile sand

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Mussel Datasheet

Surveyor names Dinkins, Krieger, Prewitt, Ford, Brust Date 7/27/20

Stream Name Bodo Talofa (UPPER) County Choctaw State AL

#	Area (US, DS, ADI)	Survey Type	Species	Length	M/F	Tag	Comments
1		Qual	V. fiscosa	60	M		
2				54	M		
3				48	F		
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

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Mussel Habitat Assessment

Project Info

Project Name: Lowman Pipeline
State: AL County: Choctaw Stream Name: Boogalosa Middle
Latitude: _____ Longitude: _____

Survey Info

Surveyor names: G. Binkins A. Prewitt M Kridge D. Ford T. Brust
Date Surveyed: 7/27/20 Distance Surveyed: 100 m
Total time Surveyed (min x people): 120 min Permit numbers: _____
Survey type: timed Search Equipment Used (Snorkel, Scuba, SSA): grubbing

Habitat Discription

Water Temp: 68 Air Temp: 75 Visibility: 1.5 ft
Max depth: 3 ft Average Depth: 2 ft Stream width: 10 m

Substrate Types (in Percent): 80 sand 10 silt 10 bedrock
Morphology (In Percent): Riffle 20 Run 40 Pool 40 Glide _____

Results

Evidence of mussels (Yes, No, Deadshell Only): _____
Species Found: ~~_____~~ V. lienosa, Strophitus radiatus

Survey Comments: Mussels found in muddy sand banks.

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Mussel Datasheet

Surveyor names Dinkins, Krieger, Prewitt, Brust, Ford Date 7/27/20

Stream Name Boogalosa (middle) County Choctaw State AL

#	Area (US, DS, ADI)	Survey Type Qual	Species	Length	M/F	Tag	Comments
1			Strophitus rotundatus	56.0			
2				60			
3				62			
4				60			
5				70			
6				78			
7				50			
8			Villosa	57	M		
9				56			
10				60			
11				54			
12				50	F		
13				50			
14				44			
15				54			
16				48			
17				50			
18				47			
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

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Mussel Habitat Assessment

Project Info

Project Name: Bowman Pipeline
State: AL County: Choctaw Stream Name: Boogalosa creek - Lower
Latitude: _____ Longitude: _____

Survey Info

Surveyor names: G Dinkins A prewitt MKrieg DFord T Brust
Date Surveyed: 7/27/20 Distance Surveyed: 100m
Total time Surveyed (min x people): 100 min Permit numbers: _____
Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): grubbing

Habitat Discription

Water Temp: 68 Air Temp: 75 Visibility: to bottom
Max depth: 2ft Average Depth: 10inch Stream width: 10 meters

Substrate Types (in Percent): 25 Bedrock 25 gravel 25 cobble 25 Sand
Morphology (In Percent): Riffle 30 Run 20 Pool 50 Glide _____

Results

Evidence of mussels (Yes, No, Deadshell Only): _____
Species Found: V. vibex V. lienosa

Survey Comments: _____

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Mussel Datasheet

Surveyor names Dinkins, Kriege, Prewitt, Ford, Brust Date 7/27/20

Stream Name Boogalosa (lower) County Choctaw State AL

#	Area (US, DS, ADI)	Survey Type Qual	Species	Length	M/F	Tag	Comments
1	DS		V vibex	63.5			Lots of bedrock
2			V liengosa	53.6	M		in site
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

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Mussel Habitat Assessment

Project Info

Project Name: Lowman

State: AL County: Choctaw Stream Name: Buck creek

Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: G.dinkins M.Kriege D. Foltz D. Ford

Date Surveyed: 5/26/20 Distance Surveyed: 100 m

Total time Surveyed (min x people): 105 Permit numbers:

Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): snorkel Grubbing

Habitat Discription

Water Temp: Air Temp: Visibility: turbid

Max depth: 2 ft Average Depth: Stream width: 8-12 m

Substrate Types (in Percent): sand gravel mix w/ some cobble

Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes, No, Deadshell Only): No mussels

Species Found:

Survey Comments: lots of large woody debris

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DATASHEET# 1
DATE 5-26-20

Project/Task: 1461 Lawrence Mussel Survey Stream Buck cr. State AL County Choctaw

ESI - Mussel Datasheet

No.	Area	Cell	Bank	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M / J / F	Photo #s	Comments
1						NLM							
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

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Mussel Habitat Assessment

Project Info

Project Name: Lowman Pipeline Survey
State: AL County: Choctaw Stream Name: Okatuppa
Latitude: _____ Longitude: _____

Survey Info

Surveyor names: Dinkins, Krieg, Prewitt, Ford, Brust
Date Surveyed: 7/28/20 Distance Surveyed: 100 m
Total time Surveyed (min x people): 150 min Permit numbers: _____
Survey type: SSA Equipment Used (Snorkel, Scuba, SSA): _____

Habitat Discription

Water Temp: 70 Air Temp: 75 Visibility: 1ft.
Max depth: 8 ft Average Depth: 3.5 ft Stream width: 30 m

Substrate Types (in Percent): 90 Sand 10 gravel
Morphology (In Percent): Riffle _____ Run 100 Pool _____ Glide _____

Results

Evidence of mussels (Yes, (No), Deadshell Only): _____
Species Found: _____

Survey Comments: Terrible substrate (mobile sand)

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Mussel Datasheet

Surveyor names Kriege, Ford Dinkins, Prewitt, Brust Date 7-28-20

Stream Name Okatuppa County Choctaw State AL

#	Area (US, DS, ADI)	Survey Type Qual	Species	Length	M/F	Tag	Comments
1			NLM				
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

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Mussel Habitat Assessment

Project Info

Project Name: Lowman

State: AL County: Choctaw Stream Name: Souwilpa creek

Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: G Dinkins, M Krieger, D. Foltz D. Ford

Date Surveyed: 5/26/20 Distance Surveyed: 100 m

Total time Surveyed (min x people): 210 m Permit numbers:

Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): snorkel & grubbing

Habitat Discription

Water Temp: Air Temp: Visibility:

Max depth: 4 ft Average Depth: Stream width: 15-20m

Substrate Types (in Percent): Sand Bottom silty banks ~~sand~~ wood in pools

Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes, No, Deadshell Only):

Species Found: 1 V. villosa vibex, 1 wd V. vienosa

Survey Comments:

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DATASHEET# 1
DATE 5-27-20

Project/Task: 161 LEHMAN Stream Sowilpa Cr State AL County Washington

ESI - Mussel Datasheet

No.	Area	Cell	Bank	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M / J / F	Photo #s	Comments
1					V	Vibex	60.0						
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

EDGE ENGINEERING & SCIENCE further insight.

Mussel Habitat Assessment

Project Info

Project Name: Lowman

State: AL County: Choctaw Stream Name: Black creek

Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: G Dinkins A Prewitt T Brust D Ford

Date Surveyed: 7/7/20 Distance Surveyed: 100m

Total time Surveyed (min x people): 30 min/p Permit numbers:

Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): grubbing

Habitat Discription

Water Temp: Air Temp: Visibility: 18 inches

Max depth: 3ft Average Depth: Stream width: 6-7m

Substrate Types (in Percent): 50% sand 40% gravel 10 cobble

Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes, No, Deadshell Only):

Species Found:

Survey Comments: Corbicula found continued lots of mobil sand and gravel

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Mussel Habitat Assessment

Project Info

Project Name: Lowman

State: AL County: Choctaw Stream Name: Turkey Creek

Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: G Dinkins APrewitt T Brust D Ford

Date Surveyed: 7/7/20 Distance Surveyed: 100m

Total time Surveyed (min x people): 120 m'n Permit numbers:

Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): & grubbing

Habitat Discription

Water Temp: Air Temp: Visibility: 5 inches

Max depth: 3.5 Average Depth: 2 Stream width: 20m

Substrate Types (in Percent): 50 sand 40 bedrock 5 gravel 5 cobble

Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes, No, Deadshell Only):

Species Found:

Survey Comments: small Oxbow and riffle at bottom rdB mobil sand LDB all Bedrock

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EDGE ENGINEERING & SCIENCE further insight.

Mussel Habitat Assessment

Project Info

Project Name: Lowman Pipeline
State: AL County: Washington Stream Name: Santa Bogue
Latitude: _____ Longitude: _____

Survey Info

Surveyor names: G.Dinkins A Prewitt M Kriege D ford T Brust
Date Surveyed: 7/27/20 Distance Surveyed: 100 m
Total time Surveyed (min x people): 320 min Permit numbers: _____
Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): Snorkel

Habitat Discription

Water Temp: ~70°F Air Temp: 75°F Visibility: 1.0 ft.
Max depth: 2.6 ft. Average Depth: 3 ft. Stream width: 20-25m

Substrate Types (in Percent): 70 sand 20 gravel 10 cobble
Morphology (In Percent): Riffle_____ Run 100 Pool_____ Glide_____

Results

Evidence of mussels (Yes, No, Deadshell Only): _____
Species Found: V Lienosa, T verricosa, Q asperta

Survey Comments: Mussels sparse but present

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EDGE ENGINEERING & SCIENCE *further insight.*

Mussel Datasheet

Surveyor names Ford, Blust, Dinkins, Prewitt, Kriegs Date 7/27/20

Stream Name Santa Bogue County Choctaw State AL

#	Area (US, DS, ADI)	Survey Type Qual	Species	Length	M/F	Tag	Comments
1			T. verrucosa	75.0	F		
2			↓	63.7	F		
3			↓	100.8	M		
4			↓	103.8	M		
5			V. lienosa	61.5	M		
6			↓	54.1	F		
7			↓	WD	F		
8			O. asperata	48.0			lacked pustules
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

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Mussel Habitat Assessment

Project Info

Project Name: Lowman
State: AL County: Washington Stream Name: Elias Creek (Adi)
Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: G. Dinkins, M. Kriege, D. Foltz, D. Ford
Date Surveyed: 5/25/20 Distance Surveyed: 100m
Total time Surveyed (min x people): 135 min Permit numbers:
Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): snorkel / Grubbing

Habitat Discription

Water Temp: Air Temp: Visibility:
Max depth: 8ft Average Depth: Stream width: 8-12m

Substrate Types (in Percent): silty sand bottom w/ clay banks lots of LWD
Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes, No, Deadshell Only): yes
Species Found: 4 U. imbecillis, 4 V. lienosa

Survey Comments: 1 campaloma sp Large black rat snake

Scanned with CamScanner

ESI

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

31.628940748 -88.13854482

DATASHEET# 1
DATE 5/25/20

Project/Task: 1461 Lowman Stream Elias Creek State AL County

(downstream site)

ESI - Mussel Datasheet

No.	Area	Cell	Bank	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M / J / F	Photo #s	Comments
1					U	utterbackia	33.9						
2					↓	↓	78.1						
3					↓	↓	67.2						
4					↓	↓	57.0						
5					V.	lienosa	57.4	1xFD 7			F		
6					↓	↓	52.5				F		
7					↓	↓	68.4				F		
8					↓	↓	72.5				M		
9													
10					Campeloma	sp.	Snail						
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

Mussel Habitat Assessment

Project Info

Project Name: Lowman
State: AL County: washington Stream Name: Elias creek (AR)
Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: G. Dinkins, M. Kriege, D. Foltz D Ford
Date Surveyed: 5/25/20 Distance Surveyed: 100 m
Total time Surveyed (min x people): 180 min Permit numbers:
Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): SCUBA & grubbing

Habitat Discription

Water Temp: Air Temp: Visibility:
Max depth: 8 ft Average Depth: 3 ft Stream width: 8-12 m

Substrate Types (in Percent): silty sand bottom w/ clay banks
Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes, No, Deadshell Only): yes
Species Found: 1 villosa vibex, 1x elliptio sp partially eaten, 2 u. imbecillis, 1 v. lienosa

Survey Comments: anoxic areas lots of LWD

Scanned with CamScanner

ESI

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

31.62840310 -88.13990873

DATASHEET# 1
DATE 5/25/20

Project/Task: 1461 Lowden

Stream Elias Creek AR State AL

(upstream site)

County

ESI - Mussel Datasheet

No.	Area	Cell	Bank	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M / J / F	Photo #s	Comments
1					V.	vibex	60.5						
2					U	tetralasmus	FD w/ impact, eaten by otter, shell + tissue retained						
3					U.	imbecilis	49.2						
4					↓	↓	64.6						
5					V.	lienosa	60.6				F		
6													
7					Campeloma	sp	Live x 3						
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

EDGE ENGINEERING & SCIENCE further insight.

Mussel Habitat Assessment

Project Info

Project Name: Lowman

State: AL County: washington Stream Name: Tauler creek

Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: GDinkins Aprewitt TBrust Dford

Date Surveyed: 7/8/20 Distance Surveyed: 100 meters

Total time Surveyed (min x people): 160 Permit numbers:

Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): Snorkling

Habitat Discription

Water Temp: Air Temp: 90 Visibility: 15 inches

Max depth: 5 feet Average Depth: 3 ft Stream width: 10 M

Substrate Types (in Percent): 100% detritus

Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes, No, Deadshell Only):

Species Found:

Survey Comments: substrate choked by detritus

Scanned with CamScanner

EDGE
ENGINEERING & SCIENCE
further insight.

Mussel Habitat Assessment

Project Info

Project Name: Lowman
State: AL County: Washington Stream Name: Folsoms Creek
Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: G. Dinkins, M. Krieger, D. Foltz, D. Ford
Date Surveyed: 5/25/20 Distance Surveyed: 100m
Total time Surveyed (min x people): 165 min Permit numbers:
Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): snorkel/grubbing

Habitat Discription

Water Temp: Air Temp: Visibility:
Max depth: 4 ft Average Depth: Stream width: 5-7m

Substrate Types (in Percent): mostly silty sand, some pockets of gravel & clay
Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes, No, Deadshell Only): yes
Species Found: 16 Villosa lienosa

Survey Comments:

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ESI

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

31.5582178 -88.08231516

DATASHEET# 1
DATE 5-25-20

Project/Task: 1461 Lawman

Stream ~~[illegible]~~ Folsoms Creek

State AL

County Washington

ESI - Mussel Datasheet

Survey Start: 9:15 AM End 10:10

No.	Area	Cell	Bank	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M / J / F	Photo #s	Comments
1	U5				V. nebulosa	lienosa	40.1	FDx1			M		
2	↓						45.6				F		
3							48.2				F		
4							36.2				F		
5							40.9				F		
6	↓						39.9				F		
7	D5						52.2				M		
8	↓						45.6				M		
9							37.4				M		
10							39.1				M		
11							45.4				M		
12							31.4				M		
13							41.0				F		
14							49.4				F		
15							33.5				F		
16	↓						43.7				F		
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

Mussel Habitat Assessment

Project Info

Project Name: Lowman

State: AL County: Washington Stream Name: Folsoms Creek AR

Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: G Dinkins, M Kriege D Foltz D Ford

Date Surveyed: 5/29/20 Distance Surveyed: 100m

Total time Surveyed (min x people): 160 min Permit numbers:

Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): Hookah & grabbing

Habitat Discription

Water Temp: Air Temp: Visibility:

Max depth: 5 ft Average Depth: Stream width: 3-6m

Substrate Types (in Percent): sand bottom pockets of gravel

Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes, No, Deadshell Only):

Species Found: Villosa lienosa

Survey Comments: Lots of concrete chunks in stream mussels found around roots

Scanned with CamScanner

ESI

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1
DATE 5/29/2020

Project/Task: 1461 Lowman Mussel Surveys **Stream** Folsoms Creek AR **State** AL **County** Washington

ESI - Mussel Datasheet

No.	Area	Cell	Bank	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M / J / F	Photo #s	Comments
1					V	lienosa	40.0	WD21 F			F		
2					↓	↓	45.1				↓		
3							48.8						
4							46.0						
5							50.2						
6							28.0						
7							35.3						
8							41.3						
9							43.4						
10							38.0				↓		
11							40.1				M		
12							52.5				↓		
13							42.4						
14							59.0						
15							45.1						
16							44.0						
17							50.3						
18					↓	↓	46.0				↓		
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

Mussel Habitat Assessment

Project Info

Project Name: Lowman
State: AL County: Washington Stream Name: UNT To Folsoms creek
Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: G. Dinkins, M. Kriege, D. Foltz, D. Ford
Date Surveyed: 5/25/20 Distance Surveyed: 100m
Total time Surveyed (min x people): 140 min Permit numbers:
Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): snorkel/Grubbing

Habitat Discription

Water Temp: Air Temp: Visibility: great clarity
Max depth: 1-5 ft Average Depth: Stream width: 3-5m

Substrate Types (in Percent): sand, gravel, and cobble mix w/ areas of clay/hardpan
Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes, No, Deadshell Only): NO Live mussels
Species Found:

Survey Comments: very downcut

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ESI

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

31.562778° -88.078783° DATASHEET# 1
DATE 5/25/20

Project/Task: NRL Louisiana Mussel Surveys Stream UNT to Folsoms Creek State AL County Washington

ESI - Mussel Datasheet

No.	Area	Cell	Bank	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M / J / F	Photo #s	Comments
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
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21													
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25													
26													
27													
28													
29													
30													

NO Mussels

* Male / Juvenile / Female

*Diver (initials only)

EDGE ENGINEERING & SCIENCE further insight.

Mussel Habitat Assessment

Project Info

Project Name: Lowman

State: AL County: Washington Stream Name: Unt Tombigbee

Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: G Dinking MKnieye DFoltz Dford

Date Surveyed: 5/27/20 Distance Surveyed: 100m

Total time Surveyed (min x people): 100 min Permit numbers:

Survey type: time search Equipment Used (Snorkel, Scuba, SSA): snorkel

Habitat Discription

Water Temp: Air Temp: Visibility: very turbid

Max depth: 3.5 ft Average Depth: Stream width: 3-20m

Substrate Types (in Percent): mostly muck and mud & LWD occasional sand pockets

Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes) No, Deadshell Only):

Species Found: Toxolasma sp., U. Tetralasmus

Survey Comments: rained 24 hrs previos

Scanned with CamScanner

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4525 Lake Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

downstream Sink (crossing)

DATASHEET# 1
DATE 5/17/20

Project/Task: Lowman Mussel Survey Stream NFT to Tombigbee State AL County Washington

ESI - Mussel Datasheet

No.	Area	Cell	Bank	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M/J/F	Photo #	Comments
1					Toxolasma sp		25.2						
2					U.	[illegible]	106.6	49.4					
3							74.7	52.2					
4							90.2	91.1					
5							68.4	81.3					
6							91.7	85.2					
7							70.9	40.5					
8							84.8	60.3					
9							79.6	85.7					
10							86.9	50.0					
11							41.5	86.3					
12							86.4						
13							89.4						
14							60.0						
15							85.5						
16							89.8						
17							79.6						
18							66.9						
19							74.1						
20							74.5						
21							76.5						
22							75.6						
23							79.4						
24							86.0						
25							86.3						
26							76.3						
27							97.0						
28							89.5						
29							81.8						
30							87.3						

* Male / Juvenile / Female

*Diver (initials only)

Scanned with CamScanner

EDGE ENGINEERING & SCIENCE further insight.

Mussel Habitat Assessment

Project Info

Project Name: Lowman
State: AL County: Washington Stream Name: UNT Tombigbee (AR)
Latitude: (b)(7)f, Preliminary pipeline location(s) Longitude: (b)(7)f, Preliminary pipeline location(s)

Survey Info

Surveyor names: G Pinkins, M Kriege, D Foltz D Ford
Date Surveyed: 5/27/20 Distance Surveyed: 100 m
Total time Surveyed (min x people): 70 min Permit numbers:
Survey type: timed search Equipment Used (Snorkel, Scuba, SSA): Snorkel & scuba

Habitat Discription

Water Temp: Air Temp: Visibility:
Max depth: 3.5 Average Depth: Stream width: 3m - 21m

Substrate Types (in Percent): sand & gravel with silt in Lower reach muck around knees
Morphology (In Percent): Riffle Run Pool Glide

Results

Evidence of mussels (Yes), No, Deadshell Only):
Species Found: 60 ea Tetralasmus
11 ea Lienosa
2 Toxolasma sp

Survey Comments: painted devil crayfish
all mussels found in down stream

Scanned with CamScanner

Upstream Site (Access Road)

ESI

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1
DATE 5/27/20

Project/Task: Mobile Lowman Mussel Surveys Stream UNT to Tombigbee ARState AL County Washington

No mussels collected US of AR

ESI - Mussel Datasheet

No.	Area	Cell	Bank	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M/J/F	Photo #s	Comments
1					Toxolasma	SP	23.1						
2					↓	↓	25.8						
3					V.	Lienosa	38.1	38.6	37.7	35.4	Females	FD x1	
4					↓	↓	42.3	42.9	40.9	20.7	43.9, 42.7	38.9 Males	
5					V.	tetralasmus	30.4	53.7	86.0				
6							53.8	70.5	71.7				
7							77.9	93.8	68.1				
8							85.8	81.6	78.9				
9							91.1	87.7	66.3				
10							78.4	71.3	50.8				
11							73.6	59.2	51.8				
12							91.5	50.3	46.4				
13							78.3	42.7	42.5				
14							79.2	40.0	37.1				
15							83.1	73.8					
16							81.2	91.3					
17							78.3	76.8					
18							81.5	81.7					
19							44.0	81.9					
20							87.3	90.4					
21							78.8	75.9					
22							75.4	104.8					
23							56.6	87.9					
24							73.2	71.8					
25							63.8	79.2					
26							38.6	62.3					
27							47.7	88.7					
28							64.5	81.8					
29							42.9	69.5					
30							74.9	87.4					

* Male / Juvenile / Female

*Diver (initials only)

Scanned with CamScanner

Appendix B

REPRESENTATIVE PHOTOGRAPHS

Black Creek



Facing upstream



Facing downstream

Buck Creek



Facing upstream



Facing downstream

Santa Bogue Creek



Facing upstream



Facing downstream



Collection of live mussels



Alabama orb – *Cyclonaias asperata*



Little spectaclecase – *Villosa lienosa*



Pistolgrip – *Tritogonia verrucosa*

Bogueloosa Creek – Lower Site



Facing upstream



Facing downstream



Little spectaclecase – *Villosa lienosa*



Southern rainbow – *Villosa vibex*

Bogueloosa Creek – Middle Site



Facing upstream



Facing downstream



Little spectaclecase – *Villosa lienosa*



Rayed creekshell– *Strophitus radiatus*

Bogueloosa Creek – Upper Site



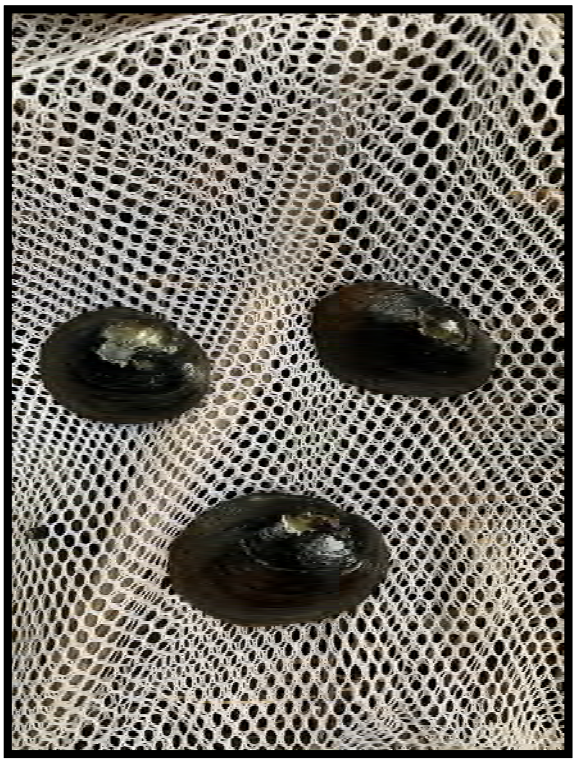
Facing upstream



Facing downstream



Log jam in the lower survey area



Little spectaclecase – *Villosa lienosa*

Souwilpa Creek



Facing upstream



Facing downstream



Southern rainbow – *Villosa vibex*

Turkey Creek



Facing upstream



Facing downstream

Elias Creek



Facing upstream



Facing downstream



Little spectaclecase – *Villosa lienosa*



Paper pondshell – *Utterbackia imbecillis*

Elias Creek – Access Road



Facing upstream



Facing downstream



Southern rainbow – *Villosa vibex*



Little spectaclecase – *Villosa lienosa*



Paper pondshell – *Utterbackia imbecillis*

UNT to Tombigbee Access Road



Facing upstream



Facing downstream



Pondhorn – *Uniomerus tetralasmus*



Toxolasma sp.



Little spectaclecase – *Villosa lienosa*



Additional site photo

UNT to Tombigbee



Facing upstream



Facing downstream



UNT to Tombigbee – Additional site photo



Collection of live mussels



Toxolasma sp.



Pondhorn – *Uniomerus tetralasmus*

Tauler Creek



Facing upstream



Facing downstream

Okatuppa Creek



Facing upstream



Facing downstream

Folsoms Creek Upper Access Road



Facing upstream



Facing downstream



Little spectaclecase – *Villosa lienosa*

UNT to Folsoms Creek



Facing upstream



Facing downstream

Folsoms Creek Lower Access Road



Facing upstream



Facing downstream



Downstream of access road crossing

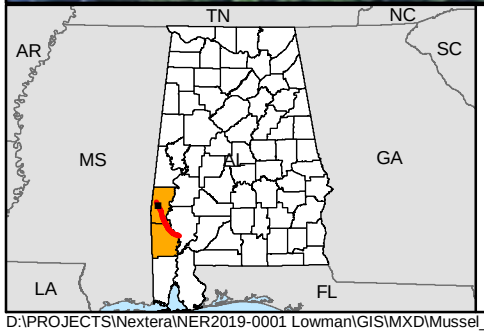


Little spectaclecase – *Villosa lienosa*

Appendix C

MUSSEL SURVEY EXTENT MAPS





Legend

- Proposed Centerline
- Proposed Access Road
- Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

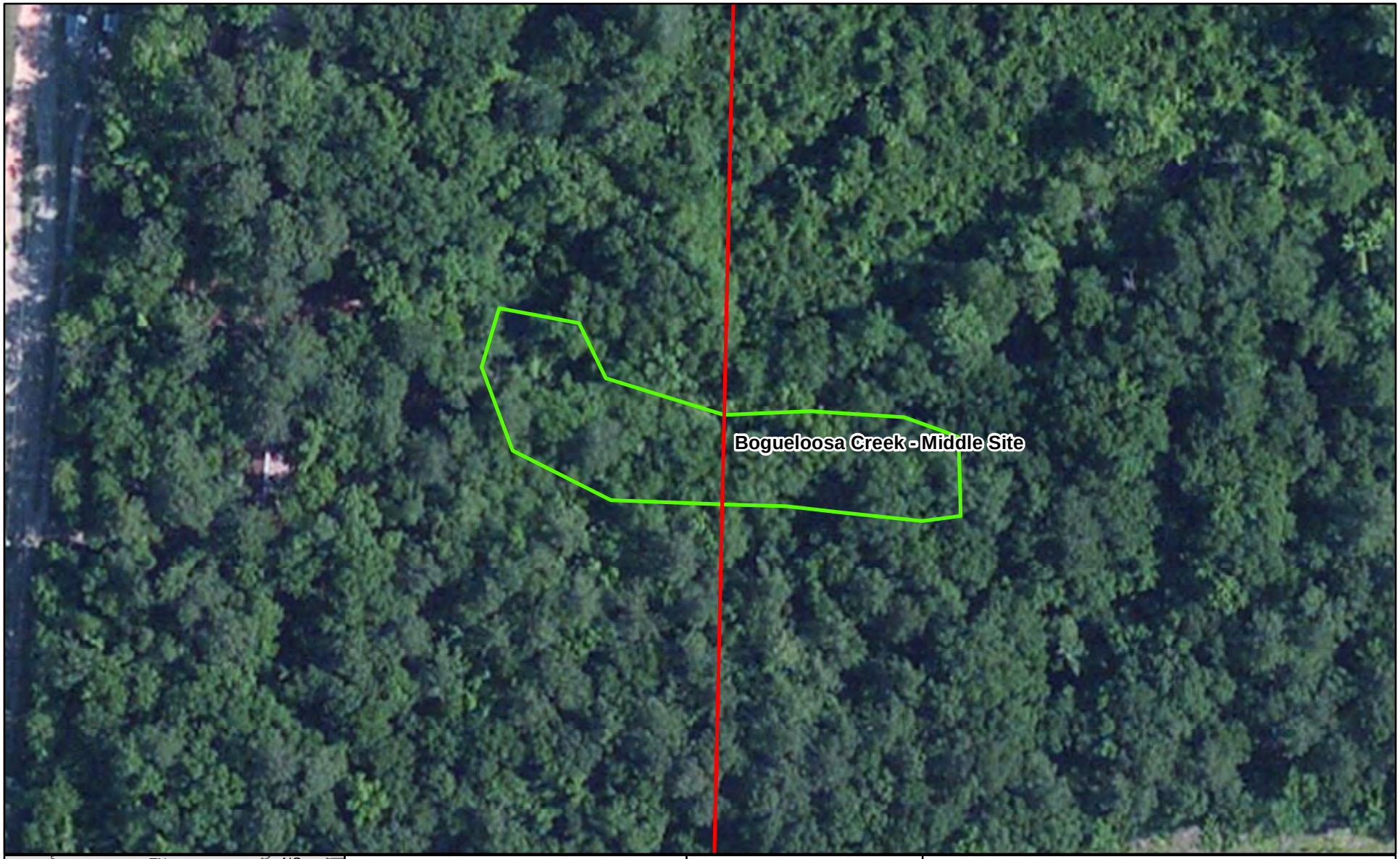
EDGE ENGINEERING & SCIENCE

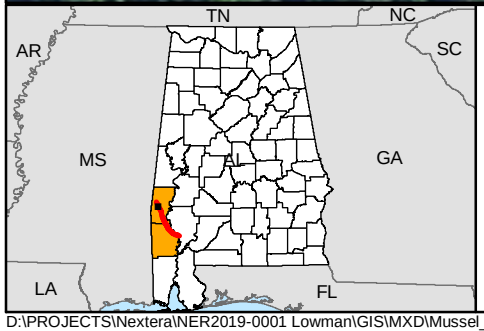
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Bogueloosa Creek - Upper Site crossing along the Proposed Lowman Pipeline Project within Choctaw County, Alabama

Map 1 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

Proposed Centerline

Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

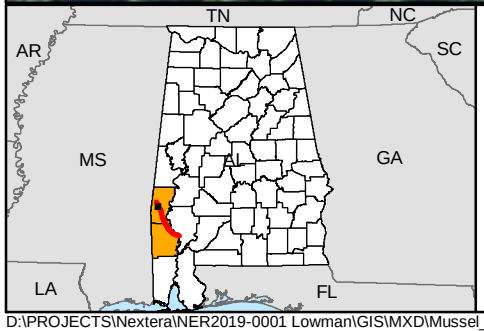
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Bogueloosa Creek - Middle Site crossing along the Proposed Lowman Pipeline Project within Choctaw County, Alabama

Map 2 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

Proposed Centerline

Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

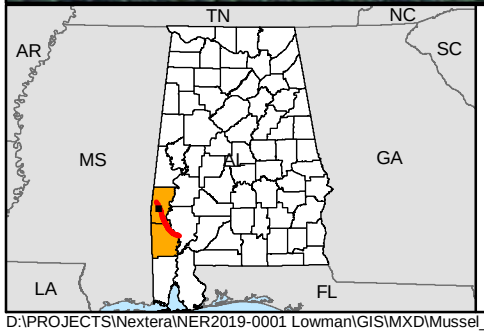
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Bogueloosa Creek - Lower Site crossing along the Proposed Lowman Pipeline Project within Choctaw County, Alabama

Map 3 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

- Proposed Centerline
- Proposed Access Road
- Survey Extent

N

0 20 40

Meters

Scale: 1:1,574

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

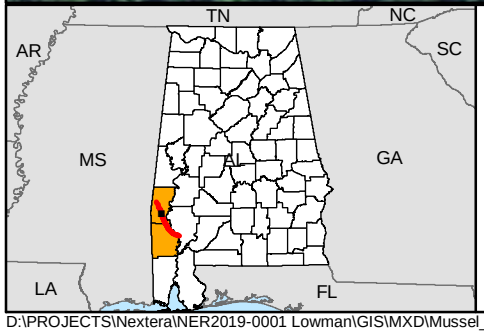
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Buck Creek crossing along the Proposed Lowman Pipeline Project within Choctaw County, Alabama

Map 4 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

Proposed Centerline

Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

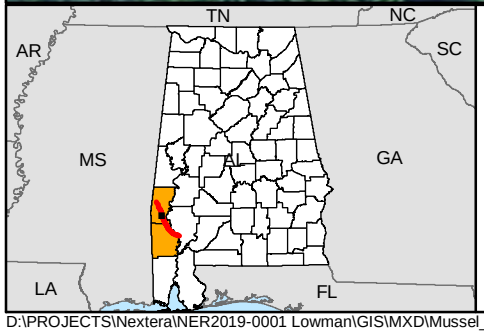
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Okatuppa Creek crossing along the Proposed Lowman Pipeline Project within Choctaw County, Alabama

Map 5 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

Proposed Centerline

Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

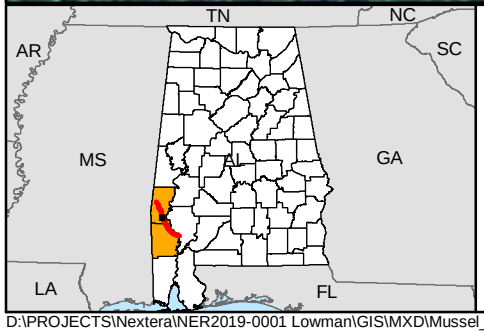
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Souwilpa Creek crossing along the Proposed Lowman Pipeline Project within Choctaw County, Alabama

Map 6 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

Proposed Centerline

Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

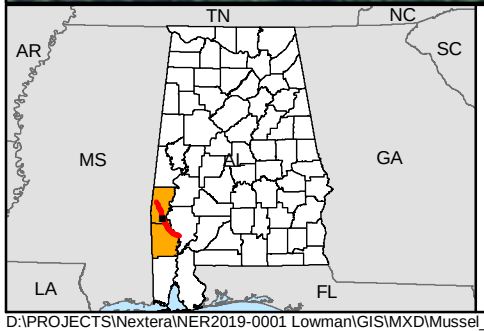
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Black Creek crossing along the Proposed Lowman Pipeline Project within Choctaw County, Alabama

Map 7 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

Proposed Centerline

Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

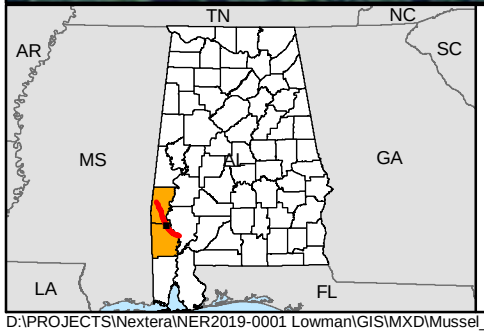
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Turkey Creek crossing along the Proposed Lowman Pipeline Project within Choctaw County, Alabama

Map 8 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

- Proposed Centerline
- Proposed Access Road
- Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

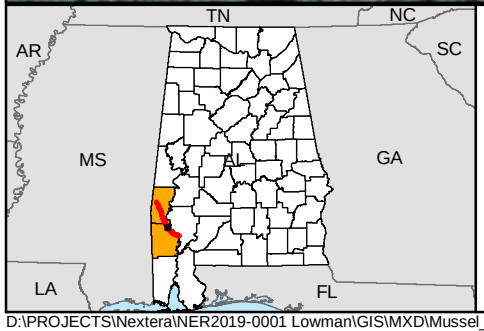
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Santa Bogue Creek crossing along the Proposed Lowman Pipeline Project within Washington County, Alabama

Map 9 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

- Proposed Centerline
- Proposed Access Road
- Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

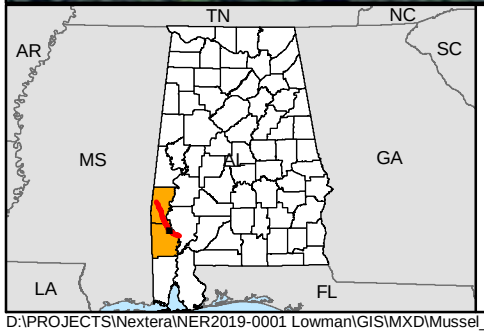
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Elias Creek crossings along the Proposed Lowman Pipeline Project within Washington County, Alabama

Map 10 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

Proposed Centerline

Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

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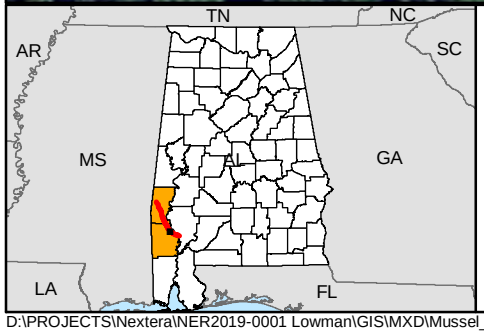
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Tauler Creek crossing along the Proposed Lowman Pipeline Project within Washington County, Alabama

Map 11 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

Proposed Access Road

Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

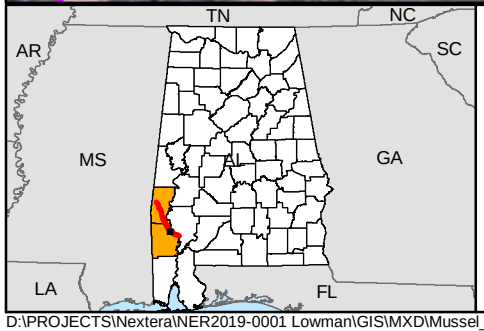
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Folsoms Creek Access Road (upstream) crossing along the Proposed Lowman Pipeline Project within
Washington County, Alabama

Map 12 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

Proposed Access Road

Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

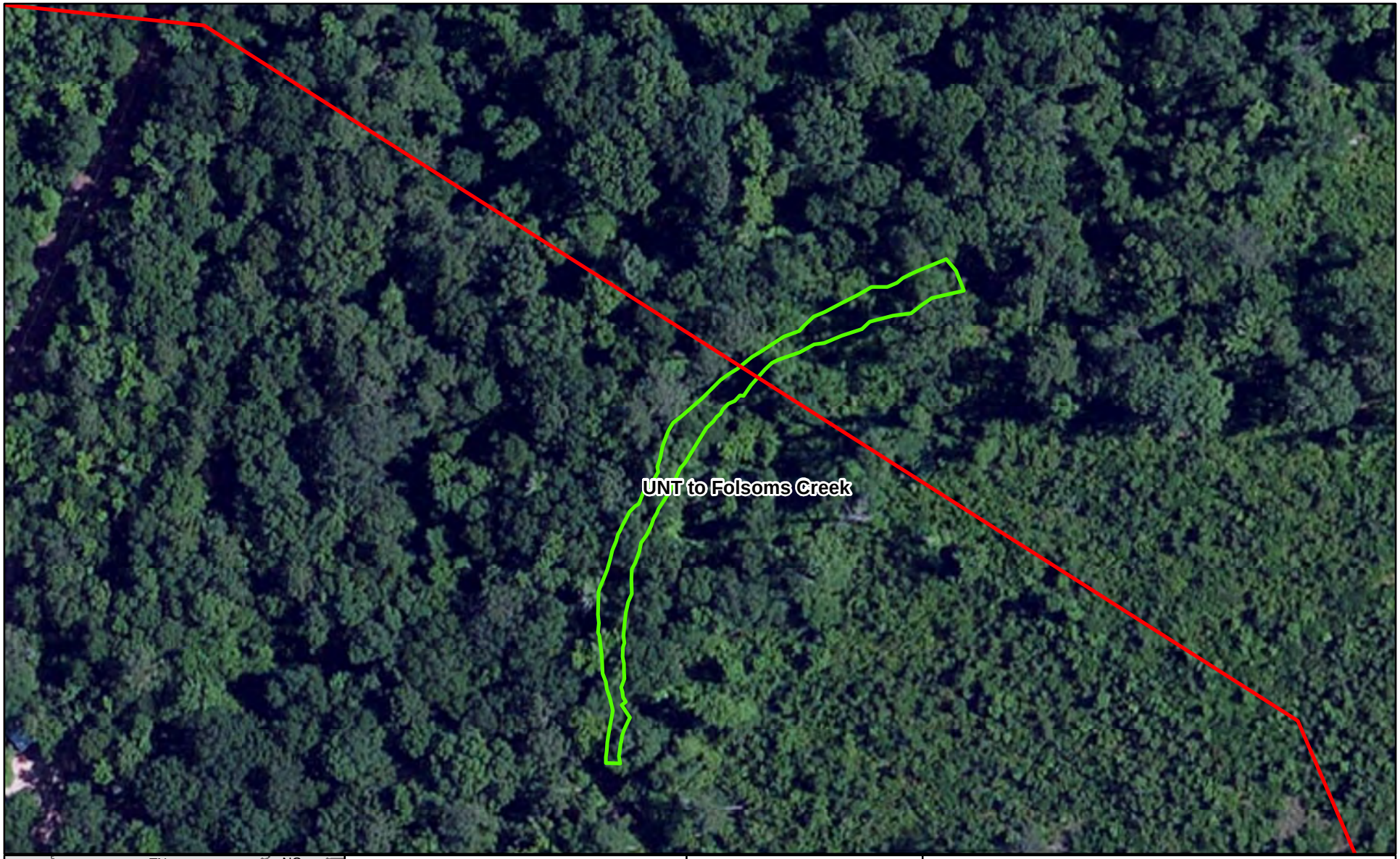
EDGE ENGINEERING & SCIENCE

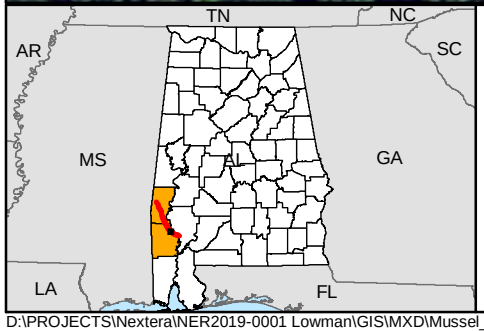
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for Folsoms Creek Access Road (downstream) crossing along the Proposed Lowman Pipeline Project within
Washington County, Alabama

Map 13 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

Proposed Centerline

Survey Extent

N

0 15 30

Meters

Scale: 1:1,181

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

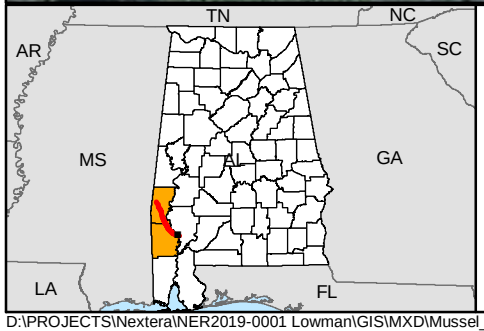
NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for UNT to Folsoms Creek crossing along the Proposed Lowman Pipeline Project within Washington County, Alabama

Map 14 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd





Legend

- Proposed Centerline
- Proposed Access Road
- Survey Extent

N

0 20 40

Meters

Scale: 1:1,574

NEXTera ENERGY

EDGE ENGINEERING & SCIENCE

NextEra Energy Resources
Lowman Pipeline Project

Appendix C
Freshwater Mussel Survey Extent for UNT to Tombigbee River crossings along the Proposed Lowman Pipeline Project within Washington County, Alabama

Map 15 of 15

D:\PROJECTS\Nextera\NER2019-0001 Lowman\GIS\MXD\Mussel_Survey\Report_Figs\NER2019_0001_Rprt_Fig2.mxd