

CFX Contract Number: 001844 CFX Project Number: 408-174

PRELIMINARY **ENGINEERING REPORT**



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1.0 – Project Information

Project Name:	SR 408 Capacity Improvements from Kirkman Road to Church Street PD&E Study
Projects Limits:	SR 408 from SR 435 (Kirkman Road) to Church Street (Figure 1)
County:	Orange
Proposed Activity:	Analyze and evaluate the addition of one lane in each direction along SR 408 from SR 435 (Kirkman Road) to Church Street
Responsible Agency:	Central Florida Expressway Authority (CFX)
Planning Organization:	CFX
Phase: Project Deve	lopment & Environment (PD&E) Study

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Figure 1: Project Location Map



2.0 – Project Background & Description

Background

In September 2022, the Central Florida Expressway Authority (CFX) began a Project Development and Environment Study (PD&E) to widen approximately three miles of SR 408 between SR 435 (Kirkman Road) and Church Street.

More than 164,000 vehicles a day travel on SR 408 as it crosses downtown Orlando. Traffic has generally increased on the segment of SR 408 from SR 435 (Kirkman Road) to I-4 and is expected to continue to grow in the future. Currently in the project study area, eastbound SR 408 is a three-lane facility from SR 435 (Kirkman Road) to I-4, while westbound SR 408 is a four-lane facility from I-4 to SR 423 (John Young Parkway) then transitions to a three-lane facility to SR 435 (Kirkman Road).

This PD&E Study will analyze and evaluate a proposed one-lane addition in the eastbound and westbound direction of SR 408 from SR 435 (Kirkman Road) to Church Street to provide greater capacity, reduce congestion and delay, and increase safety.

Study Description

The study area of this project includes the portion of SR 408 between SR 435 (Kirkman Road) and Church Street. Eastbound and westbound SR 408 is currently a three-lane facility from SR 435 (Kirkman Road) to Church Street. East of Kirkman Road is a toll gantry consisting of All Electronic Tolling (AET) for the mainline lanes and adjacent gantries for cash payments. Currently, this portion of SR 408 experiences congestion and delay, especially during peak hour commute from SR 435 (Kirkman Road) to I-4 (east of Church Street). The 6-month study will provide the necessary documented information for CFX to reach a decision on the type, design, and location of the proposed SR 408 improvements.

Purpose and Need

The purpose and need provide the basis for developing, considering, evaluating, and eliminating alternatives.

Purpose

The purpose of the study is to address increasing traffic congestion and improve mobility along a three-mile stretch of SR 408 between Kirkman Road and Church Street. With over 164,000 vehicles traveling daily in the area, the traffic volume has been steadily rising and is expected to continue growing. The project aims to widen SR 408 by adding an additional travel lane in each direction. The goal is to improve traffic flow, accommodate growing demands, reduce congestion and delay, and enhance safety.

Need

The need for adding capacity on SR 408 is based on several factors:

 Improve traffic flow: Segments of SR 408 within the project limits currently operate at an acceptable Level of Service (LOS) D or better during both the AM and PM peak hours, except for the eastbound segment between Old Winter Garden Road and John Young Parkway which operates at an unacceptable LOS E in the AM. As travel demands continue to increase, the LOS is expected to deteriorate if nothing is done. By 2045, travel demands on SR 408 are expected increase by approximately 40%.

- 2) **Reduce congestion and delay:** If nothing is done, increasing travel demands will result in more congestion and delays. This will affect the reliability of SR 408 for those who rely on it for their daily commute.
- 3) Enhance safety: A review of existing crash data indicates that rear end collisions account for 46% of all crash types. This is indicative of increasing congestion and vehicles having to abruptly stop or slow down within a limited distance. If nothing is done, it is expected that crashes would increase.
- 4) **Support regional connectivity:** SR 408 is a vital transportation corridor connecting commuters to downtown Orlando and Interstate 4 (I-4). By enhancing the capacity and efficiency of SR 408, the improvements will contribute to regional connectivity and support economic growth and development.
- 5) **Provide consistency with local plans and policies:** Improvements to SR 408 are aligned with local plans and policies related to transportation infrastructure and land use. The surrounding areas of SR 408 exhibit a mix of commercial and residential land use, with downtown Orlando located nearby. By providing a more efficient roadway, the project will ensure consistency with the existing land use patterns and support the area's planned growth and development.
- 6) Support economic benefits: Successful implementation of the study recommendations will bring economic benefits to the region. Reducing congestion and improving traffic flow will enhance logistics and other business transportation routes for goods and services. Commuters will also experience shorter travel times, leading to increased productivity and quality of life.

Other Documentation

The following documents, available under separate cover, were prepared and submitted to CFX for this PD&E Study:

- Air Quality Technical Memorandum
- Conceptual Design Roadway Plan Set
- Contamination Screening Evaluation Technical Memorandum
- Cultural Resources Desktop Analysis Technical Memorandum
- Environmental Assessment Technical Memorandum
- Existing Conditions Technical Memorandum
- Geotechnical Technical Memorandum
- Pond Siting Report
- Project Traffic Analysis Technical Memorandum
- Traffic Noise Study Report
- Typical Section Package
- Utility Assessment Technical Memorandum
- Water Quality Impact Evaluation Checklist

3.0 – Project Design Controls and Criteria

Design controls include roadway functional classification, context classification, and design speed. These three elements establish the geometric and operational characteristics and criteria of the roadway. **Table 1** lists out the classifications and design speed as determined by the consultant using all available data and documentation.

Table 1: Design Controls and Criteria

Design Element	Design Standard	Source			
General Criteria					
Design Standard Manual	2023 CFX Design Guidelines 2023 FDOT Design Manual (FDM)				
Design Vehicle:	WB-62 FL	FDM Section 201.6			
Context Based Design	Interstate Criteria	CFX 200.1			
Functional Classification	Principal Arterial Expressway	FDOT Straight-Line Diagrams (SLDs)			
Design Speed Mainline Ramps	60 mph	FDM Table 201.5.1			
 Loop and Semi-Direct Outer Cloverleaf Intermediate Portions of Long Ramps 	30 mph 35 mph 40 mph	FDM Table 201.5.2			
Direct Connections	50 mph				
Horizontal Geometry Criteria	-				
Lane Width Mainline Ramps	12 feet (mainline)	FDM Section 211.2			
 One-lane Two-lane (+) 	15 feet (one-lane ramp) 24 feet (two-lane ramp)	FDM Section 211.2.1 FDM Section 211.2.1			
Shoulder Width Mainline					
Three-lane or more	12 feet inside and outside	FDM Table 211.4.1			
Ramps					
 One-lane Two-lane Non-Interstate 	6 feet inside and outside 8 feet inside/10 feet outside	FDM Table 211.4.1 FDM Table 211.4.1			
Median Width	26 feet (with barrier)	FDM Table 211.3.1			
Border Width	10 feet (minimum for maintenance in conjunction with roadside barriers)	FDM Section 211.6.1			
Lateral Offset	Light Poles Conventional: 20 feet from Travel Lane, 14 feet from Auxiliary Lane, or Clear Zone width, whichever is less 	FDM Table 215.2.2			

SR 408 CAPACITY IMPROVEMENTS SR 435 (KIRKMAN RD) TO CHURCH ST

PROJECT DEVELOPMENT AND ENVIRONMENT STUDY

Design Element	Design Standard	Source
	High Mast: Outside Clear Zone	
	Signal Poles and Controller Cabinets • Outside Clear Zone	
	 ITS Poles and Related Items Pole & Other Aboveground Fixed Object: Outside Clear Zone Equipment Shelters and Towers: Outside limited access right of way. Breakaway Objects: As Close to R/W As Possible 	
	Traffic Control Signs Overhead Sign Structures: Outside Clear Zone 	FDM 220.3.2.3
	Trees Outside Clear Zone 	EDM 215 2 2
	Aboveground Utilities	FDW 213.3.2
	Clear Zone • New or Relocated	FDM Table 215.2.2
	Utilities: Outside Clear Zone	FDM Table 215.4.2
	 Canal and Drop-off Hazards Not less than 60 feet for flush shoulder and curbed roadways with design speeds of 50 mph or greater. 	
	Bridge Piers and Abutments Outside Clear Zone 	
	Rigid Barrier Minimum Setback Distance	
	 Concrete Barrier ≥ 40" Height: 0 feet, 0 inches Bridge Traffic Railing: 5 feet, 0 inches 	
Clear Zone Width	 Design Speed ≥ 60 mph 36 feet (travel lanes and multilane ramps) 24 feet (auxiliary lanes and single lane ramps) Design Speed = 55 mph 	FDM Table 215.2.1

SR 408 CAPACITY IMPROVEMENTS SR 435 (KIRKMAN RD) TO CHURCH ST

PROJECT DEVELOPMENT AND ENVIRONMENT STUDY

Design Element	Design Standard	Source	
	 30 feet (travel lanes and multilane ramps) 18 feet (auxiliary lanes and single lane ramps) Design Speed = 45-50 mph 24 feet (travel lanes and multilane ramps) 14 feet (auxiliary lanes and single lane ramps) 		
	 Design Speed = 40 mph 18 feet (travel lanes and multilane ramps) 10 feet (auxiliary lanes and single lane ramps) Design Speed = 35 mph 14 feet (travel lanes and multilane ramps) 10 feet (auxiliary lanes and single lane ramps) 		
Rate of Superelevation	0.10 (maximum)	FDM Section 210.9	
Minimum Curve Radius	Mainline (60 mph) 1,146 feet	FDM Table 210.9.1	
Length of Horizontal Curve	Mainline (60 mph) • 1,800 feet (desirable) • 900 feet (minimum) Ramp (50 mph) • 1,500 feet (desirable) • 750 feet (minimum) Ramp (≤ 45 mph) • 400 feet (minimum)	FDM Table 211.7.1	
Maximum Deflection without Curve	2° 00' 00" (≤ 40 mph) 0° 45' 00" (≥ 45 mph)	FDM Section 211.7.1	
Maximum Deflection through Intersection Maximum Deflection through Intersection	16° 00' (≤ 20 mph) 11° 00' (25 mph) 8° 00' (30 mph) 6° 00' (35 mph) 5° 00' (40 mph) 3° 00' (45 mph)	FDM Table 212.7.1 FDM Table 212.7.1	
Auxiliary Lane Minimum Acceleration Length	370 feet	Policy on Geometric Design (AASHTO, Table 10-4)	
Auxiliary Lane Drop	500 – 2,500 feet	Policy on Geometric Design (AASHTO, Figure 10-52)	
Vertical Geometry Criteria			
Stopping Sight Distance	673 feet (65 mph, 3% Down)	FDM Table 211.10.1	

SR 408 CAPACITY IMPROVEMENTS SR 435 (KIRKMAN RD) TO CHURCH ST

PROJECT DEVELOPMENT AND ENVIRONMENT STUDY

Design Element	Design Standard	Source
Interstate	613 feet (65 mph, 3% up)	FDM Table 211.10.1
Expressway/ Ramps	464 feet (50 mph, 5% Down) 393 feet (50 mph, 5% Up)	FDM Table 211.10.2 FDM Table 211.10.2
Maximum Profile Grade		
Limited Access Facilities	3% (60 mph)	FDM Table 211.9.1
Ramps	5% (50 mph)	FDM Table 211.9.1
Minimum Length of Vertical Curve	Sag = 800 feet Crest (open highway) = 1,000 feet Crest (within interchanges) = 1,800 feet	FDM Table 211.9.3
Crest Vertical Curve (K- Value)		
Interstate (60 mph)	313 (new construction)	
	193 (resurfacing)	FDM Table 211 0 2
Ramps (50 mph)	136 (new construction) 84 (resurfacing)	
Sag Vertical Curve (K- Value)		
Interstate (60 mph)	157	FDM Table 211.9.2
Ramps (50 mph)	96	
Maximum Change in Grade without	0.30 (60 mph)	
Vertical Curve	0.60 (50 mph)	FDIM Table 210.10.2
Vertical Clearance		
Existing Roadway Bridges	16.0 feet	
New Overhead Sign Structures	17.5 feet	
Existing Overhead Sign Structures	17.0 feet	FDM Table 260.6.1
New Dynamic Message Sign (DMS)	19.5 feet	FDM Section 210.10.3
Existing DMS	19.0 feet	
New Signals	17.5 feet	
Existing Signals	17.0 feet	
Base Clearance	3 feet minimum from bottom of roadway base course to water elevation.	
	A reduction for Ramps and certain Classification types is outlined in the requirements.	FDM Section 210.10.3

4.0 – Existing Conditions

SR 408 from (SR 435) Kirkman Road to Church Street currently provides three, 12-foot wide travel lanes and one, 12-foot wide auxiliary lane in each direction within 300 feet of right of way. Other features of the project corridor include the following:

- Mainline toll gantry between Pine Hills Road and the Old Winter Garden bridge consisting of All Electronic Tolling (AET) lanes and adjacent gantries for cash payments
- Ramp toll gantries on the Ortman Drive eastbound on-ramp, Old Winter Garden Road westbound off-ramp, and John Young Parkway eastbound on-ramp.
- Noise walls
- Terraced landscaping at the overpass bridges

Below is a summary of existing conditions. Additional information is provided in the **Existing Conditions Memorandum** provided under separate cover.

Roadway

Existing Roadway Network

The existing roadway network under evaluation is SR 408 and the roadways that provide access to this portion of the limited access facility. Additional details about the roadways in the project area are detailed below:

- SR 408 is a six- to ten-lane divided, east-west route that connects Ocoee from Florida's Turnpike in west Orange County to SR 50 (Colonial Drive) east of Alafaya Trail near the University of Central Florida in east Orange County.
- SR 435 (Kirkman Road) is a six-lane divided north-south roadway that includes an interchange to move traffic on and off SR 408.
- SR 431 (N Pine Hills Road) is a north-south roadway that includes an interchange to move traffic on and off SR 408. SR 431 (N Pine Hills Road) is a two-lane undivided roadway south of SR 408. North of SR 408, SR 431 (N Pine Hills Road) transitions to a four-lane undivided roadway.
- N Ortman Drive is a two-lane undivided north south roadway that provides access to an on-ramp to move traffic onto SR 408.
- SR 423 (John Young Parkway) is a six-lane divided north-south roadway that provides access to move traffic on and off SR 408.

Design and Posted Speeds

Table 2 provides the design speed for the study segment.

Table 2: SR 408 Posted and Design Speed

Roadway Name	Design Speed [mph]	Posted Speed [mph]
SR 408 from SR 435 (Kirkman Road) to Church Street	60	60

Typical Section

SR 408 roadway and roadside features were determined using the project as-built plans 252B, 742A, and aerial imagery. **Table 3** provides information on the typical section for the segment proposed for widening.

Table 3: Typical Section

Roadway Name	Lane Configuration	Typical Lane Widths	Paved Shoulders
SR 408 from SR 435 (Kirkman Road) to Church Street	6-Lane Divided plus one auxiliary lane in each direction	12-foot	Varies (10-12- foot)

Ramps

The following on and off-ramps are located within the SR 408 segments planned for widening:

- Kirkman Road Eastbound and Westbound On and Off-Ramps
- N Pine Hills Road On and Off-Ramps
- N Ortman Drive Eastbound On-Ramp
- Old Winter Garden Westbound Off-Ramp
- John Young Parkway Eastbound and Westbound On and Off-Ramps

Additional descriptions of these ramps are provided in **Table 4**.

Pavement Condition

The FDOT Office of Transportation Statistics Road Data Shape Files for Pavement Conditions were reviewed to confirm the existing condition of the pavement. The Pavement Conditions shape file was accessed on December 22, 2022. SR 408 within the project limits (Kirkman Road to Church Street) has a pavement condition score of 5.0 which indicates Very Good (new or nearly new).

Table 4: Ramp Data

Ramp Name	Ramp Type	Length of Acceleration/ Deceleration [ft] (Approximate)
Kirkman Road - On Ramp (Eastbound)	Parallel	985
Kirkman Road – Off Ramp (Eastbound)	Lane Drop	1624
Kirkman Road - On Ramp (Westbound)	Parallel	740
Kirkman Road – Off Ramp (Westbound)	Lane Drop	1094
N Pine Hills Road – On Ramp	Parallel	1504
N Pine Hills Road – Off Ramp	Tapered	1060
N Ortman Drive	Tapered	610
Old Winter Garden	Lane Drop	777
John Young Parkway – On Ramp (Eastbound)	Parallel	400
John Young Parkway – Off Ramp (Eastbound)	Tapered	815
John Young Parkway – On Ramp (Westbound)	Parallel	670
John Young Parkway – Off Ramp (Westbound)	Lane Drop	660

Horizontal Alignment

Horizontal alignment data – including curves and their properties – is provided in the as-built plans for project 252B. Information about the curves on the study segments is provided below in **Table 5**.

Table 5: Horizontal Alignment

Roadway Name	Number of Curves	Curve Radius [ft]	Curve Length [ft]	Description
SR 408, from Kirkman Road to Church Street	4	3823.55	1618.69	Super Elevated, e=0.046
		1909.86	1048.37	Super Elevated, e=0.079
		1914.86	1055.32	Super Elevated, e=0.079
		2864.79	2054.28	Super Elevated, e=0.058

Vertical Alignment

Vertical alignment data, including the number of bridges within the study segment was obtained from the as-built plans for project number 252B. Information on the number of bridges located within the study segment is documented below in **Table 6**.

Table 6: Vertical Alignment

Roadway Name	Flat or Rolling?	Number of Bridges
SR 408, from Kirkman Road to Church Street	Rolling	7

Detailed information on the vertical alignment including information on the curves within the study segment was not provided in the existing as-built plans.

Traffic Volumes

Traffic count data for roadways in the study area was obtained from the FDOT Open Data Hub and Florida Traffic Online database on December 22, 2022. A summary of the data obtained is provided below in **Table 7.**

Table 7: Traffic Volume Data

Roadway Name	AADT	K-Factor	T- Factor
SR 408 from SR 435 (Kirkman Road) to SR 423 (John Young Parkway)	93,500	9	3.2
SR 408 from SR 423 to Church Street	99500	8	3.2
SR 435 to Eastbound SR 408 On-Ramp	5000	8	6.2
SR 408 Westbound to SR 435 Off-Ramp	5000	8	6.2
N Pines Hill Road Eastbound On-Ramp	3400	8	6.2
N Pines Hill Road Off-Ramp	2900	8	6.2
N Ortman Drive to SR 408 Eastbound On-Ramp	3000	8	6.2
Westbound SR 408 To Winter Garden Off-Ramp	3400	8	6.2
Eastbound SR 408 to SR 423 (John Young Parkway) Off-Ramp	3600	8	6.2
SR 423 to SR 408 Eastbound On- Ramp	6100	8	6.2
Westbound SR 408 to SR 423 Off-Ramp	4600	9.5	6.2
SR 423 to Westbound SR 408 On-Ramp	6200	8	6.2

Crash Data

Crash data was obtained for the study segments from the Signal4 Analytics database. Data was collected for the five most recent years of available data from 2018-2022. Crash data is summarized in **Table 8-11**. The crash data was evaluated based on frequency, severity, type of impact, roadway conditions, and environmental conditions.

Table 8: Crash Frequency

	Total	Year						
Roadway Name	Number of Crashes	2018	2019	2020	2021	2022		
SR 408, from Kirkman Road to Church Street	664	165	138	86	125	150		

Table 9: Crash Severity

	Total		Severity	
Roadway Name	Number of Crashes	PDO	Injury	Fatal
SR 408, from Kirkman Road to Church Street	664	430	232	2

Table 10: Type of Impact

	Total	Type of Impact							
Roadway Name	Number of Crashes	Angle	Head On	Rear End	Sideswipe	Other			
SR 408, from Kirkman Road to Church Street	664	100	7	251	140	166			

Table 11: Roadway and Environmental Conditions

	Total		Ligh	ting		Road Surface Weath			Weather	•	
Roadway	Number		Dark								
Name	of		(Lighted/	Dawn		Dry/					
	Crashes	Day	Not Lighted)	/Dusk	Unknown	Unknown	Wet	Clear	Cloudy	Rain	Other
SR 408, from Kirkman Road to Church Street	664	449	172	41	2	575	89	516	83	61	4

A total of 664 crashes were reported within the study segment of SR 408 (from Kirkman Road to Church Street) within the last five years (2018-2022). Two fatalities were reported within the study segment, one of which included a pedestrian. Approximately 35% of the crashes within the study segment of SR 408 resulted in an injury. The most common impact type of crashes was rear end. The proposed widening within this study segment is anticipated to improve the study roadway which will potentially reduce the number of collisions with other vehicles.

Structures

There are twelve existing bridges within the project limits with potential to be impacted:

- Bridge No. 750100 SR 408 WB over Kirkman Road
- Bridge No. 750102 SR 408 WB over Old Winter Garden Road
- Bridge No. 750103 SR 408 WB over Ortman Drive
- Bridge No. 750104 SR 408 WB over Ferguson Drive
- Bridge No. 750106 SR 408 WB over Church Street
- Bridge No. 750182 SR 408 EB over Old Winter Garden Road
- Bridge No. 750220 SR 408 EB over Church Street
- Bridge No. 750231 SR 408 EB over Kirkman Road
- Bridge No. 750232 SR 408 over Pine Hills Road
- Bridge No. 750233 SR 408 EB over Ortman Drive
- Bridge No. 750234 SR 408 EB over Ferguson Drive
- Bridge No. 750235 SR 408 over John Young Parkway

Bridge information pertinent to the study was compiled from National Bridge Inventory Data and field verified. A description of each bridge is provided below:

SR 408 WB over Kirkman Road (Bridge No. 750100)

The existing bridge was constructed in 1973 and consists of four spans with prestressed concrete girders and a concrete deck superstructure. The maximum span length is 57.3 ft, and the total bridge length is 204.0 ft. The minimum vertical clearance over is 16.2 feet. The existing bridge provides three travel lanes with shoulders on each side. The total width of the deck from edge to edge is 58.5 ft. The inspection report dated February 2021 states that the bridge has a sufficiency rating of 96.0. The inspection report also indicated that the deck, superstructure, and substructure have an overall rating of Good (7 out of 9).

SR 408 WB over Old Winter Garden Road (Bridge No. 750102)

The existing bridge was constructed in 1973 and consists of four spans with prestressed concrete girders and a concrete deck superstructure. The maximum span length is 80.0 ft, and the total bridge length is 286.0 ft. The minimum vertical clearance is 16.6 ft. The existing bridge provides three travel lanes, one auxiliary lane, and shoulders on each side. The total width of the deck from edge to edge is 72.5 ft. The inspection report dated March 2021 states that the bridge has a sufficiency rating of 90.2. The inspection report also indicated that the deck, superstructure, and substructure have an overall rating of Good (7 out of 9).

SR 408 WB over Ortman Drive (Bridge No. 750103)

The existing bridge was constructed in 1973 and consists of four spans with prestressed concrete girders and a concrete deck superstructure. The maximum span length is 60.4 ft, and the total bridge length is 201.0 ft. The minimum vertical clearance is 15.3 ft. The existing bridge provides three travel lanes and shoulders on each side. The total width of the deck from edge to edge is 60.5 ft. The inspection report dated June 2022 states that the bridge has a sufficiency rating of 80.8. The inspection report also indicated that the deck has a rating Fair (5 out of 9) while the superstructure, and substructure have an overall rating of Good (7 out of 9).

SR 408 WB over Ferguson Drive (Bridge No. 750104)

The existing bridge was constructed in 1973 and consists of a three spans of prestress concrete girders and concrete deck superstructure. The maximum span length is 55.8 ft, and the total bridge length is 135.5 ft. The minimum vertical clearance is 15.8 ft. The existing bridge provides three travel lanes, an auxiliary lane, and shoulders on each side. The total width of the deck from edge to edge is 70.5 ft. The inspection report dated March 2021 states that the bridge has a sufficiency rating of 94.4. The inspection report also indicated the superstructure, substructure, and deck have an overall rating of Good (7 out of 9).

SR 408 WB over Church Street (Bridge No. 750106)

The existing bridge was constructed in 1973 and consists of four spans with prestressed concrete girders and a concrete deck superstructure. The maximum span length is 75.5 ft, and the total bridge length is 262.5 ft. The minimum vertical clearance is 15.4 ft. The existing bridge provides three travel lanes, an auxiliary lane, and shoulders on each side. The total width of the deck from edge to edge is 83.3 ft. The inspection report dated January 2022 states that the bridge has a sufficiency rating of 93.6. The inspection report also indicated the deck, superstructure, and substructure have an overall rating of Good (7 out of 9).

SR 408 EB over Old Winter Garden Road (Bridge No. 750182)

The existing bridge was constructed in 1973 and consists of four spans with prestressed concrete girders and a concrete deck superstructure. The maximum span length is 76.5 ft, and the total bridge length is 262.5 ft. The minimum vertical clearance is 16.6 ft. The existing bridge provides three travel lanes, an auxiliary lane, and shoulders on each side. The total width of the deck from edge to edge is 72.5 ft. The inspection report dated March 2021 states that the bridge has a sufficiency rating of 90.0. The inspection report also indicated the deck, superstructure, and substructure have an overall rating of Good (7 out of 9).

SR 408 EB over Church Street (Bridge No. 750220)

The existing bridge was constructed in 1973 and consists of four spans with prestressed concrete girders and a concrete deck superstructure. The maximum span length is 75.5 ft, and the total bridge length is 262.5 ft. The minimum vertical clearance is 15.6 ft. The existing bridge provides three travel lanes, an auxiliary lane, and shoulders on each side. The total width of the deck from edge to edge is 99.4 ft. The inspection report dated January 2022 states that the bridge has a sufficiency rating of 91.8. The inspection report also indicated the deck, superstructure, and substructure have an overall rating of Good (7 out of 9).

SR 408 EB over Kirkman Road (Bridge No. 750231)

The existing bridge was constructed in 1973 and consists of four spans of prestressed concrete box girders and concrete deck superstructure. The maximum span length is 57.3 ft, and the total bridge length is 204.0 ft. The minimum vertical clearance is 17.6 ft. The existing bridge provides three travel lanes and shoulders on each side. The total width of the deck from edge to edge is 58.5 ft. The inspection report dated February 2021 states that the bridge has a sufficiency rating of 96.0. The inspection report also indicated the superstructure, substructure, and deck have an overall rating of Good (7 out of 9).

SR 408 over Pine Hills Road (Bridge No. 750232)

The existing bridge was constructed in 1973 and consists of four spans of prestressed concrete girders and concrete deck superstructure. The maximum span length is 58.1 ft, and the total bridge length is 174.0 ft. The minimum vertical clearance is 15.3 ft. The existing bridge provides three travel lanes, one auxiliary lane, and shoulders on each side for each direction of travel. The total width of the deck from edge to edge is 141.1 ft. The inspection report dated March 2021

states that the bridge has a sufficiency rating of 85.0. The inspection report also indicated the superstructure, substructure, and deck have an overall rating of Good (7 out of 9).

SR 408 EB over Ortman Drive (Bridge No. 750233)

The existing bridge was constructed in 1973 and consists of four spans of prestressed concrete girders and concrete deck superstructure. The maximum span length is 60.4 ft, and the total bridge length is 201.0 ft. The minimum vertical clearance is 15.3 ft. The existing bridge provides three travel lanes and shoulders on each side. The total width of the deck from edge to edge is 60.5 ft. The inspection report dated March 2021 states that the bridge has a sufficiency rating of 92.1. The inspection report also indicated the superstructure, substructure, and deck have an overall rating of Good (7 out of 9).

SR 408 EB over Ferguson Drive (Bridge No. 750234)

The existing bridge was constructed in 1973 and consists of a three spans of prestress concrete girders and concrete deck superstructure. The maximum span length is 55.8 ft, and the total bridge length is 135.5 ft. The minimum vertical clearance is 15.5 ft. The existing bridge provides three travel lanes and shoulders on each side. The total width of the deck from edge to edge is 58.5 ft. The inspection report dated March 2021 states that the bridge has a sufficiency rating of 97.7. The inspection report also indicated the superstructure, substructure, and deck have an overall rating of Good (7 out of 9).

SR 408 over John Young Parkway (Bridge No. 750235)

The existing bridge was constructed in 1973 and consists of four spans of prestress concrete girders and concrete deck superstructure. The maximum span length is 81.6 ft, and the total bridge length is 259.0 ft. The minimum vertical clearance is 16.3 ft. The existing bridge provides three travel lanes and shoulders on each side for each direction of travel. The total width of the deck from edge to edge is 117.0 ft. The inspection report dated March 2021 states that the bridge has a sufficiency rating of 94. The inspection report also indicated the superstructure, substructure, and deck have an overall rating of Good (7 out of 9).

Drainage

Hydrology

The study area consists of both a closed basin and an open basin (**Figure 2**). Between Kirkman Road (SR 435) and Old Winter Garden Road, SR 408 drains south to the three interconnected Westside Manor Ponds located at the southeast quadrant of the SR 408 and Kirkman Road interchange. As a closed basin, the Westside Manor Ponds are landlocked with the only outfall being a pump station, which discharges south to Shingle Creek. SR 408 runoff between Old Winter Garden Road and Church Street is routed to Lake Mann, a large lake located south of the SR 408 mainline and east of Ivey Lane. Lake Mann is an open basin with two discharge structures: a drainwell is located at its southern most point and discharges into the groundwater and an overflow control structure at the southwest corner of the lake, which outfalls to the canal S-03 that flows south to Shingle Creek.

Surface water runoff from this project is within the Shingle Creek Headwaters basin (WBID 3169G1) and is part of the Upper Kissimmee River Watershed that ultimately discharges south to Lake Okeechobee. From Florida Department of Environmental Protection (FDEP) 2022 Comprehensive Lists, Shingle Creek Headwaters WBID is listed as impaired for dissolved oxygen, but a causative pollutant has not been identified, and the basin is undergoing further study. The entire project limits are located within the Lake Okeechobee Basin Management Action Plan (BMAP) but does not directly discharge into verified impaired waterbodies. The project is located within the jurisdiction of the South Florida Water Management District (SFWMD).

SR 408 between Kirkman Road to Pine Hills Road functions as a basin divide for the Wekiwa-Rock Springs Priority Focus springshed area, which includes the <u>Wekiwa Spring and Rock</u> <u>Springs BMAP</u>. Additionally, SR 408 is digitized as a basin divide from Pine Hills Road to Old Winter Garden Road for the Little Wekiva Canal WBID, which also includes the <u>Wekiva River</u>, <u>Rock Springs Run</u>, and Little Wekiva Canal BMAP, and the Little Wekiva Canal Alternative Restoration Plan established with the Little Wekiva Canal Total Maximum Daily Load (TMDL). The 2018 Westside Manor Watershed Management Plan, prepared for Orange County by Geosyntec Consultants, demonstrated that runoff within the project limits flows south towards Shingle Creek. Therefore, it is anticipated the project area will not be subject to either Little Wekiwa Springs or Little Wekiva Canal BMAP criteria. **Table 12** presents a summary of the ambient water quality for the watersheds to which the project will discharge.

Figure 2: Drainage Basins Overview Map



→ Westside Mannor Ponds basin

Table 12: Ambient Water Quality Summary

Paoin			DMAD		Waters Not Attaining Standards				
Dasin	VVDID	D Outfall BMAP		TIMDL	Verified Impaired ⁽¹⁾	Study List ⁽²⁾			
Lake Mann	31691	Shingle Creek	Laka						
Shingle Creek Headwaters	3169G1	Headwaters (WBID 3169G1)	Okeechobee			DO			
Water Quality Pa	rameters:								
DO – Dissolved O	DO – Dissolved Oxygen								
Notes:									
(1) Impaired waterbodies per FDEP Comprehensive Verified List (September 2022)									
(2) Other waters r	not attaining	g standards per FDI	EP Comprehensive	Study Lis	st (September	2022)			

Previous SR 408-252B record drawings and existing Environmental Resource Permits (ERPs) from the SFWMD and FDEP databases for the project corridor were researched to obtain stormwater and drainage design information. Some portions of SR 408 are treated in existing stormwater treatment facilities (SMFs) with other portions discharging directly into the Westside Manor Ponds or Lake Mann. Applicable permits are summarized in **Table 13**.

All existing SMFs within the project limits were designed under Contract 252B, which was permitted through FDEP (ERP 48-205102-001), utilizing all previously existing facilities from older SFWMD permits. This included expanding or eliminating existing linear swales and modifying the control structure at the EWE/JYP interchange ponds. Under this contract, SR 408 was widened from four to six lanes and a mainline toll plaza was added between Pine Hills Road and Old Winter Garden Road. The SMF design utilizes compensatory treatment and basin diversion to attenuate at the outfalls to accommodate these improvements. The SMFs maintain existing drainage patterns and utilize the historic outfalls within each basin. Refer to **Table 14** for a summary of the existing treatment facilities.

Table 13: Permit Summary

Project Name	Permit No.	Date Issued	Description
Western Extension of the East-West Expressway	SFWMD 88-00081-S (08238-1)	11/2/1988	No documents readily available within SFWMD e- permitting website
East-West Expressway Resurfacing	SFWMD 48-00601-S (910115-2)	2/4/1991	SR 408 Milling and Resurfacing 4-lane facility. This project included two linear detention treatment swales within both the Westside Manor and Lake Mann basins to provide treatment of the additional impervious. All four of these swales were either expanded (within Lake Mann basin) or eliminated (within Westside Manor basin due to toll plaza) within SR 408 Widening project (FDEP 48-205102- 001).
Eastwest Exprwy/ John Young Pkwy Interchange	SFWMD 48-00859-S (950406-2)	8/17/1995	Addition of EB off-ramp & WB on-ramp at the SR 408 & John Young Parkway (EWE/JYP) interchange. Included a SMF to provide treatment and attenuation for this interchange, which included future widening. Also modified an existing JYP pond. Included treatment of the interchange and treatment of offsite areas and future widening to accommodate new impervious along SR 408.
State Road 408 Contract 252	SFWMD 48-00859-S (980512-1)	6/12/1998	Widen SR 408 around existing toll plaza between JYP and Tampa Ave. The added impervious within the EWE/JYP interchange basin was less than the amount of future impervious permitted within the EWE/JYP SMF (App. 950406-2).
SR 408, Contract 252B CFX Record Drawings & FDEP 48-205102- 001		2/7/2008	Widen SR 408 from four-lane to six-lane facility. Contract 252B maximized all existing SMFs (linear swales and offsite wet detention facilities) and constructed new ponds to accommodate new impervious.
Orlo Vista Flood Mitigation Project	SFWMD 48-103547-P (200528-3565)	11/18/2020	Proposed equalizing pipes and vertical grading to Westside Manor ponds with modification to pump station to alleviate flooding for large storm events.

Table 14: Summary of Existing Treatment Facilities

Contract	Treatment Facility	Treatment Method	Treatment Criteria	Basin Area (ac)	Required Treatment (ac-ft)	Provided Treatment (ac-ft)	Discharge Location	Special Criteria	Comments	
	Pond 2H Wet Detention		9.4	9.48	0.64	6.5 (capacity)			Treats the southwestern portion of the Kirkman Road and SR 408 interchange. Pond discharges to the Kirkman Road drainage system that outfalls into the Westside Manor North Pond	
408-252B	Pond 3H	Wet Detention	Greater of: 1-inch over the basin, or 2.5-in over impervious	Basin 3H 7.59 Basin 3I 5.30	1.16	11.58 (capacity)	Westside Manor	Closed Basin – 100yr/24h and 25y/72h	Treats the northern portion of the Kirkman Road and SR 408 interchange. Pond discharges to SR 408 roadside ditch that flows to the 10'x10' CBC that directly outfalls into Westside Manor North Pond	
	Pond L	Wet Detention		ne basin, or 5-in over npervious 31.12	4.42	4.68			Treats SR 408 mainline and toll plaza from Pine Hills Road to Old Winter Garden Road. Pond outfalls towards Mission Road where its discharge is conveyed 0.65 miles west via ditches and cross drains to Westside Manor North Pond.	
	N-NW ⁽¹⁾	Dry Detention		6.21	0.76	0.91		Attenuation 25y/72h	Treats the area from the bridge over Pine Hills Road to the Ferguson Bridge Dry	
	N-SW ⁽¹⁾	Dry Detention		2.70	0.31	0.32		Attenuation 25y/72h	ponds discharge to the 7'x3' CBC that	
	N-SE ⁽¹⁾	Dry Detention		6.91	0.79	0.79		Attenuation 25y/72h	discharges south via ditches and storm sewer into Lake Mann.	
	Pond O	Wet Detention		6.63	0.99	1.01		Attenuation 25y/72h	Outfalls to an existing ditch system to Lake Mann.	
408-220 (ERP App 950406-2)	EWE/JYP (Pond P)	Wet Detention	Greater of: 1-inch over the basin, or 2.5-in over impervious	10.32	0.90	0.96	Lake Mann	Attenuation 25y/24h	Includes 0.60 ac of future impervious for SR 408 within the SMF basin. Utilized 0.45 ac of increase in impervious under 408-252B mainline widening (FDEP 205102-001).	
JYP (ERP App 03038-1)	JYP Pond 1	Wet Detention	0.5-in over basin	13.23	0.55			Attenuation 25y/24h	Pond mentioned in EWE/JYP interchange plans. Appears to only treat John Young Parkway.	

(1) Appears the SMF will be impacted by outside widening and/or ramp reconfigurations.

Floodplains

The Federal Emergency Management Agency (FEMA) has determined the 100-year floodplain limits in the vicinity of the project limits in the form of Flood Insurance Rate Maps (FIRM). The 100-year floodplain limits were extracted from the City of Orlando and Orange County Unincorporated Areas panels 12095C0240F and 12095C0245F effective 9/25/2009, with a Letter of Map Revision (LOMR) 19-04-2940P effective 3/11/2020 encompassing the Westside Manor Ponds basin.

The 100-year floodplain crosses the SR 408 right-of-way from north to south in two locations. First location is a large box culvert (10-ft x 10-ft) located 1,200-ft east of Kirkman Road interchange. This box culvert has an established base flood elevation (BFE) of 83.3 ft-NAVD. The second location is at a 24-inch cross drain within the SR 408 toll plaza located 1,800-ft west of the SR 408 bridge over Old Winter Garden Road. This cross drain connects wetland areas north of SR 408 to the wetland area to the south. The wetlands to the north are classified as Zone A, which does not have an established BFE, but the wetlands to the south have a BFE of 89.7 ft-NAVD. Both locations are within the LOMR limits for the Westside Manor Ponds. There are no regulated floodways that cross SR 408 within the project limits.

Utilities

The UAOs in the study area were determined using a variety of sources. First, a Sunshine 811 Design Ticket was made to identify the utility providers and operators registered in the area. These utility providers were then contacted to establish the proper personnel to assist with locating and identifying existing and planned utilities in the area. Lastly, plans, permits and/or mapping of the utilities were requested for review including any right of way or easement agreements along the affected corridors. The UAO identities on the project are summarized in **Table 15** and summarized below.

Utility Owner	Contact	Email/Phone	Facilities
Windstream	TBD	locate.desk@windstream.com	Fiber
ATT	Marin	martin@trecgroup.com	Fiber
City of Orlando – Water Reclamation	Michael Zeno	michael.zeno@cityoforlando.net	Water
Charter Communications	John Smith	john.smith5@charter.com	Fiber
Florida Gas Transmission	Joseph Sanchez	joseph.e.sanchez@energytransfer.com	Gas
Zayo Group	Henry Klobucar	(406) 496-6510	Fiber
Duke Energy	TBD	(407) 629-1010	Electric
MCI	TBD	investigations@verizon.com	Fiber
Crown Castle NG Fiber	TBD	fiber.dig@crowncastle.com	Fiber
Orange County – Waste Water	Marc Brown	marc.brown@ocfl.net	Water, Sewer
Orange County Public Works	Matthew Shipley	(407) 836-7814	TBD
City of Orlando - Fiber	John Falango	orlando traffic signal construction@ cityoforlando.net	Fiber
CFX Fiber	Will Hawthorne	(407) 690-5337	Fiber
Summit Broadband	Michelle Daniel	(407) 996-1183	Fiber
Orlando Utilities - Water	Steve Lockington	(407) 434-2568	Water
Orlando Utilities – Electric	Juan Diaz	developmentservices@OUC.com	Electric
TECO Peoples Gas	Joan Domning	(813) 275-3783	Gas
AT&T Distribution	Dino Farruggio	<u>G27896@ATT.com</u>	Fiber
Uniti Fiber LLC	Charlie Croft	Charlie.croft@uniti.com	Fiber

Table 15: List of Utility Contact Information

Windstream

Windstream has facilities along Pine Hills Road. They have an underground fiber line. Along Pine Hills Road, the service line runs on the east side of the road.

ATT

ATT has no facilities within the project limits.

City of Orlando

The City of Orlando-Traffic Engineering Division has facilities located within the project limits. They have an underground fiber line running along John Young Parkway.

The City of Orlando-Water Reclamation Division has the following facilities within the project limits:

- 36" Force Main running along Mission Road
- 42" Sanitary Sewer running from North Ivey Lane heading towards Barry Street
- 15" Sanitary Sewer running along Old Winter Garden Road
- 8" Sanitary Sewer running along West Robinson Street
- 8" Force Main running along Ferguson Drive
- 10" Sanitary Sewer running along West Church Street
- 8" Sanitary Sewer running underneath SR 408 along West Jackson Street
- 30" Sanitary Sewer line is running along South Tampa Ave

Charter Communications

Charter Communications has facilities along Kirkman Road and Pine Hills Road. They have an underground fiber line. Along Kirkman Road, their service line is located on the east side of the road. Along Pine Hills Road, the service line runs on the west side of the road.

Florida Gas Transmission

Florida Gas Transmission was emailed on 3/31/2023 and then again on 7/11/2023 with no response.

Zayo Group

Zayo Group was called with voicemail on 3/31/2023 and then again on 7/11/2023 with no response.

Duke Energy (Distribution)

Duke Energy was called on 3/31/2023 and then again on 7/11/2023 with no response.

MCI

MCI required a form to be submitted and that form was submitted on 4/18/2023 with no response.

Crown Castle

Crown Castle has facilities located within the project limit. They have an underground conduit running along North Pine Hills Road.

Orange County

Orange County – Waste Water has facilities located within the project limit. They have a pump station at the corner of Wilmer Ave and Amelia Street. They have a sewer force main running along the west side of Wilmer Ave and running underneath SR 408 to their pump station. The force main is running along the north side of SR 408 and then turning to run north along Mission Road. The force main tee's at Pine Hills Road and runs north down Pine Hills Road.

OUC

OUC-Electric has facilities within the project limit. They have an overhead transmission line along Mission Road.

OUC-Water has the following facilities within the project limits:

- 20" watermain running along North Kirkman Road
- 12" watermain running along North Pine Hills Road
- 6" watermain inside a 12" casing running along Mission Road and underneath SR 408
- 8" watermain running along Old Winter Garden Road
- 12" watermain inside a 20" casing running along North Ivey Lane heading towards Barry Street and underneath SR 408
- 6" watermain along North Ortman Drive and Ferguson Drive
- 10" watermain along John Young Parkway
- 8" watermain along West Church Street
- 12" watermain inside a 24" casing running along South Texas Ave and underneath SR 408

Summit Broadband

Summit Broadband was emailed on 3/31/2023 and then again on 7/13/2023 with no response.

TECO Peoples Gas

TECO Peoples Gas was emailed on 3/31/2023 and then again on 7/13/2023 with no response.

AT&T Distribution

AT&T Distribution has facilities located within the project limit. They have duct running along North Pine Hills Road and have a manhole near the intersection of the off-ramp and North Pine Hills Road. They have a duct running along the south R/W line from Mission Road to the Toll Plaza and buried fiber line along Old Winter Garden Road, North Ortman Drive, Ferguson Drive, North Cottage Hill Road, and West Church Street. They have a buried line along the on-ramp at North Ortman Drive.

Uniti Fiber LLC

Uniti Fiber LLC has facilities along Pine Hills Road. They have an underground fiber line. Along Pine Hills Road, the service line runs on the east side of the road.

Lighting

The segment of SR 408 from Kirkman Road to Church Street has conventional light poles on both sides of the roadway. These poles appear to be spaced approximately 200 feet apart. There are LED luminaires on rounded cobra head arms that extend off the pole upright. The conventional light poles and luminaires are painted black. Along the bridge sections of SR 408, the poles are mounted to the bridge. There are segments of the roadway where light poles are located behind guardrail or mounted within the barrier wall between the SR 408 off-ramp and main lines. All poles are fed by underground or bridge mounted/embedded conduit.

Intelligent Transportation Systems

The ITS configuration along SR 408 includes two (2) 72-count single mode backbone Fiber Optic Cables (FOC) buried along both sides (eastbound and westbound) of the mainline expressway for the entire limits of the project.

Within the study area, there are multiple closed-circuit television (CCTV) cameras, microwave vehicle detection systems (MVDS), automatic vehicle identification (AVI), dynamic message signs (DMS), and wrong way detection systems (WWDS). These devices are summarized below in **Table 16** and are identified based on mile marker location.



Table 16: Existing ITS Devices


























Geotechnical

The United States Geological Survey (USGS) Quadrangle Map, the Natural Resources Conservation Service (NRCS), Orange County Soil Survey and current available plans and documents were reviewed and used to prepare this memorandum. A summary of the existing available data is documented below.

- Natural ground surface topography varies from +80 to +100 feet NGVD in the project area.
- Land use is primarily commercial.
- Near surface soils are primarily poorly drained sand soils. Candler-Urban sand (7) is present at the project beginning at Kirkman Road and is classified as a well-drained upland soil.
- Organic muck soils (Samsula Muck (40) and Hontoon muck (19)) are present in the central portion of the project.
- The muck soils were likely removed for the original SR 408 construction.
- An area of Arents is located immediately east of Kirkman Road.
- Groundwater depth varies based on topography but is generally within 5 feet of natural grade.
- Review of available plans indicate the bridges were originally supported on 18-inch precast piles extending 50 to 80 feet below natural grade.
- Piles for the widening that was performed about 15 years ago utilized steel HP piles extending 65 to 115 feet below natural grade.
- Geotechnical considerations include exploration for highly compressible organic muck soils, evaluation of variable groundwater conditions and deep Standard Penetration Test (SPT) borings for bridge foundation design.
- Bridges should be supported on a deep driven pile substructure due to Karst environment and likely high Factored Loads required.
- Dry stormwater ponds may be feasible depending on pond location, the presence of the clay confining layer and groundwater levels.

5.0 – Traffic Analysis

A traffic analysis was conducted and is documented under a **Project Traffic Analysis Memorandum** available under separate cover. The traffic analysis provides future traffic forecasts and operational analysis for the 2025 opening year and 2045 design year.

Currently, field observations show that the SR 408 three-lane eastbound segment from Pine Hills Road on-ramp to John Young Parkway off-ramp is a congestion hotspot during the morning commute on weekdays. Merging traffic from the Pine Hills Road/toll plaza cash lanes and Old Winter Garden Road on-ramps exacerbate congestion in this area. In addition, traffic demand in other segments within the study limits is expected to exceed capacity in the future. By the year 2025, the Annual Average Daily Traffic (AADT) is expected to reach 125,500. By 2045, the AADT is expected to reach 174,600.

The analysis showed that the SR 408 mainline will require four lanes and an auxiliary lane in each direction from Kirkman Road to Church Street between year 2030 and 2041. These capacity improvements are expected to serve the projected traffic demand through the 2045 design year.

6.0 – Alternatives Considered

One Build Alternative was evaluated for this study. The Build Alternative includes adding a lane in each direction along SR 408 by widening to the outside. Accommodating the additional lanes involves widening of the overpass bridges and modification or reconstruction of the mainline toll plaza (east of Kirkman Road) and the ramp toll gantries (westbound exit to Old Winter Garden Vineland and eastbound on-ramps from Ortman Drive and John Young Parkway). Other improvements include an additional lane on the westbound Kirkman Road off-ramp and eastbound John Young Parkway off-ramp. No additional right of way is anticipated for improvements associated with the mainline; however, additional right of way is anticipated for potential pond sites. See **Appendix A** for the concept plans of the Build Alternative.

7.0 – Preferred Alternative

Typical Sections

The proposed typical section for SR 408 (**Appendix B**) includes a 12-foot wide outside shoulder (10-foot paved), four 12-foot wide travel lanes, and a 10-foot wide inside shoulder along both directions of travel. The existing barrier wall would remain separating the east and west directions of travel. A 12-foot wide auxiliary lane is also proposed throughout most of the project limits.

Bridges and Structures

A summary of bridge widening needs is provided below. All bridge typical sections are provided in **Appendix C**.

Bridge No. 750100 – SR 408 WB over Kirkman Road:

The westbound SR 408 bridge over Kirkman Road is being widened from three travel lanes to four and will provide 9'-5" inside and 10'-0" outside shoulders. Only one superstructure design alternative is considered for the overall bridge length of 204 ft along the bridge centerline. The proposed widening can be accommodated utilizing prestressed Florida-I Beam girders. **Table 17** provides data for both the widening and removal of the existing structure.

SR 408 WB over Kirkman Road Preliminary Bridge Design Information							
	Comments						
Length=		204	ft	from bridge inspection reports			
Widening Width=		15.135	ft	from typical section			
Removal Width=		3.047	ft	from typical section			
Structure Depth=		4.0	ft	Assumes FIB-36 beams			
Total Widening Area=	3087.54		SF				
Total Removal Area=		621.56	SF				
Construction Cost per Sqft=	\$	250.00 [*]	USD/SF	Cost based on SDG 9.2.3 - Widening (Construction Only) - High Range			
Removal Cost per Sqft=	\$	195.00 [*]	USD/SF	Cost based on SDG 9.2.3 - Widening Removal Work - High Range			
Bridge Cost=	\$	893,094.70*	USD	Widening and Removal			

Table 17: Westbound over Kirkman Bridge

* Cost estimates are in 2023 dollars

Bridge No. 750231 – SR 408 EB over Kirkman Road:

The eastbound SR 408 bridge over Kirkman Road is being widened to the outside from three travel lanes to four and will provide 9'-5" inside and 10'-0" outside shoulders. Only one superstructure design alternative is considered for the overall bridge length of 204 ft along the bridge centerline. The proposed widening can be accommodated utilizing prestressed Florida-I Beam girders. **Table 18** provides data for both the widening and removal of the existing structure.

SR 408 EB over Kirkman Road Preliminary Bridge Design Information						
	Comments					
Length=		204	ft	from bridge inspection reports		
Widening Width=		15.049	ft	from typical section		
Removal Width=		3.135	ft	from typical section		
Structure Depth=	4.0		ft	Assumes FIB-36 beams		
Total Widening Area=	3070.00		SF			
Total Removal Area=		639.63	SF			
Construction Cost per Sqft=	\$	250.00 [*]	USD/SF	Cost based on SDG 9.2.3 - Widening (Construction Only) - High Range		
Removal Cost per Sqft=	\$	195.00 [*]	USD/SF	Cost based on SDG 9.2.3 - Widening Removal Work - High Range		
Bridge Cost=	\$	892,209.30 [*]	USD	Widening and Removal		

Table 18: Eastbound over Kirkman Bridge

Bridge No. 750232 – SR 408 WB over Pine Hills Road:

The SR 408 bridge over Pine Hills Road is being widened from four travel lanes to five in both directions and will provide 10'-0" inside and 10'-0" outside shoulders. Only one superstructure design alternative is considered for the overall bridge length of 174 ft along the bridge centerline. The proposed widening can be accommodated utilizing prestressed Florida-I Beam girders. **Table 19** provides data for both the widening and removal of the existing structure.

SR 408 over Pine Hills Road Preliminary Bridge Design Information							
	Comments						
Length =	174	ft	from bridge inspection reports				
Widening Width =	27.833	ft	from typical section				
Removal Width =	3.833	ft	from typical section				
Structure Depth =	4.0	ft	Assumes FIB-36 beams				
Total Widening Area =	4842.94	SF					
Total Removal Area =	667	SF					
Construction Cost por Saft-	¢ 250.00*		Cost based on SDG 9.2.3 - Widening				
Construction Cost per sqrt-	\$ 250.00	030/35	(Construction Only) - High Range				
Removal Cost per Saft-	ć 10F.00*		Cost based on SDG 9.2.3 - Widening				
	030/35	Removal Work - High Range					
Bridge Cost=	\$ 1,340,789.19 [*]	USD	Widening and Removal				

Table 19: Pine Hills Road Bridge

* Cost estimates are in 2023 dollars

Bridge No. 750102 – SR 408 WB over Old Winter Garden Road:

The westbound SR 408 bridge over Old Winter Garden Road is being widened from four travel lanes to five and will provide 9'-5" inside and 10'-0" outside shoulders. Only one superstructure design alternative is considered for the overall bridge length of 286 ft along the bridge centerline. The proposed widening can be accommodated utilizing prestressed Florida-I Beam girders. **Table 20** provides data for both the widening and removal of the existing structure.

Table 20: Westbound over Old Winter Garden Road Bridge

SR 408 WB over Old Winter Garden Road Preliminary Bridge Design Information							
				Comments			
Length=		286	ft	from bridge inspection reports			
Widening Width=		15.135	ft	from typical section			
Removal Width=		3.047	ft	from typical section			
Structure Depth=	4.0		ft	Assumes FIB-36 beams			
Total Widening Area=	4328.61		SF				
Total Removal Area=		871.41	SF				
Construction Cost por Saft-	ć	250.00*	USD/S	Cost based on SDG 9.2.3 - Widening			
construction cost per sqrt-	ጉ	250.00	F	(Construction Only) - High Range			
Romoval Cost por Saft-	ć	5 195.00 [*]	USD/S	Cost based on SDG 9.2.3 - Widening			
Kenioval Cost per sqrt-	Ŷ		F	Removal Work - High Range			
Bridge Cost=	\$	1,252,083.69*	USD	Widening and Removal			

Bridge No. 750182 – SR 408 EB over Old Winter Garden Road:

The eastbound SR 408 bridge over Old Winter Garden Road is being widened to the outside from four travel lanes to five and will provide 11'-5" inside and 10'-0" outside shoulders. Only one superstructure design alternative is considered for the overall bridge length of 286 ft along the bridge centerline. The proposed widening can be accommodated utilizing prestressed Florida-I Beam girders. **Table 21** provides data for both the widening and removal of the existing structure.

SR 408 EB over Old Winter Garden Road Preliminary Bridge Design Information							
	Comments						
Length=		286	ft	from bridge inspection reports			
Widening Width=		15.047	ft	from typical section			
Removal Width=		3.135	ft	from typical section			
Structure Depth=		4.0	ft	Assumes FIB-36 beams			
Total Widening Area=		4303.44	SF				
Total Removal Area=		896.73	SF				
Construction Cost por Saft-	ć	250.00*		Cost based on SDG 9.2.3 - Widening			
construction cost per sqrt-	Ŷ	250.00	030/35	(Construction Only) - High Range			
Romoval Cost por Saft-	t= \$ 195.00 [*]	10E 00 [*]		Cost based on SDG 9.2.3 - Widening			
		030/35	Removal Work - High Range				
Bridge Cost=	\$	1,250699.45*	USD	Widening and Removal			

Table 21: Eastbound over Old Winter Garden Road Bridge

* Cost estimates are in 2023 dollars

Bridge No. 750103 – SR 408 WB over Ortman Drive:

The westbound SR 408 bridge over Ortman Drive is being widened from three travel lanes to five and will provide 11'-5" inside and 10'-0" outside shoulders. Only one superstructure design alternative is considered for the overall bridge length of 201 ft along the bridge centerline. The proposed widening can be accommodated utilizing prestressed Florida-I Beam girders. **Table 22** provides data for both the widening and removal of the existing structure.

Table 22: Westbound over Ortman Drive Bridge

SR 408 WB over Ortman Drive Preliminary Bridge Design Information						
	Comments					
Length=	201	ft	from bridge inspection reports			
Widening Width=	27.7917	ft	from typical section			
Removal Width=	1.859	ft	from typical section			
Structure Depth=	4.0	ft	Assumes FIB-36 beams			
Total Widening Area=	5586.13	SF				
Total Removal Area=	373.73	SF				
Construction Cost por Saft-	¢ 250.00*		Cost based on SDG 9.2.3 - Widening			
construction cost per sqrt-	Ş 250.00	030/35	(Construction Only) - High Range			
Romoval Cost por Saft-	Removal Cost per Sqft= \$ 195.00 [*]	Domoval Cost por Saft-		Cost based on SDG 9.2.3 - Widening		
		030/35	Removal Work - High Range			
Bridge Cost=	\$ 1,469,396.43*	USD	Widening and Removal			

Bridge No. 750233 – SR 408 EB over Ortman Drive:

The eastbound SR 408 bridge over Ortman Drive is being widened from three travel lanes to five and will provide 9'-5" inside and 10'-0" outside shoulders. Only one superstructure design alternative is considered for the overall bridge length of 201 ft along the bridge centerline. The proposed widening can be accommodated utilizing prestressed Florida-I Beam girders. **Table 23** provides data for both the widening and removal of the existing structure.

SR 408 EB over Ortman Drive Preliminary Bridge Design Information						
	Comments					
Length=	201	ft	from bridge inspection reports			
Widening Width=	25.839	ft	from typical section			
Removal Width=	3.792	ft	from typical section			
Structure Depth=	4.0	ft	Assumes FIB-36 beams			
Total Widening Area=	5193.64	SF				
Total Removal Area=	762.13	SF				
Construction Cost por Saft-	¢ 250.00*		Cost based on SDG 9.2.3 - Widening			
construction cost per sqrt-	\$ 250.00	030/35	(Construction Only) - High Range			
Romoval Cost por Saft-			Cost based on SDG 9.2.3 - Widening			
	030/36	Removal Work - High Range				
Bridge Cost=	\$ 1,447,037.19*	USD	Widening and Removal			

Table 23: Eastbound over Ortman Drive Bridge

* Cost estimates are in 2023 dollars

Bridge No. 750104 – SR 408 WB over Ferguson Drive:

The westbound SR 408 bridge over Ferguson Drive is being widened from four travel lanes to five and will provide 9'-5" inside and 10'-0" outside shoulders. Only one superstructure design alternative is considered for the overall bridge length of 135.5 ft along the bridge centerline. The proposed widening can be accommodated utilizing prestressed Florida-I Beam girders. **Table 24** provides data for both the widening and removal of the existing structure.

Table 24: Westbound over Fe	erguson Drive	Bridge
-----------------------------	---------------	--------

SR 408 WB over Ferguson Drive Preliminary Bridge Design Information						
	Comments					
Length=		135.5	ft	from bridge inspection reports		
Widening Width=		15.135	ft	from typical section		
Removal Width=	3.047		ft	from typical section		
Structure Depth=	4.0		ft	Assumes FIB-36 beams		
Total Widening Area=		2050.79	SF			
Total Removal Area=		412.85	SF			
Construction Cost por Saft-		250.00*	USD/SF	Cost based on SDG 9.2.3 - Widening		
construction cost per sqrt-	Ş	250.00		(Construction Only) - High Range		
Removal Cost per Sqft= \$ 195.00*	105 00*		Cost based on SDG 9.2.3 - Widening			
	030/35	Removal Work - High Range				
Bridge Cost=	\$	593,207.50 [*]	USD	Widening and Removal		

Bridge No. 750234 – SR 408 EB over Ferguson Drive:

The eastbound SR 408 bridge over Ferguson Drive is being widened from three travel lanes to five and will provide 9'-5" inside and 10'-0" outside shoulders. Only one superstructure design alternative is considered for the overall bridge length of 135.5 ft along the bridge centerline. The proposed widening can be accommodated utilizing prestressed Florida-I Beam girders. **Table 25** provides data for both the widening and removal of the existing structure.

SR 408 EB over Ferguson Drive Preliminary Bridge Design Information						
	Comments					
Length=		135.5	ft	from bridge inspection reports		
Widening Width=		27.047	ft	from typical section		
Removal Width=		3.135	ft	from typical section		
Structure Depth=	4.0		ft	Assumes FIB-36 beams		
Total Widening Area=	3664.87		SF			
Total Removal Area=	424.85		SF			
Construction Cost por Saft-	ć	250.00*		Cost based on SDG 9.2.3 - Widening		
construction cost per sqrt-	Ş	250.00	030/35	(Construction Only) - High Range		
Romoval Cost por Saft-	Cost per Sqft= \$ 195.00*	¢ 105.00*	val Cast par Saft-	ć 105.00*		Cost based on SDG 9.2.3 - Widening
		030/35	Removal Work - High Range			
Bridge Cost=	\$	999,051.66*	USD	Widening and Removal		

Table 25: Eastbound over Ferguson Drive Bridge

* Cost estimates are in 2023 dollars

Bridge No. 750235 – SR 408 over John Young Parkway:

The SR 408 bridge over John Young Parkway Drive is being widened from three travel lanes to four in both directions and will provide 10'-0" inside and 10'-0" outside shoulders. Only one superstructure design alternative is considered for the overall bridge length of 259 ft along the bridge centerline. The proposed widening can be accommodated utilizing prestressed Florida-I Beam girders. **Table 26** provides data for both the widening and removal of the existing structure.

Table 26: John Young Parkway Bridge

SR 408 over John Young Parkway Preliminary Bridge Design Information							
	Comments						
Length=	259	ft	from bridge inspection reports				
Widening Width=	28.479	ft	from typical section				
Removal Width=	4.479	ft	from typical section				
Structure Depth=	4.0	ft	Assumes FIB-36 beams				
Total Widening Area=	7376.06	SF					
Total Removal Area=	1160.10	SF					
Construction Cost por Saft-	¢ 250.00*		Cost based on SDG 9.2.3 - Widening				
construction cost per sqrt-	ş 250.00	030/35	(Construction Only) - High Range				
Removal Cost per Saft-	¢ 105.00*		Cost based on SDG 9.2.3 - Widening				
		030/35	Removal Work - High Range				
Bridge Cost=	\$ 2,070,227.15 *	USD	Widening and Removal				

Bridge No. 750106 – SR 408 over Church Street:

The SR 408 bridge over Church Street is being widened for the westbound travel lanes from four lanes to five and will provide 10'-0" inside and 10'-0" outside shoulders. No widening is proposed for the eastbound direction. Only one superstructure design alternative is considered for the overall bridge length of 265.5 ft along the bridge centerline. The proposed widening can be accommodated utilizing prestressed Florida-I Beam girders. Table 27: Church Street Bridge. **Table 27** provides data for both the widening and removal of the existing structure.

SR 408 over Church Street Preliminary Bridge Design Information						
	Comments					
Length=	262.5	ft	from bridge inspection reports			
Widening Width=	14.00	ft	from typical section			
Removal Width=	2.042	ft	from typical section			
Structure Depth=	4.0	ft	Assumes FIB-36 beams			
Total Widening Area=	3675.00	SF				
Total Removal Area=	535.94	SF				
Construction Cost por Saft-	¢ 250.00*		Cost based on SDG 9.2.3 - Widening			
construction cost per sqrt-	ş 230.00	030/35	(Construction Only) - High Range			
Removal Cost per Saft-	\$ 105.00*		Cost based on SDG 9.2.3 - Widening			
		030/35	Removal Work - High Range			
Bridge Cost=	\$ 1,023,274.88 [*]	USD	Widening and Removal			

Table 27: Church Street Bridge

* Cost estimates are in 2023 dollars

Right of Way and Relocations

No additional right of way is anticipated for improvements associated with the mainline. However, additional right of way is anticipated for potential pond sites. No residential or business relocations are anticipated. Additional information is provided in the **Pond Siting Report** available under separate cover. A final determination on the size and location of ponds will be made during the design phase.

Horizontal and Vertical Geometry

The horizontal and vertical geometries of the roadways will not change from existing conditions. See the **Existing Conditions Memorandum** available under separate cover.

Tolling Sites

There are four tolling sites in total within the study area. A toll plaza is located on the mainline between Pine Hills Road and the Old Winter Garden Road bridge. The plaza spans the entire facility and includes three all electronic only lanes along the mainline in each direction and separate gantries on the outside that include three cash lanes and one transponder lane. Modification to the existing mainline toll plaza will be required to accommodate the proposed widening. This includes eliminating one lane from the outside gantries including cutting back the overhead roof.

There is a toll gantry on the Ortman Drive eastbound on-ramp with two lanes—one for exact change and one transponder reader only. There is a toll gantry on the Old Winter Garden Road

westbound off-ramp featuring two lanes—one for exact change and one transponder reader only. There is a similar configuration at John Young Parkway, with a two-lane toll gantry located on the eastbound on-ramp. Reconstruction of these ramp toll gantries is needed to accommodate the widening.

No reconstruction or modification is needed for the toll gantry at the John Young Parkway westbound off-ramp.

Bicycle and Pedestrian Accommodations

No changes to bicycle and pedestrian accommodations are proposed as part of this project.

Multimodal Accommodations

No changes to multimodal accommodations are proposed as part of this project.

Access Management

No change in access is proposed as part of this project.

Intersection and Interchange Concepts

Proposed changes to the interchange ramps include the following:

Kirkman Road

- Eastbound On-Ramp: One lane existing; no change proposed
- Westbound Off-Ramp: One lane existing; proposed widening to two lanes

Pine Hills Road

- Eastbound On-Ramp: One lane existing; no change proposed
- Westbound Off-Ramp: One lane existing; no change proposed

Old Winter Garden Road

• Westbound Off-Ramp: One lane existing; no change proposed

Ortman Drive

• Eastbound On-Ramp: One lane existing; no change proposed

John Young Parkway

- Eastbound On-Ramp: One lane existing; proposed widening to two lanes
- Westbound Off-Ramp: One lane existing; no change proposed

Intelligent Transportation System (ITS)

To increase the safety of the traveling public, SR 408 proposed ITS infrastructure will include equipment consistent with CFX's overall ITS vision for the future. The safety aspect of ITS equipment consists of its ability to monitor traffic and provide incident management and travel information to travelers on SR 408.

The Preferred Alternative may result in impacts to some of the existing ITS System along SR 408. ITS Improvements will be further evaluated during the design phase and may include the following ITS elements. The high-level planning cost estimates for the proposed ITS

infrastructure described below are \$595,000.00. The details are provided in the Table 28.

Wrong-Way Vehicle Detection and Warning Equipment (WWVD)

The wrong-way vehicle detection system includes vehicle detectors and wrong-way LED Rapid Flashing Beacon warning system that gives wrong-way drivers a visible real-time indication prior to entering the CFX roadway system. When activated, the wrong-way signs flash with high intensity LEDs. The wrong way driving system utilizes radar and an HD camera to detect, analyze and confirm oncoming or outgoing vehicles. When a wrong-way driving event occurs, the information collected sends an alert notification and event package containing a configurable sequence of images, video and other data to the Regional Transportation Management Center (RTMC) so that the RTMC can deploy the necessary safety protocol. The proposed system will monitor the SR 408 ramps 24 hours a day without interfering with other traffic detection systems.

The proposed location for wrong-way detection includes the SR 408 westbound off-ramp at N Pine Hills Road. Note that the WWVD for SR 408 eastbound off-ramp at S Tampa Avenue is included under the ongoing CFX Project ID 408-315 SR 408 Tampa Avenue Interchange based on the latest project plans.

Data Collection Sensor (DCS)

DCS's are used in travel time analysis by the detecting transponders located in the traveling vehicles. The DCS will be installed at the on/off-ramps and will collect accurate travel time information to be disseminated to the traveling public via existing DMS signs. Installing DCS at the on/off ramps is an effective way to control traffic congestion by analyzing and predicting traffic flow.

The proposed locations for DCS's include the SR 408 on/off-ramps at N Kirkman Road and N Pine Hills Road.

Power Distribution System and Fiber Connections:

For this study it was assumed one power service per HUB location will be needed. The future design firm shall be responsible for verifying the proposed locations and determining available power sources and voltages needed to operate all the proposed ITS equipment. Additionally, it will be necessary to coordinate with Utility Companies for the power connection. Disconnects, service meters and six-inch-thick maintenance pads are to be installed at all locations. The CFX fiber infrastructure mainly runs along the east side of the roadway adjacent to the right of way line. The design team will have to design the connections between the existing fiber line to the proposed ITS elements.

ITS Systems	Proposed Location	High-Level Planning Cost Estimate			
WWVD	SR 408 westbound off-ramp at N Pine Hills Road	\$	183,000		
	N Kirkman Road On-Ramp	\$	103,000		
DCC	N Kirkman Road Off-Ramp	\$	103,000		
DCS	N Pine Hills Road On-Ramp	\$	103,000		
	N Pine Hills Road Off-Ramp	\$	103,000		
	Total Cost:	\$	595,000*		

Table 28: Proposed ITS Infrastructure

Utilities

Data on existing utilities within the study limits was obtained through a Sunshine Design Ticket. Cost, scheduling, and any UAO dispositions and agreements pertaining to the potential relocation of any facilities will be further investigated as part of the design phase for this project.

Drainage and Stormwater Facilities

The design of stormwater facilities will comply with the standards set forth by CFX, St. Johns River Water Management District (SJRWMD), South Florida Water Management District (SFWMD), Orange County, and FDOT. Since the Florida Department of Environmental Protection (FDEP) performed the original permit review, an Environmental Resource Permit is anticipated from FDEP in lieu of separate permits from SJRWMD and SFWMD. This should be confirmed during the design phase. There are 16 total basins within the project limits of which eight will require additional treatment through offsite ponds. A summary of the basins requiring offsite ponds is provided in **Table 29**. Required pond sizes for each basin were calculated by evaluating runoff volume using the Natural Resources Conservation Service Curve Number (NRCS CN) method and calculating treatment volume requirements. These volumes were added together and combined with landscaping and maintenance berm assumptions to result in the total required pond size. Additional information is provided in the **Pond Siting Report** available under separate cover.

Basin	Proposed Treatment Volume - with 50% Additional	Required Treatment Volume (ac-ft)	Required Roadway Attenuation Volume (ac-ft)	Total Required Pond Volume (ac-ft)	Area at NWL (ac)	Provided Volume (ac-ft)	Additional Percent for Landscaping / Tie-In Area	Estimated Required Pond Area (ac)	Remarks
M-South	0.103	0.000	0.290	1.19	0.5	2.70	20%	1.9	Pond M
M-North	0.564	0.000	0.233						
N-NW	1.631		0.959	7.11	1.54	7.30	20%	3.9	Pond N
N-SW	0.556		0.108						
N-NE	0.757	4.544	0.809						
N-South	0.046		0.059						
N-SE	1.553		0.628						
Q	0.175	0.175	0.323	0.50	0.5	2.70	20%	1.9	Pond Q

Table 29: Summary of Basins Requiring Offsite Ponds

For Basin M, selection of Pond Alternative M3 was based upon joint use of an existing Orange County pond which appears to have sufficient room for expansion. Use of this pond or purchase of this pond site will need to be coordinated with Orange County. For Basin N, selection of Pond Alternative N2 was based upon acquisition of vacant parcels that are adjacent to existing Pond O with no evident contamination, utilities, wetlands or floodplain concerns. As Pond Alternative N2 is not large enough, use of this site in combination with Pond Alternative Q2 is recommended for Basin N. For Basin O, selection of Pond Alternative O2 was based upon use of existing CFX R/W and one acquisition parcel that is vacant with no evident contamination, utilities, wetlands or floodplain concerns. For Basin Q, selection of Pond Alternative Q2 was based upon use of existing CFX R/W and acquisition of vacant parcels with no evident contamination, utilities, wetlands or floodplain concerns. Proposed pond locations for acquisition are shown in **Appendix D**.

Floodplain Analysis

The floodplain impact volume includes the storage lost due to the proposed roadway widening between the existing ground elevation and the 100-year base flood elevation. Impacts to floodplains will be minimal, and it is anticipated that these impacts can be mitigated within the right of way with use of walls as needed to remove fill encroachment.

Noise Walls

Modification to existing walls and new noise walls are proposed in several locations as summarized in the **Traffic Noise Study Report** available under separate cover. Specific locations are illustrated in **Appendix A** and discussed below.

Noise walls are proposed on the eastbound side, approximately from where the on-ramp merges into the mainline to approximately where walls currently exist along the Pine Hills Road eastbound on-ramp. Additionally, the walls along this on-ramp will be extended to the west.

New noise walls are proposed on the westbound side, on the Pine Hills Road bridge, extending east to near start of the off-ramp. There is existing wall along the off-ramp.

Along the Ortman Drive westbound on-ramp, new noise walls are proposed along the ramp and on the mainline in the same area. Additional new noise walls are proposed on the westbound side, from where the existing wall ends to the John Young Parkway off-ramp and across the John Young Parkway bridge.

Lighting

A lighting analysis was performed in AGi32 software using the proposed typical sections along SR 408. Both a 4-lane section and a 5-lane section (auxiliary lanes) were analyzed for proposed pole spacing using a 241W Lumec Signify Large RoadFocus cobra head luminaire. Based on CFX Design Guidelines and Lighting Standards, a 45' mounting height and a 15' bracket arm length were assumed for this analysis. FDOT lighting criteria for Limited Access Facilities from Table 231.2.1 of the FDM was used to set the parameters for the lighting analysis. AGi32 roadway optimizer results showed a required spacing of 173' and 162' for the four-lane and five-lane typical sections, respectively.

This analysis incorporated the clear zone setback requirements as detailed in Table 215.2.1 of the FDM. Upon review of the corridor, many existing light poles are currently installed behind guardrail or behind a wall section. Assuming that future conditions will have similar accommodations, the clear zone requirement along the corridor could be significantly reduced. Thus, it can be concluded that results of the analysis show that light poles are needed every approximately 175-200' on each side of the roadway to achieve FDOT lighting criteria for limited access facilities.

Special Features

Terraced landscaping walls are located at all bridge crossings (example shown in **Figure 3**). Modification or replacement is proposed within the project limits. Exact wall locations, lengths, and heights will be determined during the design phase. The cost estimate referenced below includes landscaping walls.



Figure 3: Terraced landscaping walls at John Young Parkway Interchange

Design Variations and Exceptions

No design variations or exceptions are needed for this project.

Cost Estimates

The total estimated construction cost for the Preferred Alternative is \$ 109,533,836. A breakdown of costs is provided in **Appendix E**.

Appendix A – Concept Plans















Appendix B – Roadway Typical Section





REVISIONS								
DATE	DESCRIPTION	DATE	DESCRIPTION	PREPARED BY	SR 408 WIDENING FROM		CENTRAL	
				KIMLEY-HORN AND ASSOCIATES INC.	KIRKMAN ROAD TO CHURCH STREET	FLORIDA	ורי	
			189 SOUTH ORANGE AVENUE, SUITE 1000	ROAD NO.	PROJECT NO.	EXPRESSWAY	<u> </u>	
				ORLANDO, FLORIDA, 32801	SR-408	408-174	AUTHORITY	



Appendix C – Bridge Typical Sections





SR 408 OVER PINE HILLS ROAD

•	REVI	SIONS						
DATE	DATE DESCRIPTION DATE DESCRIPTION		_ PREPARED BY	SR 408 WIDENING FROM		CENTRAL		
				KIMLEY-HORN AND ASSOCIATES INC. 189 SOUTH ORANGE AVENUE, SUITE 1000	FLOR		FLORIDA	\mathbf{L}
					ROAD NO.	PROJECT NO.	EXPRESSWAY	-
		ORLANDO, FLORIDA, 32801	SR-408	408-174	AUTHORITY			











6161 RULE 0 DIG S
VARIES VARIES VARIES 2'-0" TRAFFIC RAILING 🧯 CONST. S.R. 408 -MEDIAN BARRIER 1'-4" 10'-0" MIN. 5 LANES @ 12'-0'' = 60'-0''10'-0'' 10'-0'' 4 LANES, @ 12'-0'' = 48'-0''TRAFFIC RAILING SHOULDER SHOULDER SHOULDER VARIES, OUT TO OUT EXISTING BRIDGE TRAFFIC RAILING (36" SINGLE SLOPE) (INDEX REMOVAL VARIES 1'-9" MIN. 0'-0" MIN. 521-427) 2'−0½" MAX. 12'-0" MAX. P.G.L. — - CONSTR. JOINT Slope: 0.02 Ft/Ft Slope: 0.02 Ft/Ft EXISTING AASHTO GIRDER (TYP.) - 36" FLORIDA-I BEAM (INDEX 450-036) (TYP.) 3'-0" 7'-0" MAX. 4'-0''

SR 408 OVER CHURCH STREET TYPICAL SECTION

REVISIONS				PREPARED BY	CD 400 1440					
DATE	DESCRIPTION	DATE	DESCRIPTION		SR 408 WIDENING FROM KIRKMAN ROAD TO CHURCH STREET		SR 408 WIDENING FROM		CENTRAL	L
				KIMLEY-HORN AND ASSOCIATES INC.			FLORIDA	T		
				189 SOUTH ORANGE AVENUE, SUITE 1000	ROAD NO.	PROJECT NO.	EXPRESSWAY			
		ORLANDO, FLORIDA, 32801	ORLANDO, FLORIDA, 32801	SR-408	408-174	AUTHORITY				



LEGEND:

- EXISTING BRIDGE TO BE REMOVED
- E EXISTING STRUCTURE
- DIRECTION OF TRAVEL

BRIDGE ND. 750106

YPICAL SECTION

004 61615-23 RULE INDI ED SE AND SIGNED DIGITALLY FILE RONIC ELECT ГΗΕ ΙS SHE THIS ОF RECORD AL ICI OFF ТНЕ

SHEET NO.

Appendix D – Preferred Offsite Ponds



- **->-** Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Widening
- Open Space
- Orange County Parcels
- State Owned Land

FIGURE 9D3

Pond Alternative M3 (Basin M)



PD&E Study SR 408 Widening from Kirkman Road to Church Street CFX Project No. 408-174 Orange County, FL



- **->-** Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
 - Open Space
 - Widening
 - Orange County Parcels
 - State Owned Land

FIGURE 9E2

Pond Alternative N2 (Basin N)



PD&E Study SR 408 Widening from Kirkman Road to Church Street CFX Project No. 408-174 Orange County, FL



- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange Couty Parcels

FIGURE 9H2

Pond Alternative Q2 (Basin N, O, P & Q)

> CENTRAL FLORIDA EXPRESSWAY AUTHORITY

PD&E Study SR 408 Widening from Kirkman Road to Church Street CFX Project No. 408-174 Orange County, FL



- ->- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
 - Open Space
- Widening
- Orange County
- Parcels

FIGURE 9F2

Alternative Pond O2 (Basins O & P)

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

PD&E Study SR 408 Widening from Kirkman Road to Church Street CFX Project No. 408-174 Orange County, FL

Appendix E – Cost Estimates

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COSTS

Actual Construction Costs will vary

SR 408 Widening - Kirkman Road to Church Street

Orange County, FL

Prepared: December 2023

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE*	TOTAL
	ROADWAY				
110-1-1	CLEARING AND GRUBBING	AC	22	\$31,559.65	\$ 698,365.93
110-3	REMOVAL OF EXISTING STRUCTURES/BRIDGES	SF	7,366	\$195.00	\$ 1,436,315.40
120-6	EMBANKMENT	CY	124,133	\$16.26	\$ 2,018,408.00
160-4	TYPE B STABILIZATION	SY	109,129	\$8.87	\$ 967,972.70
285-7-1	OPTIONAL BASE, BASE GROUP 04	SY	38,645	\$30.18	\$ 1,166,302.01
285-7-9	OPTIONAL BASE, BASE GROUP 09	SY	70,484	\$39.26	\$ 2,767,200.40
327-70-2	MILLING EXISTING ASPHALT PAVEMENT, 3 1/2" AVG DEPTH	SY	169,958	\$4.84	\$ 822,597.95
334-1-15	SUPERPAVE ASPHALTIC CONC, TRAFFIC E (2.5")	TN	9,692	\$166.29	\$ 1,611,607.01
334-1-55	SUPERPAVE ASPH CONC, TRAFFIC E, PG 76-22 (1.5")	TN	5,815	\$164.20	\$ 954,811.01
334-1-55	SUPERPAVE ASPH CONC, TRAFFIC E, PG 76-22 (2")	TN	4,251	\$164.20	\$ 698,003.54
334-1-55	SUPERPAVE ASPH CONC, TRAFFIC E, PG 76-22 (2.75")	TN	25,706	\$164.20	\$ 4,220,955.71
337-7-25	ASPHALT CONCRETE FRICTION COURSE, INC BIT, FC-5, PG 76-22 (3/4")	TN	9,618	\$245.77	\$ 2,363,739.34
400-4-11	CONC CLASS IV, RETAINING WALLS	CY	4,731	\$864.02	\$ 4,087,246.61
415-1-3	REINFORCING STEEL- RETAINING WALL	LB	378,440	\$1.75	\$ 662,270.00
521-72-3B	BARRIER WALL CONCRETE RIGID - SHOULDER MODIFIED INDEX 410 W/SOUNDWALL	LF	191	\$838.00	\$ 160,058.00
521-72-24	SHOULDER CONCRETE BARRIER, 8' NOISE WALL	LF	2,315	\$610.00	\$ 1,412,228.61
521-72-40	SHOULDER CONCRETE BARRIER, 38" OR 44" HEIGHT	LF	30,779	\$418.13	\$ 12,869,690.17
534-72-101	SOUND/NOISE BARRIER-INC FOUNDATION, PERMANENT	SF	55,889	\$70.40	\$ 3,934,610.94
700-1-11	SINGLE POST SIGN, F&I GROUND MOUNT, UP TO 12 SF	EA	27	\$499.50	\$ 13,236.75
700-2-11	MULTI- POST SIGN, F&I GROUND MOUNT, UP TO 12 SF	EA	27	\$4,767.73	\$ 126,344.85
700-4-114	OVERHEAD STATIC SIGN STRUCTURE, FURNISH & INSTALL, CANTILEVER, 41-50 FT	EA	9	\$147,035.00	\$ 1,323,315.00
700-4-126	OVERHEAD STATIC SIGN STRUCTURE, FURNISH & INSTALL, SPAN, 101-150 FT	EA	15	\$390,000.00	\$ 5,850,000.00
700-8-135	FRONT ACCESS DYNAMIC MESSAGE SIGN, FURNISH & INSTALL- WITH UPS, FULL COLOR, 51-100 SF	EA	1	\$83,598.24	\$ 83,598.24
713-101-201	PAVEMENT MARKING-PREFORMED TAPE, YELLOW, SOLID, 6"	GM	8.56	\$30,500.00	\$ 261,202.46
713-101-506	PAVEMENT MARKING-PREFORMED TAPE, B/W CONTRAST, SOLID, 9"	GM	11.21	\$48,000.00	\$ 538,036.36
713-101-536	PAVEMENT MARKING-PREFORMED TAPE, B/W CONTRAST, SKIP, 9", (10'-30'	GM	21.34	\$14,250.00	\$ 304,132.24
715-61-411	LIGHT POLE COMPLETE, F&I STD POLE STANDARD FOUNDATION, 45' MOUNTING HEIGHT	EA	195	\$15,286.68	\$ 2,980,902.60
999-9-99	CLADDING WALLS	SF	39,626	\$125.00	\$ 4,953,196.50
	ITS	LS	1	\$595,000.00	\$ 595,000.00
	Toll Plaza Demolition and Reconstruction	EA	1	\$1,500,000.00	\$ 1,500,000.00
	AET Tolling Point	EA	3	\$680,000.00	\$ 2,040,000.00
	Bridge Contruction Cost	SF	47,179	\$250.00	\$ 11,794,755.68
	Pond Cost	AC	5.5	\$400,000.00	\$ 2,200,000.00
	ROADWAY SUBTOTAL				\$ 77,416,104.02

* THESE VALUES WERE OBTAINED USING THE HIGHER COST BETWEEN THE FOLLOWING THREE SOURCES:

FDOT ESTIMATES OFFICE WEBSITE SIX MONTH HISTORICAL AVERAGES FROM 2022/12/01 TO 2023/05/31,

FDOT ESTIMATES OFFICE WEBSITE TWELVE MONTH HISTORICAL AVERAGES FROM 2022/06/01 TO 2023/05/31, AND

FDOT ESTIMATES OFFICE WEBSITE TWELVE MONTH HISTORICAL AVERAGES FROM MARKET AREA 8 (Orange Co) FROM 2022/12/01 TO 2023/05/31

Construction Categories Total	\$ 77,416,104.02
Maintenance of Traffic (10%)	\$ 7,741,610.40
Mobilization (10%)	\$ 7,741,610.40
Structures Contingency (15%)	\$ 4,863,384.67
Roadway Contingency (20%)	\$ 8,998,707.91
Drainage (10%)	\$ 449,935.40
Aesthetic Contingency (3%)	\$ 2,322,483.12
Project Subtotal	\$ 109,533,835.92
Project Grand Total	\$ 109,533,835.92

NOTE: THE CONSULTANT HAS NO CONTROL OVER THE COST OF LABOR, MATERIALS, EQUIPMENT, OR OVER THE CONTRACTOR'S METHODS OF DETERMINING PRICES OR OVER