NORTH LAKE TRAIL PHASE 3
CORRIDOR PLANNING STUDY
DRAINAGE AND FLOODPLAIN REPORT

NORTH LAKE TRAIL

FPID # 441626-1

April 2019

Florida Department of Transportation
District Five
719 South Woodland Boulevard
DeLand, FL 32720-6834

CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT) District Five is conducting a Corridor Planning Study to assess alternative alignments for a multi-use trail from C.R. 450/Bulldog Lane, City of Umatilla to S.R. 40. The corridor is anticipated to follow S.R. 19, though potential alternative paths will also be evaluated. The 19-mile study area includes eastern Marion County and northern Lake County. The purpose of the study is to:

- Identify reasonable alternatives to carry forward to a preferred trail alignment; and
- Establish a long-term plan to guide the evolution of the multi-use trail corridor which balances land use and transportation planning.

The North Lake Trail was first established in 2008 with the development of the North Lake Trail Phase 1 which begins at the Tavares Station Trailhead, and connects a five-mile shared-use path to the City of Eustis. This was the first step in the overall completion of a 29-mile trail which will cross through various communities along S.R. 19 and C.R. 445, and will serve as the "Gateway to the Ocala National Forest." Phase 2 of the trail is planned to begin just north of Ferran Park in Eustis and ends in the City of Umatilla (*Lake County Trails Master Plan, 2018*). This section is anticipated to also occupy the inactive CSX railroad right-of-way (ROW) until it reaches C.R. 450/Bulldog Lane. At C.R. 450/Bulldog Lane the trail will cross S.R. 19 to the east side of the road to connect with an existing ten foot sidewalk, and then continue north, within City of Umatilla owned ROW, until reaching C.R. 450/Bulldog Lane.

The North Lake Trail Phase 3 Corridor Planning Study will analyze alternatives to identify a preferred multi-use trail alignment from C.R. 450/Bulldog Lane to S.R. 40, connecting up to two counties over approximately 19 miles. The potential trail corridor will create a new pathway for Florida residents and visitors to experience Central Florida. It would link the City of Umatilla and the local communities of Altoona, Pittman, and Astor Park with the Ocala National Forest, by providing a connection to the proposed Black Bear Trail in addition to other trails in the area.

1.1. STUDY SEGMENTS

The study area is divided into eight general segments based on changing characteristics of the corridor and adjacent land uses. These segments will be referred to as follows:

- Segment 1 – S.R. 19 from C.R. 450/Bulldog Lane to Beach Street
- Segment 2 – S.R. 19 from Beach Street to Lakeview Terrace Drive
- Segment 3 – W. Altoona Road from Lakeview Terrace Drive To Lake Daisy Drive
- Segment 4 – S.R. 19 from Lakeview Terrace Drive to C.R. 445
- Segment 5 – S.R. 19 from C.R. 445 to S.R. 40
- Segment 6 – C.R. 445 from S.R. 19 to C.R. 445A
- Segment 7 – Railroad Grade Road from Dorr Road to S.R. 19
- Segment 8 – C.R. 445A from S.R. 19 to S.R. 40

1.2. ALTERNATIVE ALIGNMENTS

There are three (3) alternatives proposed for this trail on S.R. 19. All three alternatives begin at the intersection of C.R. 450/Bulldog Lane and S.R. 19 in the City of Umatilla, as shown in Figures 1 through 4.

Alternative A begins at C.R. 450/Bulldog Lane, and travels north on the eastern side of S.R. 19. Alternative A crosses to the western side of S.R. 19 at Beach Street and continues north. Upon reaching W Altoona Road, a dirt road parallel to the west S.R. 19, the path then crosses Lakeview Terrace Drive and then to the western side of W Altoona Road, continuing north. The path then crosses Lake Daisy Drive and then crosses east over W Altoona Road and when reaching S.R. 19, turns north on the western side of the road. The path continues on the western side of S.R. 19 until terminating at S.R. 40.

Alternative B follows a similar path as Alternative A, until reaching C.R. 445. At C.R. 445, the trail would cross from the west side of S.R. 19 to the east, and follow C.R. 445 on the south/east side of the road. The trail would use the existing Alexander Springs Creek Bridge to cross Alexander Springs Creek, and continue until reaching C.R. 445A. Once at C.R. 445A, the path crosses to the northern/western side of C.R. 445A, continuing north until reaching S.R. 40.

Alternative C also begins at C.R. 450/Bulldog Lane, following S.R. 19 north until reaching C.R. 445A. The trail alternative then proceeds to follow C.R. 445A until reaching the intersection with S.R. 40. The trail would end at the intersection of C.R. 445A and S.R. 40.

See *Corridor Planning Study-Technical Memorandum S.R. 19* for the alternatives concept plans and trail locations.

1.3. DESIGN CRITERIA

Proposed drainage design and strategies due to the trail installation should comply with the local, state and federal drainage design criteria. Below is a list of the criteria expected to impact any trail alternative:

- St. Johns Water Management District
    - Environmental Resource Permit (ERP) should be obtained if trail construction impacts are not exempt or above the permit thresholds for the water quantity, water quality, and wetlands.
- FDOT Design Manual and Drainage Design Criteria Guide
- National Pollutant Discharge Elimination System (NPDES)
    - Storm water Pollution Prevention Plan (SWPPP) should be developed and submitted.

2. EXISTING CONDITIONS

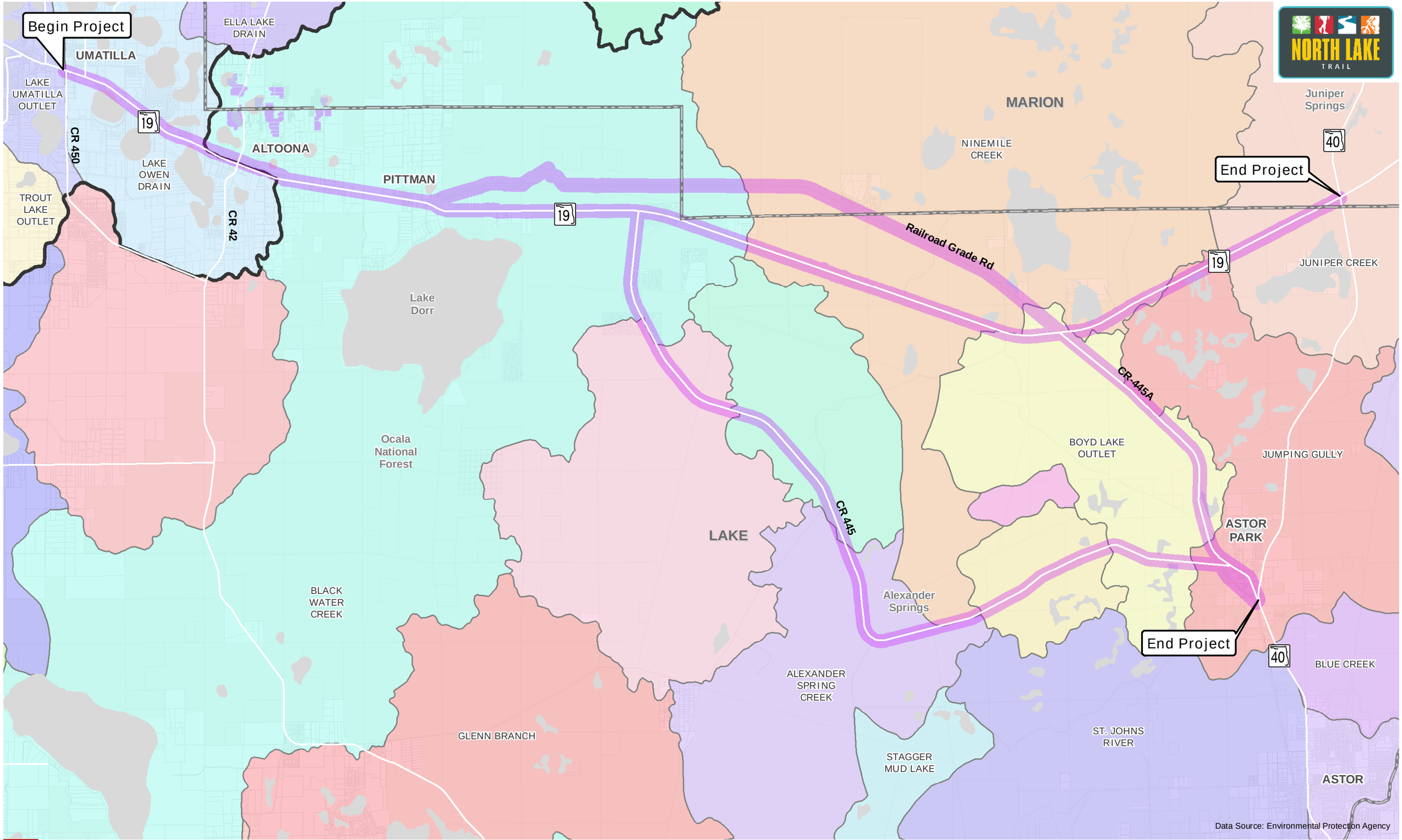
2.1. DRAINAGE FEATURES

The proposed trail is located within the Upper St. Johns hydrologic basin. This basin is broken down into several sub-basins, which include (from south to north): Blackwater Creek, Ninemile Creek, Boyd Lake Outlet, Jumping Gully and Morman Branch. Storm runoff from the study area drains to these branches through street flow in the existing conditions. The Drainage Basin map is shown in Figure 1. Existing culverts and cross drains are listed in Table 1.

Table 1 | Existing Culverts and Cross Drains along S.R. 19

Mile Post (MP)	Structure Type	Number of Structures/Barrels	Diameter (in)	Span (ft)	Rise (ft)	Length (ft)
5.817	Concrete Pipe	1	24			51
6.404	Concrete Pipe	1	15			85
6.652	Concrete Pipe	1	18			84
6.984	Concrete Pipe	1	24			54
8.877	Concrete Pipe	1	24			37
9.959	Concrete Pipe	1		23	14	78
10.097	Concrete Pipe	1		23	14	84
10.136	Concrete Pipe	1		23	14	78
10.298	Concrete Pipe	1	18			80
11.191	Concrete Pipe	1	24			46
11.826	Concrete Pipe	2	60			59
11.865	Concrete Pipe	1	60			63
11.913	Concrete Pipe	2	36			62
12.32	Concrete Pipe	1	24			46
12.669	Concrete Pipe	1	24			48
1.126	Concrete Pipe	2	36			77
2.911	Concrete Pipe	1	24			65
3.67	Concrete Pipe	1	24			66
4.317	Concrete Pipe	1	36			55
4.656	Concrete Pipe	3	42			88
5.963	Concrete Pipe	1	36			58
6.393	Concrete Pipe	1	24			37
6.755	Concrete Pipe	1	24			38
7.685	Concrete Pipe	1	24			40
7.843	Concrete Pipe	1	24			42
8.425	Concrete Pipe	1	24			52
8.545	Concrete Pipe	1	24			56
8.925	Concrete Pipe	1	24			57

Source: Straight Line Diagrams



FDOT

0 Miles 1

Drainage Basin (each basin represented by a different color)

Watershed

Study Corridor(s)

Drainage Basins
North Lake Trail Corridor Planning Study
Figure 1

PATH: E:\DATA1\FDOT_DIST-5_BBT_SR40_TRAILS\MAP_DOCS\DRAFT\NLT\FIGURE_XX_DRAINAGE_BASINS_11X17.MXD - USER: JHILL - DATE: 7/17/2018

2.2. WETLAND AND FLOODPLAIN

Several rivers, creeks, lakes, and natural springs are located within the study area, which increases the occurrence of wetlands and floodplains. The wetlands and floodplains analyses were performed in geographic information systems (GIS) using Federal Emergency Management Agency (FEMA) and National Wetlands Inventory (NWI) data.

The study area crosses, or is immediately adjacent to, numerous floodplains according to Federal Emergency Management Agency (FEMA) maps. The floodplains are designated as Zone A, which indicates that 100-year flood elevation is not determined. See Figure 2 for a view of a portion of this wetland near S.R. 19. Figure 3 shows the wetlands and floodplains within the study area. Figure 4 shows the topography of the study area. Tables 2 and 3 reiterate the acreages of impact to the existing condition as described in the *Corridor Planning Study-Technical Memorandum S.R. 19.*

Table 2 | Wetland Impacts

	Alternative A	Alternative B	Alternative C
Acreage of Wetland Impacts	0.3	1.4	0.5

Table 3 | Floodplain Impacts

	Alternative A	Alternative B	Alternative C
Floodplain Impacts in Acreage	3.4	3.8	3.8

Figure 2 | Surface Water & Wetland Area near S.R.19

Begin Project
UMATILLA
CR 450
19
ALTOONA
CR 42
PITTMAN
19
Lake Dorr
MARION
Juniper Springs
40
End Project
Railroad Grade Rd
19
CR-445A
Ocala National Forest
CR 445
LAKE
Alexander Springs
ASTOR PARK
End Project
40
ASTOR
Data Source: NWI; FEMA; Florida Geographic Data Library

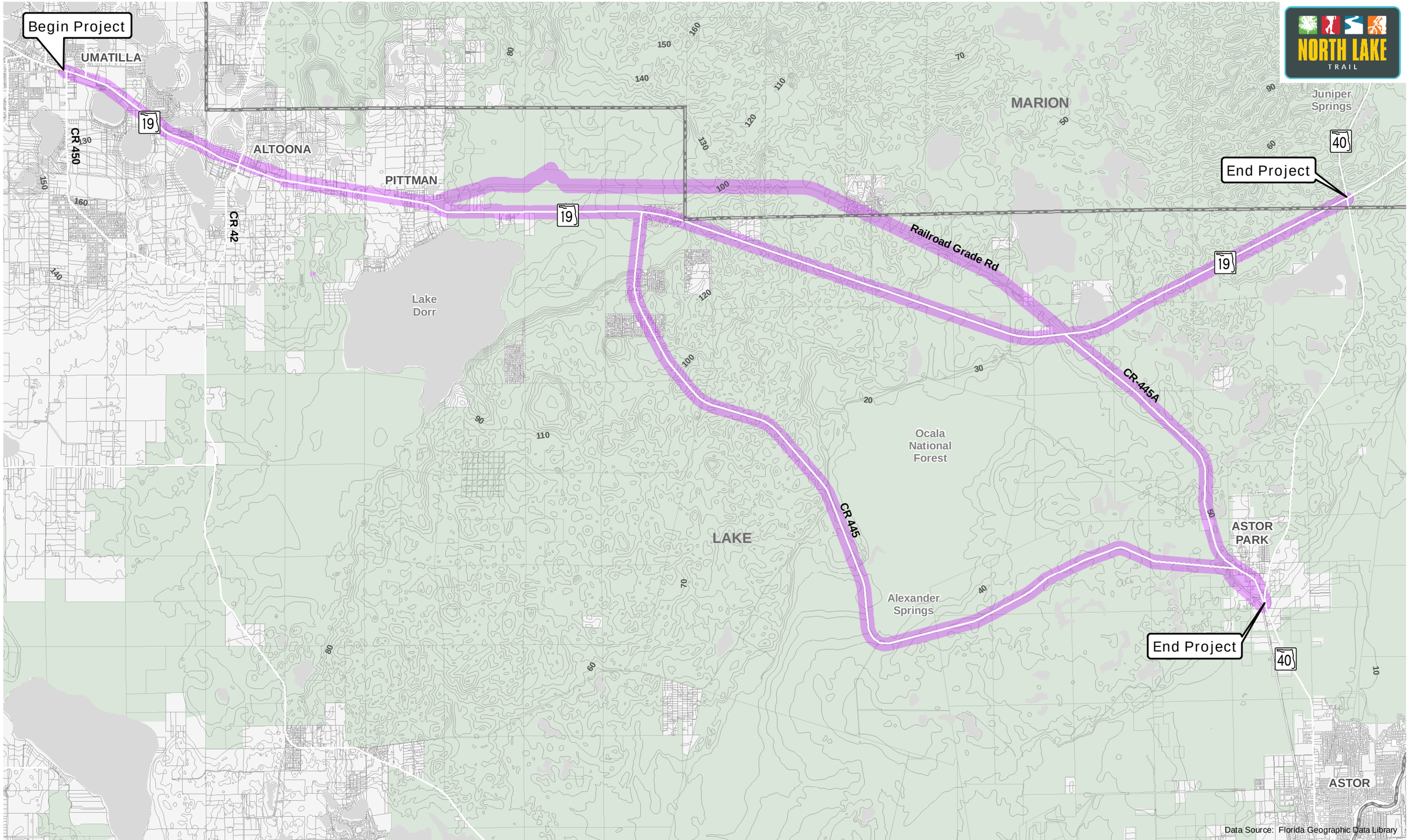
FDOT

0 Miles 1

Floodplain
Wetland
Conservation Area
Study Corridor(s)

Wetlands & Floodplains
North Lake Trail Corridor Planning Study
Figure 3

PATH: E:\DATA1\FDOT_DIST-5_BBT_SR40_TRAILS\MAP_DOCS\DRAFT\NLT\FIGURE_XX_WETLANDS_AND_FLOODPLAINS_11X17.MXD - USER: JHILL - DATE: 7/17/2018



Topographic Map
North Lake Trail Corridor Planning Study
Figure 4

PATH: E:\DATA1\FDOT_DIST-5_BBT_SR40_TRAILS\MAP_DOCS\DRAFT\NLT\FIGURE_XX_TOPOGRAPHIC_11X17.MXD - USER: JHILL - DATE: 7/17/2018

2.3. AQUATIC PRESERVES / OUTSTANDING FLORIDA WATERS

The study has no involvement with Florida's aquatic preserves. The following water bodies are designated by EPA as Outstanding Florida Waters:

- Juniper Creek
- Alexander Springs Creek
- Lake Dexter
- Lake Dorr
- Lake Norris

No impacts to the Outstanding Florida Waters are anticipated with any of the proposed build alternatives.

2.4. WILD AND SCENIC RIVERS

Alexander Springs Creek is classified as a Wild and Scenic River by the U.S. Department of Agriculture Forestry Service. The creek is located on the north and south side of C.R. 445 within Lake County. No impacts to Alexander Springs Creek are anticipated with any of the proposed build alternatives.

2.5. COASTAL ZONE CONSISTENCY / COASTAL BARRIER RESOURCES

Neither Lake nor Marion County are subject to the National Coastal Zone Management Program Administrated by the National Oceanic and Atmospheric Administration (NOAA), this program is a voluntary partnership between the federal government and coastal states and territories that works to address some of today's more pressing coastal issues

2.6. STRUCTURES

One existing structure is located within the study area, and is the C.R. 445 Bridge over Alexander Springs Creek (Bridge No. 114047), as shown in Figure 5. The C.R. 445 Bridge over Alexander Springs Creek was built in 1959. The bridge is owned by Lake County and is not programmed for rehabilitation (repairs) or replacement.

The trail will continue over the bridge without modifications to the structure and will not need any drainage modifications to the bridge or approach areas.

Figure 5 | C.R. 445 Bridge over Alexander Springs Creek

2.6.1. TYPICAL SECTION

The existing bridge typical section consists of two approximately 10.5-foot travel lanes and 1.5-foot outside shoulders with a curb and concrete traffic railing on both sides. The overall bridge width is 30 feet.

3. PROPOSED DRAINAGE CONDITIONS

There are two ROW conditions classified for this report, non-constrained and constrained. The sections of S.R. 40 that are not separated from adjacent land by a physical barrier (i.e. fence or wall) are classified as non-constrained areas. Constrained areas are separated from adjacent land by a physical barrier and limit the possibility of easements to accommodate drainage modifications. Cross section concepts for these two ROW conditions are provided in the *Corridor Planning Study-Technical Memorandum S.R. 19*.

3.1. NON-CONSTRAINED DRAINAGE MODIFICATIONS

The existing ROW in these areas along the S.R. 19, C.R. 445, and C.R. 445A alignments are sufficiently wide to minimize the need for adjacent easements. When identifying potential easements, the presence of utilities and varying existence of roadside ditches should be considered. With or without easements, considerations should be made in regards to maintaining existing flow patterns.

Strategies for preventing offsite impacts from the trail improvements include the use of gravity wall or establishing a raised vegetative bank at the outer edge of the trail. These barriers will help channel the trail runoff via sheet flow towards the new or existing linear ditch and minimize direct flow offsite. To maintain existing offsite flow patterns towards the roadway, the embankment would become flush with the wetland or existing surface elevation and the offsite sheet flow may continue unimpeded across the trail towards the ditch. Ideally, these flow pattern accommodations should primarily use sheet flow to avoid erosion and ponding issues A new or modified existing roadside ditches adjacent to the trail should be installed to maintain the overall existing flow pattern. Any existing side drains and cross drains should be extended, and new structures installed in conjunction with ditch modifications. All these modification should accommodate the additional runoff resulting from the trail surface.

3.2. CONSTRAINED AREA DRAINAGE MODIFICATIONS

Areas with a very constrained ROW may have an existing ditch and utilities present along the proposed trail alignment. These existing ditches will most likely need fill and stabilized for the trail construction. This will alter the sheet flow pattern from the roadway to the original ditch. To mitigate this altered flow pattern the installation of a curb and gutter for low speed sections of S.R. 19, C.R. 445, and C.R. 445A, and shoulder gutters for high speed sections can collect the trail runoff and the existing roadway runoff. These gutter systems may connect to a closed drainage system with cross drains, diverting flow to the opposite existing roadside ditch. That existing ditch may require modification to accommodate the increased runoff volume. Alternatively, if the water table permits, French Drains may be utilized.

3.3. STRATEGIES TO MITIGATE WETLAND IMPACTS

Wetland impacts are of primary concern in the non-constrained areas of the S.R. 40 alignment. Several mitigation strategies may be applied individually or in conjunction with each other, depending on implementation costs and limiting factors such as water table elevation.

Direct impacts to the wetlands include construction or modification of existing ditches, fill, dredging, and modification of the wetland boundaries resulting from the trail construction. As discussed Section 3.1, the use of dredging gravity wall or similar will minimize impacts to the wetland area due to the trail surface runoff. Use of boardwalk is also an effective way to reduce the wetland impacts.

Indirect impacts include introduction of potential pollutants, increased runoff, a higher probability of ponding, and fluctuating water level elevations as a result of the trail improvements. The severity of each impact should be considered. Any indirect impact should comply and align with any applicable ordinances or proposed conservation or developmental plans set forth by the St. Johns River Water Management District.

3.4. STRATEGIES TO MITIGATE FLOODPLAIN IMPACTS

Sections of boardwalk or similar can be utilized in locations over floodplains to mitigate floodplain impacts.

3.5. CULVERT MODIFICATIONS

In order to accommodate a trail along the each of the roadway alignments, the crossing culverts under the existing road are anticipated to be extended. In locations where culverts cannot be extended, a new culvert will be installed for the trail itself at the existing culvert location. Within the study area, major culverts are located at Blackwater Creek and Ninemile Creek. The trail will also cross over the bridge present over Alexandra Springs Creek along C.R. 445, no modification is anticipated at the bridge crossing to accommodate the trail.