STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TECHNICAL REPORT COVERSHEET

SR 710 Location Hydraulics Report

Florida Department of Transportation

District One

Design Services for SR 710

Limits of Project: From US 441 to L-63 Canal

Okeechobee County, Florida

Financial Management Number: 419344-3

ETDM Number: 11092

Date: 7/10/2024

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.

To: Phil Menke (FDOT Project Manager)

By: Jennifer Nunn, P.E. (The Balmoral Group)

Checked By: Greg Seidel, P.E. (The Balmoral Group)

Memorandum Date: July 10, 2024

Subject: Technical Memorandum: PD&E Location Hydraulics Memo Update
Financial Project ID No. 419344-3-32-01
SR 710 from US 441 to L-63N Canal
Okeechobee County, Florida

In May of 2012, the Florida Department of Transportation (FDOT) published a Location Hydraulics Report (LHR) for a Project Development and Environment (PD&E) Study that was conducted for SR 710 from US 441 to CR 714 (SW Martin Highway) in Okeechobee and Martin Counties, which included the project segment. Since that time, the FDOT has identified the need to modify the proposed alignment of SR 710 from US 441 to the L-63N Canal to improve highway operations, safety, and regional mobility. In 2018, The Balmoral Group submitted a Phase 2 Design to meet these needs. In response to public comments received from Okeechobee Utility Authority (OUA) during the August 30th, 2018 public hearing, the proposed alignment was modified and shifted north. This Memorandum presents a comparison between the 2018 Phase 2 Design and the 2023 OUA wellfield avoidance realignment.

1. Project Description

The proposed roadway improvements remain unchanged from 2018 to 2023, consisting of a new four-lane suburban typical section. The roadway includes two 12-foot wide travel lanes in each direction, separated by a raised 30-foot wide grassed median. This roadway section will also feature four-foot shoulders to the inside of the travel lanes and seven-foot paved shoulders adjacent to the outside travel lanes to function as a bike lane. Type E curb and gutter will be provided along the median and outside edges of the roadway with a closed stormwater conveyance system. The total length of the project is 3.8 miles. The project also includes a widening of the existing bridge over the L-63N Canal and a new bridge culvert over Taylor Creek. Acquisition of ROW will be required for the new roadway alignment and stormwater ponds.

The 2023 OUA wellfield avoidance realignment of the road affects just under 1 mile of the project length. Starting east of Taylor Creek, the centerline of the road shifts north of the original design, before converging with the original alignment east of the proposed Pond 2 site. The maximum difference between the two alignments is 275 feet, occurring near Station 536+00. Refer to **Figure 1** for a comparison of the original and realigned roadway designs.

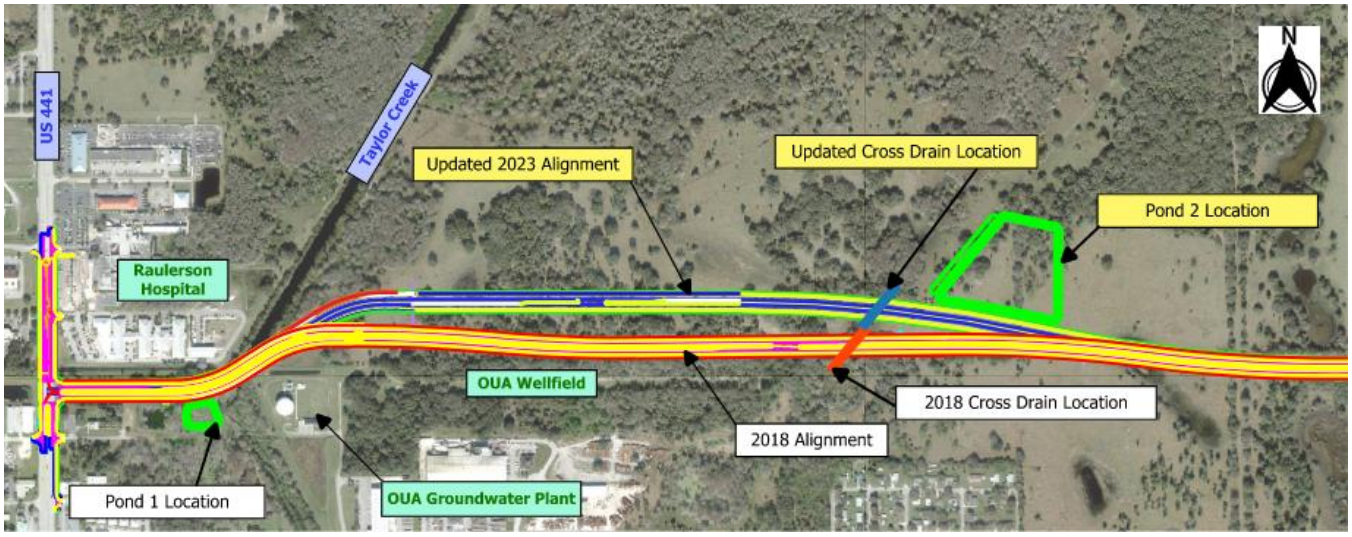

Figure 1: Comparison of 2018 to 2023 Roadway Design with Cross Drain Location

2. Cross Drain Analysis

For the 2018 design, there are eleven (11) cross drains. One (1) cross drain, located at Station 551+20, was affected by the 2023 OUA wellfield avoidance realignment, with its location moving 252 feet northeast. The new location is shown in **Figure 1**. Its size, length and inverts remained unchanged. The remaining ten (10) proposed cross drains were not affected by the redesign. Along the alignment, there are several areas where historic depressions are being impacted. This impact to storage is being accounted for in the routing calculations utilizing Interconnected Channel and Pond Routing (ICPR) Model Software. A bypass conveyance system has been designed to convey offsite runoff to the L-63N Canal. The peak stages were analyzed at all off-site locations to insure the post-development peak stages are at or below the pre-development peak stages or that no adverse impacts are associated with the increase.

Table 1 below compares stages and inflows at relevant nodes that were affected by the realignment between the 2018 and 2023 proposed designs for the 25yr/72hr event. Nodal areas are shown in **Figure 2**. As shown, the 2023 updated design decreased stages at all relevant model nodes except NA07_B, which received a slight increase in stage due to a much larger basin in the 2023 modeling. With the 2023 alignment, the northern shift actually provided more existing depressional storage to remain than the 2018 design, which helped slightly reduce post development stages as shown. All noted differences from the 2018 modeling are considered minimal. While differences are noticed in node inflows, adverse increases in stages were not experienced.

Table 1: Comparison of Proposed Node Stages and Inflows (2018 vs 2023)

Node	*Post-Development (2018)*		Post-Development (2023)		Stage Difference (feet) (2023 - 2018)
	25yr/72HR Stage (feet)	25yr/72HR Inflow (cfs)	25yr/72HR Stage (feet)	25yr/72HR Inflow (cfs)	
NA04	**16.09**	**177.59**	**16.03**	**136.47**	**-0.06**
NA05_A	**16.13**	**68.66**	**16.05**	**31.99**	**-0.08**
NA05_B	**16.40**	**23.87**	**16.28**	**35.61**	**-0.12**
NA06	**17.99**	**412.90**	**17.93**	**387.09**	**-0.06**
NA07_A	**18.40**	**264.61**	**18.39**	**247.08**	**-0.01**
NA07_B	**19.52**	**46.90**	**19.68**	**66.53**	**0.15**

Figure 2: 2023 Modeling Nodal Diagram

Table 2 compares flows through CD-3, the cross drain affected by the realignment. While an increase of 4.42 cfs is experienced in the updated design, this does not result in a need to upsize the cross drain or cause adverse affects downstream of the cross drain (Node NA07_A). This is demonstrated by no adverse increase in stage upstream or downstream of the cross drain as compared to the pre-development condition. Full model results will be included in the drainage design report.

Table 2: Comparison of Proposed Link Flows (2018 vs 2023)

Link	*Post-Development (2018)*	Post-Development (2023)	Flow Difference (2023 - 2018)
	50yr/72HR Max Flow (CFS)	50yr/72HR Max Flow (CFS)	
CD3	**60.55**	**64.97**	**4.42**

3. Floodplain Analysis

There are FEMA Zone AE and Zone A floodplains within the project limits. Zone AE floodplains are located at the Taylor Creek and L-63N crossing and Taylor Creek is a Regulatory Floodway. There is a Zone A floodplain in the vicinity of proposed Pond 5. The updates discussed in this memorandum impact only the Zone AE floodplain associated with Taylor Creek. As found in the 2018 analysis, the 100-year floodplain will not be impacted due to the encroachment as significantly as depicted in the orginal PD&E LHR. With the updated alignment, there is still encroachment into the FEMA floodplain due to the roadway fill at Station 518+00 within Basin 2 (as part of the Taylor Creek Crossing), as was found with the 2018 design. However, the floodplain impacts associated with the Taylor Creek crossing are considered transverse and have been evaluated through hydraulic analysis to estimate the existing and proposed behavior. As no additional fill is being proposed, the encroachment is the same and just occurring in a section of the floodplain further north. Refer to Figure 3 which shows the area of impacts associated with the current alignment (5.44 acres) as compared to the 2018 alignment (4.70 acres). The No-Rise Analysis previously performed will be investigated to determine if any updates are needed in order to demonstrate criteria is being met. The floodplain encroachment and provided compensation in Basin 5 remains unchanged with the updated 2023 alignment.

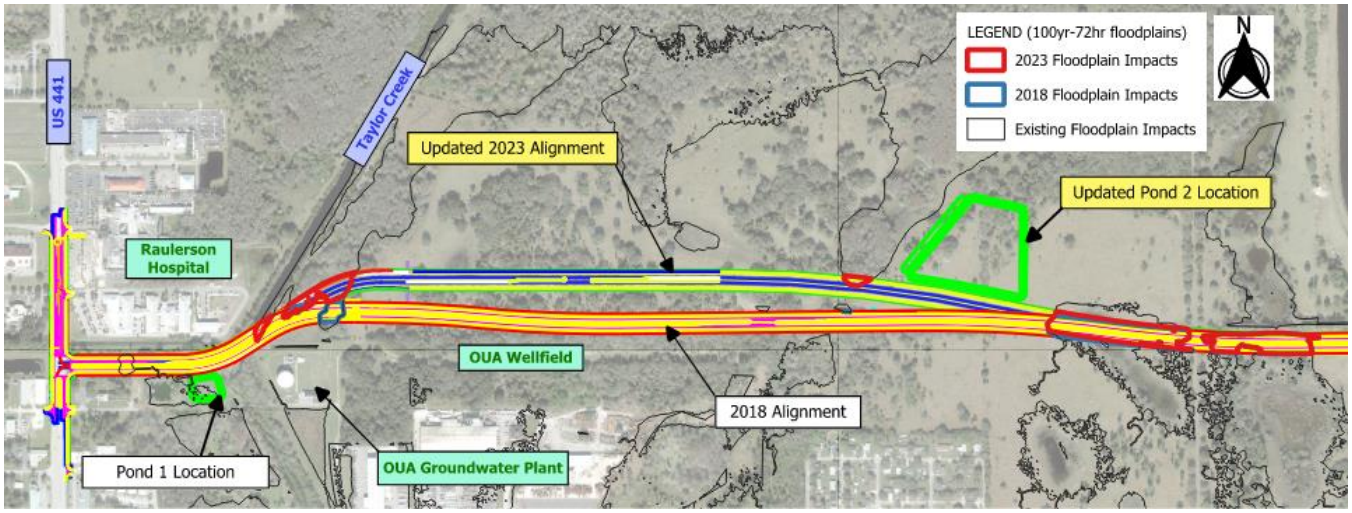

Figure 3: Floodplain area of impacts from 2023 and 2018

4. Conclusion

The 2023 modified alignment of the proposed SR 710 roadway will not cause additional adverse impacts that were not originally identified in the 2018 proposed design. One (1) cross drain in Basin 2 is impacted by the realignment and requires its position to be shifted northeast. However, its size, length and inverts remain unchanged from the original design. Stages and flows of the updated ICPR modeling indicate conditions that are similar to and generally improved from the 2018 design. The proposed roadway does encroach into the FEMA Floodplain more than the original alignment near Taylor Creek, and as previously mentioned, the FEMA No-Rise Analysis will be reviewed to determine if any updates are required to demonstrate that criteria is still being met. Design criteria for discharge to the L-63N and Taylor Creek outfalls was coordinated with SFWMD during the design effort in 2017.