FINAL

Preliminary Engineering Report

State Road 414 Expressway Extension
Project Development and Environment Study
From US 441 to SR 434
Orange County and Seminole County, Florida

CFX Project Number: 414-227

Prepared for:
Central Florida Expressway Authority
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PPS0223210615ORL

MAY 2022

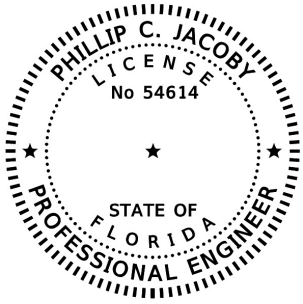
CENTRAL FLORIDA EXPRESSWAY AUTHORITY

PROFESSIONAL ENGINEER CERTIFICATION

CFX Project Number:	414-227
Project:	State Road 414 Expressway Extension Project Development and Environment Study From US 441 to SR 434
County:	Orange County and Seminole County, Florida
CFX Project Manager:	Will Hawthorne, P.E.

This preliminary engineering report contains engineering information that fulfills the purpose and need for the State Road 414 Expressway Extension Project Development & Environment Study from US 441 to SR 434 in Orange County and Seminole County, Florida. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Jacobs Engineering Group Inc., and that I have prepared or approved the evaluation, findings, opinions, conclusions or technical advice for this project.



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Phillip C. Jacoby, P.E.

on the date adjacent to the seal.

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Acronyms and Abbreviations

AADT	annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
AET	all-electronic tolling
AMA	Alternative Mobility Area
AN	advanced notification
AO	Archaeological Occurrence
APE	Area of Potential Effect
AVI	automatic vehicle identification
BATM	Bridge Analysis Technical Memorandum
BMAP	basin management action plan
CADD	computer-aided design and drafting
CATV	cable television
CAV	Connected and Autonomous Vehicles
CCTV	closed-circuit television
CFR	Code of Federal Regulations
CFX	Central Florida Expressway Authority
COVID-19	Coronavirus Disease 2019
CSER	Contamination Screening Evaluation Report
CST	construction
DCS	data collection sensors
DLT	Displaced Left Turn
DMS	dynamic message sign
EAG	Environmental Advisory Group
EB	eastbound
EFH	essential fish habitat
ESC	Environmental Stewardship Committee
FDEP	Florida Department of Environmental Protection
FDM	*FDOT Design Manual*
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FLUCCS	Florida Land Use Cover Classification System
FMSF	Florida Master Site File
FS	Florida Statutes
FWC	Florida Fish and Wildlife Conservation Commission
FY	fiscal year
HW	hazardous waste
I-4	Interstate 4
ICE	Intersection Control Evaluation
ID	identification
ITS	Intelligent Transportation System
LOS	Level of Service
MOT	maintenance of traffic
MOU	Memorandum of Understanding
MP	mile post
mph	mile(s) per hour
MSE	mechanically stabilized earth

MTP	2045 Metropolitan Transportation Plan
MUTS	*Manual on Uniform Traffic Studies*
MVDS	microwave vehicle detection system
N/A	not applicable
NAC	Noise Abatement Criteria
NGVD	National Geodetic Vertical Datum of 1929
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
P	petroleum product
PAG	Project Advisory Group
PD&E	Project Development and Environment
PI	point of intersection
PT	point of curvature
PTAR	*Project Traffic Analysis Report*
PVI	point of vertical intersection
RC	reverse crown
RHPZ	Riparian Habitat Protection Zone
ROW	right-of-way
RTMC	Regional Transportation Management Centers
SHPO	State Historic Preservation Officer
SJRWMD	St. Johns River Water Management District
SR 414	State Road 414
SR 429	State Road 429
SR 434	State Road 434
SR 436	State Road 436
SR 50	State Road 50
SR 504	State Road 504
TIP	Transportation Improvement Plan
TMP	Transportation Management Plan
TMS	Traffic Monitoring Stations
TSM&O	Transportation Systems Management and Operations
TTC	Temporary Traffic Control Plan
UAO	Utility Agency Owner
UAP	Utility Assessment Package
US 441	U.S. Highway 441
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VDS-AVI	vehicle detection system-automatic vehicle identification
WB	westbound

1. Project Summary

1.1 Project Background and Description

The Central Florida Expressway Authority is conducting the State Road 414 Expressway Extension Project Development and Environment Study to evaluate alternatives for a proposed grade-separated expressway extension of the tolled SR 414 (John Land Apopka Expressway). The existing SR 414 Expressway provides regional connectivity from State Road 429 and U.S. Highway 441 in Apopka and extends south and east to SR 414 (Maitland Boulevard) just east of US 441. Figure 1-1 presents the Regional Location Map. The study limits extend along the existing SR 414 (Maitland Boulevard) corridor from US 441 (Orange Blossom Trail) to State Road 434 (Forest City Road). Figure 1-2 presents the Project Location Map. The approximate 2.8-mile-long study corridor generally runs along the boundary of Orange County and Seminole County and is located within the cities of Maitland (Orange County) and Altamonte Springs (Seminole County). Both CFX and the Florida Department of Transportation own portions of SR 414 within the project study limits. CFX owns and operates the SR 414 (John Land Apopka Expressway) from SR 429 to just east of US 441, and FDOT owns and operates SR 414 (Maitland Boulevard) from just east of US 441 to U.S. Highway 17/U.S. Highway 92. The existing SR 414 (Maitland Boulevard) is a four-lane divided urban principal arterial with three major signalized intersections at Bear Lake Road/Rose Avenue, Eden Park Road and Magnolia Homes Road, and an unsignalized intersection at Gateway Drive between the grade-separated intersections of SR 414/US 441 and SR 414/ SR 434. A minor grade-separated overpass exists over the Little Wekiva Canal and an access road between the Lake Lotus Park and Ride lot and Lake Lotus Park, which served as FDOT mitigation for the original SR 414 Maitland Boulevard construction.

The PD&E Study is evaluating alternatives for a proposed grade-separated SR 414 Expressway Extension to provide system linkage between the western terminus of the SR 414 (John Land Apopka Expressway) and Interstate 4. The SR 414 Expressway Extension includes alternatives for a facility with up to two lanes in each direction from US 441 to SR 434. Project alternatives involve various configurations of grade-separated express lanes on SR 414 (Maitland Boulevard) to provide needed capacity between US 441 and SR 434 while maintaining the existing local access lanes. Alternatives considered include reversible, bi-directional and convertible express lanes along the project corridor to avoid right-of-way acquisition needs.

Prior to the PD&E Study, CFX completed the SR 414 Reversible Express Lanes Schematic Report that included an assessment of tolled, directional express lanes within the median of SR 414 (CFX 2019). The Report recommended a two-lane, reversible, grade-separated viaduct in the median of SR 414. The Report also found that a single lane bi-directional express lane would require a 75 percent wider bridge and was not considered viable.

The proposed improvements also include reconfiguring the existing at-grade SR 414 (Maitland Boulevard) to accommodate the SR 414 toll facility while maintaining two SR 414 local access lanes in each direction. The study will involve analysis of intersection improvements, bridge modifications at Lake Bosse and Little Wekiva Canal, stormwater management facilities, pedestrian and bicycle needs and access management modifications. The No-Build Alternative is a viable option throughout the study.

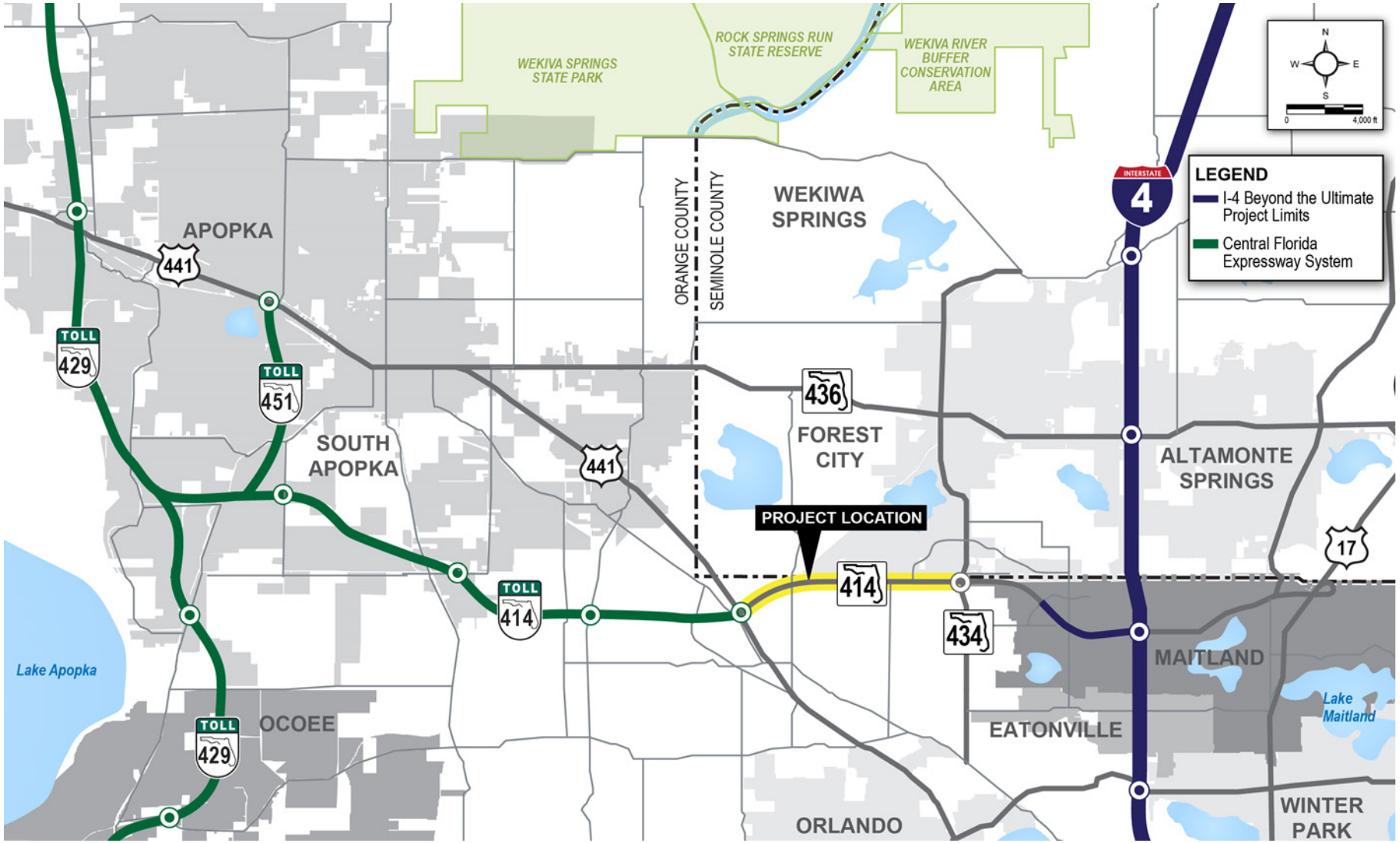

Figure 1-1. Regional Location Map

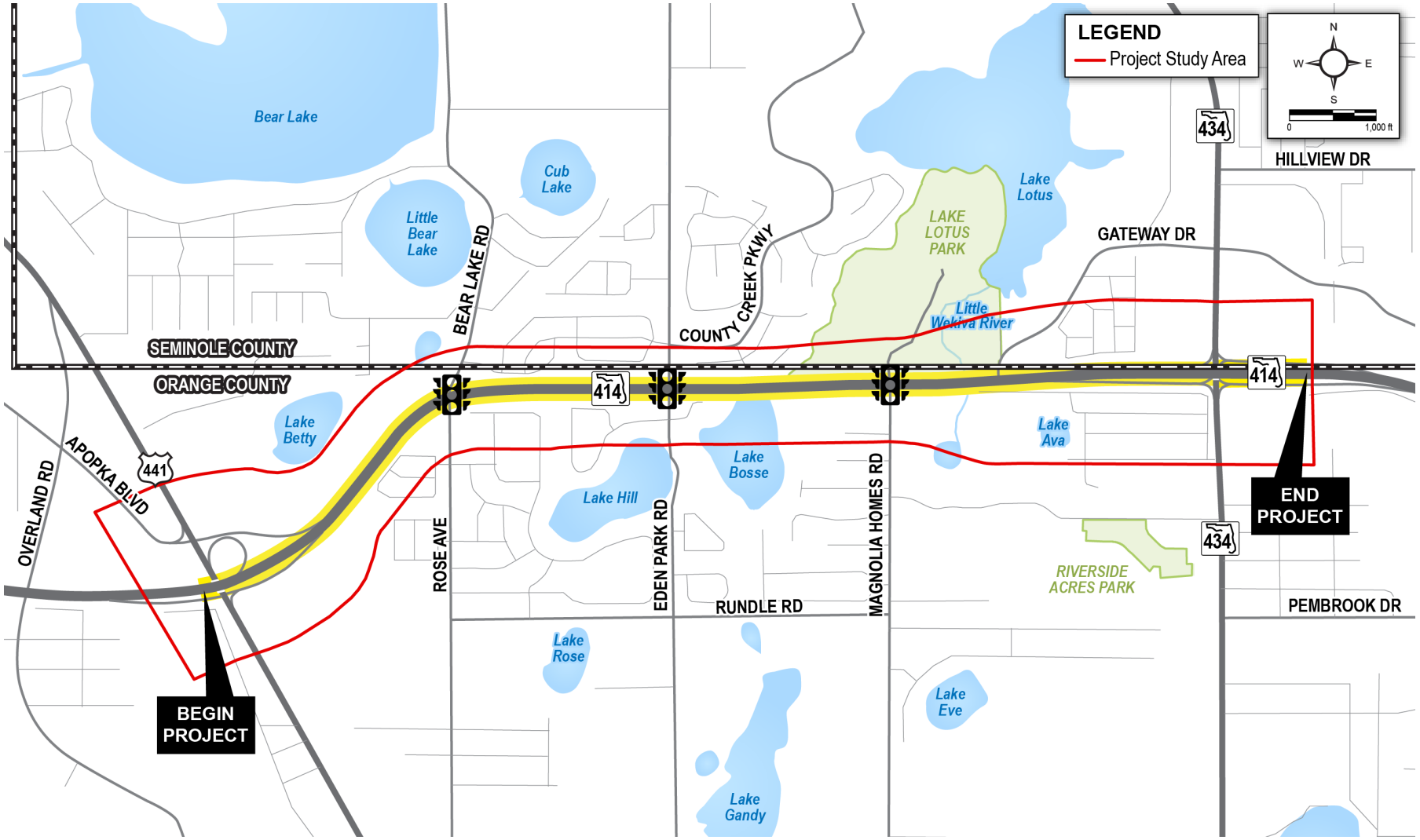

Figure 1-2. Project Location Map

1.2 Purpose and Need

The purpose of the proposed SR 414 Expressway Extension PD&E Study is to provide needed capacity on SR 414 and improve system connectivity between SR 429 and I-4 to meet future traffic needs. The 2.8-mile-long project corridor of SR 414 is an arterial connecting two limited-access facilities. The proposed project will complete the limited-access gap between US 441 and SR 434 and provide limited-access regional connectivity between SR 429 and I-4. The proposed grade-separated SR 414 Expressway Extension will separate the through traffic from the local traffic, allowing for greater mobility and reduced congestion for both facilities. The proposed improvements are to 1) accommodate anticipated transportation demand, 2) improve safety, 3) improve system connectivity/linkage and 4) support multimodal opportunities.

1.2.1 Anticipated Traffic Demand

Traffic demand is based on the *Project Traffic Analysis Report* (CFX 2022j). Traffic counts from October 2019 indicate that the annual average daily traffic on SR 414 is approximately 59,000 vehicles per day west of SR 434, exceeding an adopted Level of Service D. Within the project limits, the study corridor experiences significant peak-hour traffic congestion. In the existing condition, high-speed travelers on the limited-access facilities east and west of the project corridor transition to a signalized arterial roadway with lower speeds and multiple cross streets that provide access to significant residential land uses and serve as collector roadways. Within the study limits, the traffic signals along SR 414 are located approximately every 0.5 mile, which impedes traffic flow and increases travel time through the corridor by 15 minutes on average in the peak-hour direction. Preliminary traffic forecasts indicate that the AADT on SR 414 west of SR 434 will double by 2045. While there are no Developments of Regional Impact within the study area, residential land development projects are located in the northeast corner of US 441 and SR 414, as well as in the southeast corner of SR 434 and SR 414. Additionally, several mixed-use land development projects are located along SR 429 (Wekiva Parkway) northwest of the study area.

As noted in the PTAR, the Florida Bureau of Economic and Business Research estimates population in Orange County to grow 1.5 percent per year, Seminole County population is expected to grow 1.4 percent per year and Lake County population is anticipated to grow 1.7 percent per year. Employment growth rates are similar, with Orange County at 1.8 percent, Seminole County at 1.6 percent and Lake County at 1.7 percent. The Maitland Center, located on SR 414 just west of I-4, is a large office complex whose employment base contributes to the existing traffic congestion along SR 414 in the morning (eastbound direction) and afternoon (westbound direction) peak hours.

With increased population and employment growth in the region and continued development near SR 429, traffic volumes on SR 414 are expected continue to increase. Traffic from eastern Lake County (west of the study area) heading to the employment centers in the Orlando Metropolitan Area is steadily increasing. The proposed improvements are needed to accommodate existing and future travel demand and to provide a limited-access connection between the northwestern portions of the Orlando Metropolitan Area and I-4.

1.2.2 Safety

According to crash data extracted from the state's Crash Analysis Reporting System, the study area experienced 694 total crashes between 2014 and 2018. Of these crash incidents, two fatalities were reported and another 164 resulted in injury (CFX 2022j). In 2019, two pedestrian/bicycle fatalities occurred within the study area based on local media reports. However, the 2019 crash history is not yet

available. By separating high-speed regional traffic from local traffic, along with improving the pedestrian and bicycle facilities, the proposed improvements will improve accommodations for pedestrians, bicyclists and motorized vehicles throughout the study area.

1.2.3 Improved System Connectivity/Linkage

As stated previously, there is a limited-access gap along SR 414 within the project study limits. Inter-regional traffic from surrounding counties and municipalities to the north and northwest travel through the study corridor to access the Orlando Metropolitan Area via SR 429 and I-4. The I-4 Ultimate Improvement Project (under construction) includes improvements to SR 414 that provide a limited-access facility between SR 434 and I-4 at the eastern end of the study area as well as increased I-4 capacity. SR 414 connects two Strategic Intermodal System facilities: SR 429 and I-4. On the west side of the interchange of SR 414/US 441 is a large industrial area and the Florida Central Railroad. Florida Central Railroad is a Class III railroad serving industries in Lake and Orange counties and connects to CSX Transportation railroad in Orlando. These industrial and commercial land uses generate a significant amount of truck traffic through the study corridor. The proposed improvements will improve the system to system connectivity between SR 429 and I-4 and improve regional connectivity among the surrounding areas. Additionally, the proposed project is anticipated to improve truck traffic mobility between I-4 and the industrial area at the western end of the study area, thereby supporting regional economies and interregional connectivity.

1.2.4 Multimodal Opportunities

The surrounding land use within the project limits is primarily residential. West of Gateway Drive, 5-foot-wide sidewalks are located on both sides of SR 414 along with a 4-foot-wide undesignated bicycle lane east of Bear Lake Road. These facilities connect to nearby trails and Lake Lotus Park within the study area. The proposed improvements consider wider sidewalks and dedicated buffered bicycle lanes to enhance walking and bicycling through the corridor and improve multimodal connectivity.

The Lake Lotus Park and Ride is a shared-use facility located within the study area at the southeastern corner of Magnolia Homes Road and SR 414, across from Lake Lotus Park. As part of permitting and mitigation agreements associated with the construction of SR 414, the park and ride serves as parking for the Lake Lotus Park and as a standard FDOT park and ride. The lot includes 33 shared parking spaces and operates on a ’first come, first served’ basis and is accessible 24 hours a day. Tram service to the park from this lot is available on the weekends and during special events.

The Central Florida Regional Transportation Authority (also known as LYNX) provides bus transit for three counties in the region: Orange, Seminole and Osceola. There is no LYNX bus service along this segment of SR 414. However, bus service is available within the study area along SR 434 and US 441. The LYNX service along SR 414 east of the study area provides a connection to SunRail. Improved transportation facilities along the corridor will enhance access to nearby bus stops and improve multimodal connections to transit options, such as LYNX and SunRail.

1.3 Consistency with Regional and Local Transportation Planning

Planning consistency of the proposed project is documented in various local planning documents. A brief explanation of each follows. Consistency with the following local comprehensive plans is being coordinated during the PD&E Study:

- CFX. The project is currently listed in the *CFX Visioning + 2040 Master Plan* (CFX 2016) and in the *Five-Year Work Plan FY 2022 - 2026*, adopted May 2021 (CFX 2021d). The project is fully funded, pending the results of this PD&E Study. The design phase is funded in FY 2022/23 and the construction phase is funded in FY 2025/26.
- MetroPlan Orlando. The project is listed in MetroPlan Orlando's adopted *Transportation Improvement Program* adopted July 7, 2021, as a CFX project that is fully funded (Management Number 99223), pending the results of this PD&E Study. The design phase is funded in FY 2022/23 and the construction phase is funded in FY 2025/26.

1.4 Commitments

The following commitments have been made for the project:

- Avoidance and minimization of wetland and listed species impacts will continue to be evaluated during the final design, permitting and construction phases of this project and all possible and practicable measures to avoid or minimize these impacts will be incorporated.
- Pre-construction surveys will be conducted for listed species as required.
- The most recent version of the USFWS Standard Protection Measures for the Eastern Indigo Snake will be adhered to during construction of the proposed project.
- Best Management Practices to control erosion and sedimentation in accordance with Standard Specifications for Road and Bridge Construction will be implemented.
- Construction of feasible and reasonable noise abatement measures recommended in the Noise Study Report are contingent upon the following conditions:
  - Final recommendations on the construction of abatement measures are determined during the project's final design and through the public involvement process.
  - Detailed noise analyses during the final design process support the need, feasibility and reasonableness of providing abatement.
  - Community input supporting types, heights and locations of the noise barrier(s) is provided to CFX.
- During the Design phase, the noise abatement locations, noise barrier types, lengths and heights will be determined. A Noise Study Addendum will be prepared during the final design phase to re-evaluate the need for noise barriers on the proposed SR 414 elevated expressway, identify and evaluate any new noise sensitive sites, re-evaluate the effectiveness of the existing noise barriers and re-evaluate any existing noise sensitive sites based on alignment and profile changes in design. As part of this noise re-evaluation, noise sensitive sites without existing noise walls (such as Lake Hill Woods, Crescent Place at Lake Lotus, Oranole Road, and Enclave at Bear Lake) will be re-evaluated in consideration of both existing noise levels and future noise levels.
- Mitigation of aesthetic effects and landscaping are determined during the project's final design and through the public involvement process. CFX will evaluate potential solutions that are feasible and reasonable.

- Relocation of utilities impacted by the construction of the project will be conducted prior to construction where feasible and reasonable. Interruption in services for relocated utilities will be minimized and coordinated with appropriate agencies.

1.5 Surrounding Projects

Review of regional and local government comprehensive plans indicate that there are multiple surrounding projects or studies near the proposed SR 414 project. Figure 1-3 shows programmed transportation projects adjacent to the study area. Table 1-1 presents the surrounding project details. Seminole County Comprehensive Plan Policy TRA 2.1.4 notes that Bear Lake Road from Orange County line to SR 436 is policy constrained to two lanes.[1]

Table 1-1. Surrounding Projects

Project	From	To	Improvement	Documented Agency Plan
MetroPlan 2045 Metropolitan Transportation Plan				
SR 434 Roadway Improvement	SR 414 (Maitland Boulevard)	SR 436	Complete Streets/Safety/Ops	MetroPlan 2045 MTP Cost Feasible Plan (CST Funded 2031-35) (ID# 2145)
US 441/Orange Blossom Trail Roadway Improvement	US 192	SR 429	Operational/Safety	MetroPlan 2045 MTP Cost Feasible Plan (CST Funded 2036-45) (ID# 2091)
SR 414 Roadway Improvement	Begin Expressway	US 441/Orange Blossom Trail	Operational/Safety	MetroPlan 2045 MTP Cost Feasible Plan (Unfunded) (ID# 2079)
Rose Avenue Roadway Improvement	Orange Blossom Trail	SR 414 (Maitland Boulevard)	Transportation Systems Management & Operations/Intelligent Transportation System Operational/Safety	MetroPlan 2045 MTP Cost Feasible Plan (Unfunded) (ID# 3260)
Bear Lake Road Bicycle and Pedestrian	at Seminole Wekiva Trail Crossing		Safety Improvements	MetroPlan 2045 MTP Cost Feasible Plan (Unfunded) (ID# 5041)
Pine Hills Trail Bicycle and Pedestrian	Red Bone Lane	SR 414 (Maitland Boulevard)	Shared Use Path	MetroPlan 2045 MTP Cost Feasible Plan (Unfunded) (ID# 5074)
Gateway Drive ITS/Connected and Autonomous Vehicle Mobility	Seminole State College	Maitland Center	ITS CAV Circulator	MetroPlan 2045 MTP Cost Feasible Plan (Unfunded) (ID# 3263)
MetroPlan Transportation Improvement Program Fiscal Year 2022–2026				
SR 434/Forest City Road Roadway Improvement	SR 424/ Edgewater Drive	Orange/Seminole County Line	Widen to six lanes	MetroPlan TIP FY 2022–2026 Federal & State Funded FM# 2394221 (CST Funded FY 2022/23)
SR 434 Roadway Improvement-Complete Streets	SR 414 (Maitland Boulevard)	SR 436	Context Sensitive improvements	MetroPlan TIP FY 2022–2026 (Unfunded)

[1] https://www.seminolecountyfl.gov/core/fileparse.php/3289/urlt/TRA-Element.pdf

Table 1-1. Surrounding Projects

Project	From	To	Improvement	Documented Agency Plan
Orange Co. Gap Segment 2 Bicycle and Pedestrian	Hiawassee Road	North of SR 414/Maitland Boulevard	Bike Path/Trail	MetroPlan TIP FY 2022-2026 (CST Funded FY 2022/23)
Other Agencies				
Florida Coast-to-Coast Trail	St. Petersburgh	Titusville	New Trail	FDEP Office of Greenways and Trails, May 2018, Funded
Orange County's Little Wekiva Regional Stormwater Treatment Facility	Adjacent to Little Wekiva River and Lake Lotus Park and Ride		Stormwater Treatment	N/A

Note:

CST = construction

N/A = not applicable

1.6 Alternatives Considered

Alternatives were evaluated for environmental and operational constraints. Seven initial alternatives were developed and analyzed as part of this PD&E Study. Two typical section options were considered for the at-grade SR 414 (Maitland Boulevard), which included the No-Build Alternative. Five typical section options were developed for the SR 414 Elevated Expressway involving local access lanes on SR 414 (Maitland Boulevard).

An at-grade alternative for the SR 414 Elevated Expressway within the median of SR 414 (Maitland Boulevard) was eliminated because while it provided uninterrupted travel along the expressway, traffic from the local cross streets would not be able to cross SR 414 (Maitland Boulevard). Another alternative considered included an adjacent corridor to SR 414 (Maitland Boulevard). However, because SR 414 (Maitland Boulevard) is mostly developed, this alternative would result in significant community impacts and was eliminated from further consideration. Finally, an alternative that included individual overpasses at each of the existing intersections was also considered. However, because of the limited spacing between each intersection, this alternative was not feasible and was, therefore, eliminated.

Viable alternatives were developed and presented for public input at the Alternatives Public Workshop held on February 10, 2021. These viable alternatives included roadway concepts for both the SR 414 Expressway Extension toll lanes and the SR 414 (Maitland Boulevard) local access lanes. The viable alternatives were updated after the Alternatives Public Workshop to reflect ongoing alternatives refinements that avoid and minimize environmental impacts.

1.6.1 Viable Alternatives

The evaluation of typical section options is documented in the SR 414 Expressway Extension *Typical Section Technical Memorandum* (CFX 2022l). All typical section options assumed the SR 414 Expressway Extension and the SR 414 (Maitland Boulevard) local access lanes would be constructed within the existing ROW to avoid community and environmental impacts and, therefore, a variety of elevated expressway alternatives were developed within the median. All the potential typical sections were

developed within the existing typical section footprint of 118 feet wide. The alignment is constrained by the ROW and median width needed for pier placement of the proposed elevated structure. To maximize the use of the existing typical section of 118 feet, the proposed alignment for both the at-grade and elevated facilities is along the centerline of the existing ROW. The piers for the elevated SR 414 bridge are proposed within the median of the at-grade SR 414 (Maitland Boulevard) facility. Based on the design criteria, the design speed was reduced from 55 miles per hour to 45 mph along the at-grade SR 414 (Maitland Boulevard) facility.

Based on the initial analyses, the viable typical section for the at-grade SR 414 (Maitland Boulevard) maintains the pavement footprint of the four-lane facility but shifts and restripes the lanes to provide a 7-foot-wide buffered bike lane with proposed Type F curb and gutter in the median and split concrete barrier wall offset 8 feet from the median curb and gutter. The viable typical section options for the elevated SR 414 Expressway Extension include Options 4 and 6 as detailed in the following text. The *Typical Section Technical Memorandum* provides descriptions of each typical section option (CFX 2022l).

- Typical Section Option 4 (SR 414 Elevated Expressway – Two lanes per direction): provides four 12-foot-wide express lanes (two per direction separated by a median barrier wall) in the median of SR 414 (Maitland Boulevard)
- Typical Section Option 6 (SR 414 Elevated Expressway – Three convertible lanes): provides three 12-foot-wide express lanes separated by a movable barrier wall. In morning peak traffic, there are two lanes eastbound and one lane westbound. In afternoon peak traffic, there is one lane eastbound and two lanes westbound. The movable barrier would be shifted approximately 12 feet via a specialty vehicle twice daily. This option is both reversible and convertible and requires advance signing, access equipment, specialty barrier and specialty vehicle with onsite or nearby storage.

Typical Section Option 4 construction costs are higher but are offset by the significant capital and operating costs for Option 6. Additionally, Option 4 provides higher capacity and safer incident management. Therefore, the recommended option for the elevated SR 414 Expressway Extension is Option 4. The proposed design speed for the SR 414 Elevated Expressway is 50 mph.

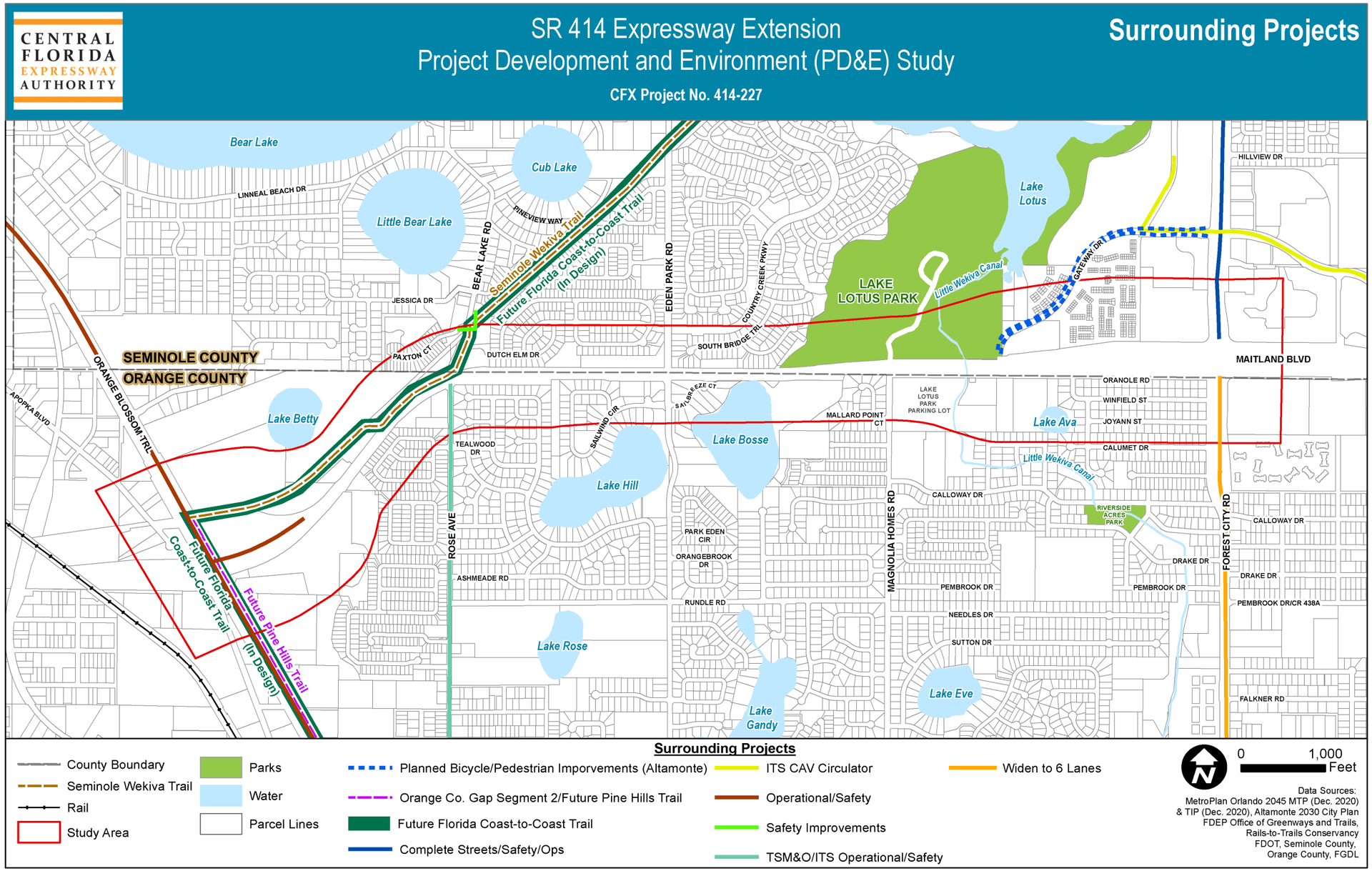

Figure 1-3. Surrounding Projects Map

1.6.2 Preferred Alternative

As a result of the alternatives analyses conducted for the project, a Preferred Alternative was identified for further analysis and public input. The Preferred Alternative involves an elevated SR 414 Expressway Extension toll facility to serve regional traffic and at-grade SR 414 (Maitland Boulevard) local access lanes (non-tolled) from US 441 to SR 434. The proposed SR 414 Expressway Extension typical section for the Preferred Alternative includes the elevated SR 414 facility in the median, as four 12-foot-wide express lanes (two lanes per direction) separated by a median barrier wall. The Preferred Alternative also includes maintaining the existing SR 414 (Maitland Boulevard) access lanes at-grade with two lanes per direction on either side and below the SR 414 Expressway Extension. The at-grade portion of the facility on SR 414 (Maitland Boulevard) will maintain the existing pavement width (60 feet) but shifts and restripes the existing lanes to provide a 7-foot-wide buffered bike lane east of Bear Lake Road. Using these recommendations to minimize ROW and ongoing traffic analysis, the Preferred Alternative will be further evaluated as the study progresses. As part of the Preferred Alternative, operational improvements at intersections are anticipated to accommodate the elevated SR 414 Expressway Extension while maintaining local access at cross streets. In addition, impacts to environmental resources including social, cultural, natural and physical will be considered as the Preferred Alternative is further developed.

1.6.3 No-Build Alternative

The No-Build Alternative for the study area assumes previously programmed improvements are built including widening SR 414 to six lanes (at-grade with no elevated expressway) from US 441 to SR 434 as noted in MetroPlan Orlando's *2045 Metropolitan Transportation Plan Cost Feasible Plan*, Revised June 9, 2021. The No-Build Alternative is not funded in the FDOT 5-Year Work Program, adopted July 2020 and is no longer programmed. Consistency with local transportation plans is being coordinated during the PD&E Study. The previously programmed improvements to SR 414 (Maitland Boulevard) do not meet the future traffic needs through the year 2045 nor the purpose and need for the project to accommodate future transportation demand or improve system connectivity. An at-grade widening of SR 414 (Maitland Boulevard) to six lanes would preclude a four-lane expressway within the median (at two lanes per direction) or require substantial ROW impacts. Similarly, widening at-grade SR 414 (Maitland Boulevard) to six lanes combined with a two-lane SR 414 Elevated Expressway, within the median (one lane per direction) would result in ROW impacts and affect the ability to maximize the use of the existing median to accommodate infrastructure such as utilities and drainage needs. Therefore, the No-Build Alternative is not the Preferred Alternative. However, the No-Build Alternative shall remain under consideration throughout the PD&E Study for public input and to provide a comparison to the Preferred Alternative.

2. Existing Conditions

The following sections summarize the existing roadway and environmental characteristics for the study area.

2.1 Existing Roadway Conditions

The existing roadway network in the study area consists of local roads, rural and urban arterials, and limited-access facilities. SR 414 is an east-west oriented facility in the study area providing regional connectivity at the boundary of Orange County and Seminole County and connecting SR 429 and I-4. The study area includes two interchanges (US 441 and SR 434), three at-grade signalized intersections (Bear Lake Road/Rose Avenue, Eden Park Road and Magnolia Homes Road) and one unsignalized at-grade intersection (Gateway Drive). The SR 414 project corridor has four bridges including one over US 441, one over Lake Bosse, one over the Little Wekiva Canal and one over SR 434. The following sections summarize the existing roadway and environmental characteristics for the study area.

2.1.1 Functional Classification

In the study area, SR 414 is functionally classified as an Urban Principal Arterial Other for the majority of the project and transitions to an Urban Principal Arterial Expressway on the western limit where it becomes the SR 414 (John Land Apopka Expressway). Table 2-1 lists the functional classifications of roadways in the study area.

Table 2-1. Existing Roadways Functional Classifications

Name of Roadway	Maintaining Agency	Functional Classification	Primary Direction	Number of Lanes
SR 414/SR 429	CFX – from Begin Project approximate mile post 0.224 to MP 0.000	Urban Principal Arterial Expressway	north-south (east-west in study area)	Five – Divided (three westbound and two eastbound)
SR 414 (Maitland Boulevard)	FDOT – from MP 36.206 to End Project	Urban Principal Arterial Other	east-west	Four - Divided
US 441/SR 500	FDOT	Urban Principal Arterial Other	north-south	Four - Divided
SR 434	FDOT	Urban Principal Arterial Other	north-south	Six - Divided
Bear Lake Road/Rose Avenue	Orange County/Seminole County	Collector	north-south	Three - Undivided
Eden Park Road	Orange County/Seminole County	Collector	north-south	Three - Undivided
Magnolia Homes Road/ Lake Lotus Park Drive	Orange County/City of Altamonte Springs	Collector/Local Access	north-south	Two - Undivided
Gateway Drive	City of Altamonte Springs	Local Access	north-south	Two - Undivided

Note:

MP = mile post

2.1.2 Access Management

FDOT currently identifies the SR 414 corridor from US 441 to SR 434 as an Access Classification 3, which allows full median openings and signalized intersections with a minimum spacing of 2,640 feet and directional median openings at a minimum spacing of 1,320 feet. Minimum connection spacing is allowed at 660 feet for sections posted above 45 mph. Current speed limits posted on SR 414 are between 50 mph and 55 mph. The SR 414 (John Land Apopka Expressway) limited-access facility overlapping the western end of the project study area is Access Classification 1, which allows ingress and egress only via interchanges.

2.1.3 Roadway Typical Section

The existing SR 414 roadway between US 441 to SR 434 is an urban typical section approximately centered within the existing minimum ROW of 118 feet and has a closed drainage system with Type F curb to the outside and grassy swales in the median. The typical section occurs outside the interchanges between Bear Lake Road and Gateway Drive and consists of four 11-foot-wide lanes (two lanes in each direction), 4-foot-wide inside and outside shoulders and a 46-foot-wide median. All lanes slope to the outside with the inside lane at 0.02 feet per foot and the outside lane at 0.03 feet/foot, except where superelevated. Within this section are 5-foot-wide sidewalks adjacent to SR 414 on both sides (refer to Figure 2-1). There is an 1,800-foot-long section between the US 441 Interchange and Bear Lake Road that uses the same footprint of existing pavement but is striped so that each side consists of one 14-foot-wide lane and one 12-foot-wide lane (two lanes in each direction), a 46-foot-wide median and 4-foot-wide inside shoulder but no outside shoulder. There is a 12-foot-wide shared use path on the north side of SR 414 that begins in Orange County ROW at US 441 and connects into SR 414 ROW for approximately 900 feet to the west of Bear Lake Road.

The western project limit within the US 441 Interchange includes approximately 1,700 feet from the bridge over US 441 to the CFX/FDOT boundary marked by signage and the end of a median barrier wall. This area transitions from a barrier-separated, closed 26-foot-wide median to tie into the suburban 46-foot-wide median described above. This rural typical section includes 12-foot-wide lanes, 12-foot-wide inside shoulders and 10- to 12-foot-wide outside shoulders. There is a 5-foot-wide sidewalk on the south side of the limited-access ROW separated from the roadway by a fence.

The eastern project limit includes approximately 2,500 feet between Gateway Drive and the end project at SR 434 and the typical section transitions from urban to rural. This typical holds the 46-foot-wide median and includes 12-foot-wide lanes, 4-foot-wide paved inside shoulders and 8- to 10-foot-wide paved outside shoulders. There is no sidewalk on either side of SR 414 within this eastern section.

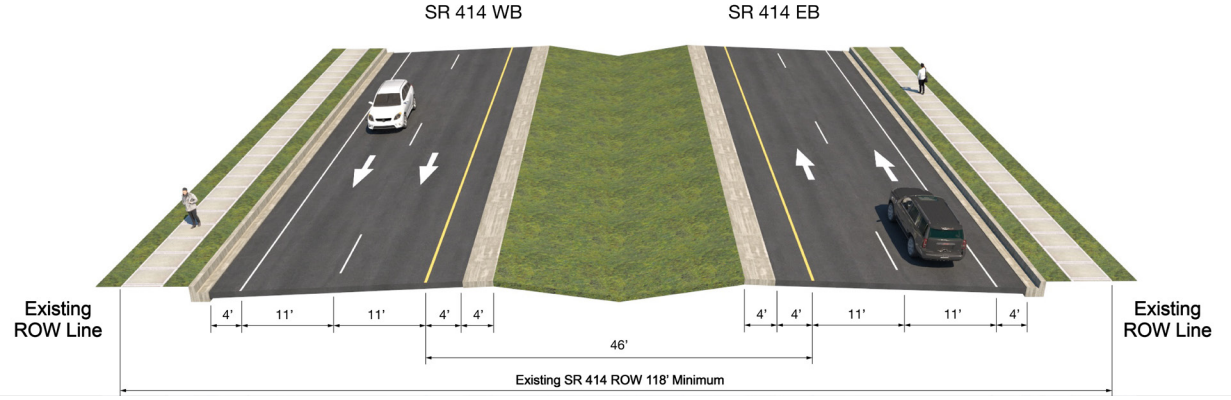

Figure 2-1. Typical Section

2.1.4 Context Classification

The FDOT context classification system applies to all FDOT highways functionally classified as arterials or collectors and ensures that projects along these highways harmonize with the surrounding land use characteristics and the intended uses of the roadway. By informing planners and engineers about the type and intensity of uses along various roadway segments, state roadways can be planned, designed and maintained to be supportive of safe and comfortable travel for their anticipated users.

Eight FDOT context classifications are used to describe unique land use contexts in Florida. The context classifications range from "C1 - Natural" to "C6 - Urban Core". The context classification provides insight to the types of road users that can be expected, and corresponding design criteria reflect their diversity of needs. Table 2-2 and Figure 2-2 summarize the context classification determinations for the project as provided by FDOT.

Table 2-2. Context Classification Determinations

Segment	From	To	Existing Context Classification
1	Begin Project US 441 (SR 500) MP 35.965	Orange/Seminole County Line (East of Bear Lake Road) MP 36.781	C3C – Suburban Commercial
2	Orange/Seminole County Line (East of Bear Lake Road) MP 36.781	SR 414 Off Ramp MP 38.063	C3R – Suburban Residential
3	SR 414 Off Ramp MP 38.063	End Project SR 434 MP 38.442	C3C – Suburban Commercial

2.1.5 Pedestrian and Bicycle Facilities

Continuous sidewalks extend on both sides of SR 414 from US 441 to Gateway Drive including a 5-foot-wide, barrier-separated sidewalk on the bridges over Lake Bosse and Little Wekiva Canal. There is a 12-foot-wide shared use path from US 441 to Bear Lake Road just north of SR 414. Sidewalk is discontinued east of Gateway Drive. There are no pedestrian accommodations on the bridge over SR 434.

Between Bear Lake Road and Gateway Drive are 4-foot-wide outside shoulders that can be used as an undesignated bicycle lane on both sides of SR 414. The bridge over Lake Bosse provides a 12-foot-wide outside shoulder and the bridge over Little Wekiva Canal provides an 8-foot-wide outside shoulder. The bridge over SR 434 contains 10-foot-wide outside shoulders, but the entrance and exit ramps at SR 434 prevent continuity of bicycle facilities.

2.1.6 Posted Speeds

Table 2-3 provides the existing posted speed limits along the existing SR 414 corridor.

Table 2-3. Existing (2020) Corridor Posted Speed Limits

Corridor	From	To	Posted Speed
SR 414 Maitland Boulevard)	US 441 (SR 500)	Gateway Drive	50 mph
SR 414 (Maitland Boulevard)	Gateway Drive	East of SR 434	55 mph

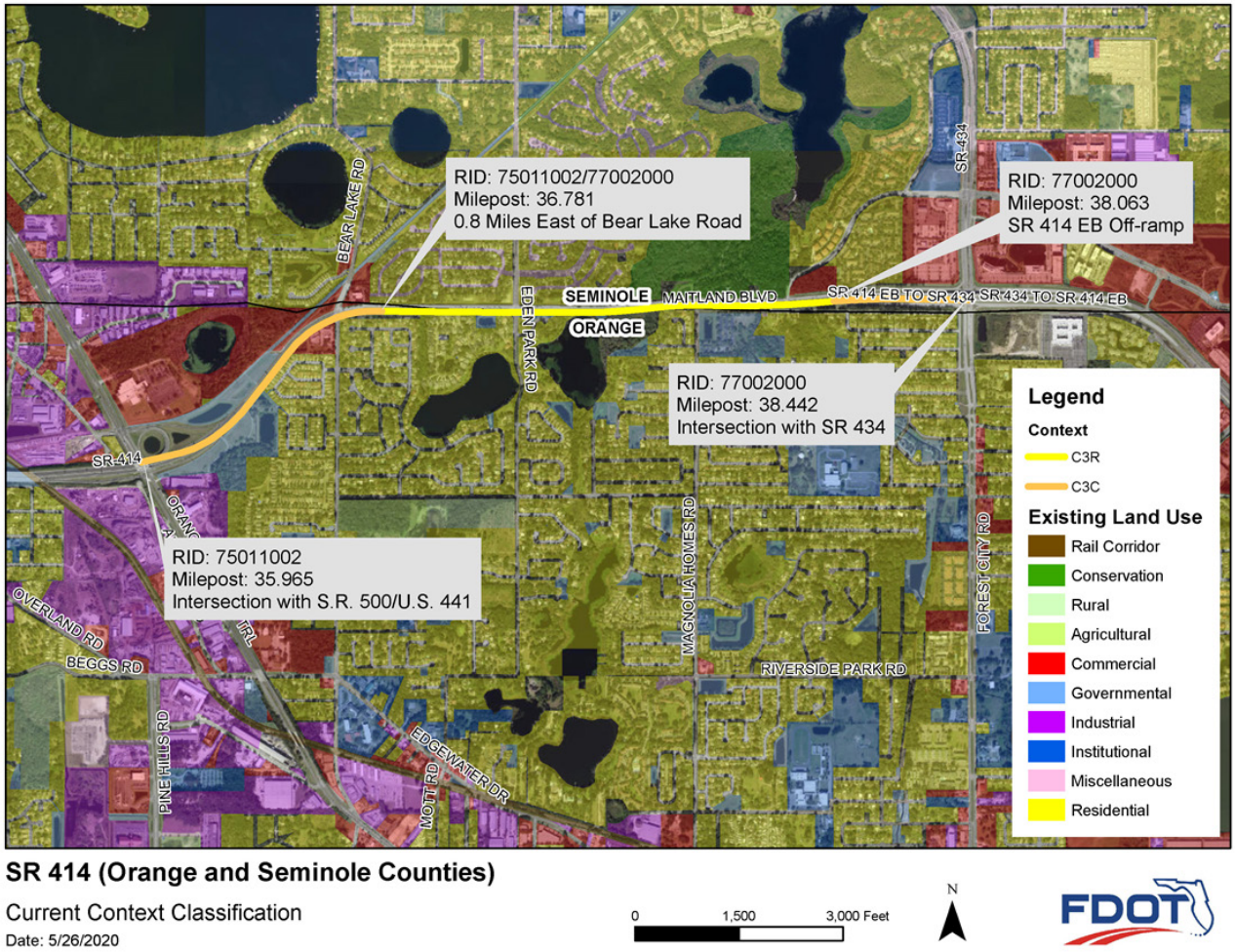

Figure 2-2. SR 414 Current Context Classification

2.1.7 Right-of-Way

The ROW for SR 414 through the project limits is a minimum 118-foot width. The ROW widens at the eastern and western limits of the project study area to accommodate the existing interchange footprints including ponds and ramps. Portions of the ROW are fenced and designated as limited access as indicated by the existing plans. Several neighborhoods have existing noise walls installed along the ROW also restricting access from the neighboring communities. The primary access to the ROW for pedestrian routes are at or near the intersections.

2.1.8 Geometric Elements

The information on the existing horizontal and vertical alignment of SR 414 was obtained from the available FDOT and CFX construction plans for SR 414 between US 441 and SR 434. The four primary data sources listed from west to east are:

1) SR 414 (Maitland Boulevard) Extension
    a) CFX Project 414-211 (FY 2007)
    b) Interchange at 414 and US 441

2) SR 414 (Maitland Boulevard) Original Construction
   a) Project 77002-3508, Orange County (1995)
   b) From east of US 441 Interchange to east of Bear Lake Road/Rose Avenue
3) SR 414 (Maitland Boulevard) Original Construction
   a) Project 77002-3503, Seminole County (1995)
   b) From east of Bear Lake Road/Rose Avenue to Gateway Drive
4) SR 414 (Maitland Boulevard) and SR 434 Interchange Construction
   a) Project 77002-3505 (FY 1997)
   b) Interchange at SR 414 and SR 434

2.1.8.1 Horizontal Alignment

Table 2-4 lists the horizontal curves within the study limits.

Table 2-4. SR 414 Existing (2020) Horizontal Alignment

Horizontal Curve PI Station	Design Speed (mph)	Posted Speed (mph)	Degree of Curvature	Curve Direction	Radius (feet)	Curve Length (feet)	Existing Super Elevation (feet/foot)	Existing Design Deviation (Yes, No)	Location
415+75.82	55	50	2°12'13"	left	2,600.00	1,990.95	0.055	no	US 441
442+40.40	45	50	3°38'52"	right	1,570.72	1,426.13	reverse crown*	no	Bear Lake Road
05+83.19	45	50	00°06'40"	right	51,556.20	889.83	normal crown	no	
17+04.96	45	50	00°09'53"	left	34,768.27	859.99	normal crown	no	Eden Park Road
36+65.30	45	50	00°50'53"	left	6,755.80	910.77	normal crown	no	Lake Bosse Bridge
43+76.15	45	50	01°38'13"	right	3,500.00	511.39	normal crown	No 675 foot desired, 400 foot min.	
157+39.66	45	55	00°45'00"	left	7,639.44	721.21	normal crown	no	east of Gateway Drive
170+30.55	45	55	00°30'00"	right	11,459.16	1,146.16	normal crown	no	west of SR 434

Note:

PI = point of intersection

Design speed is documented from Original Construction Plans listed in Table 2-4. The existing superelevation matches criteria for e_{max} = 5% at 45 mph and FDM Table 210.9.2 does not provide superelevation rates for 50 mph, which is the corridor posted speed. Design deviations are identified using the 45 mph design speed.

* Reverse crown requires 2 percent super elevation in the curve direction.

2.1.8.2 Vertical Alignment

Table 2-5 lists the vertical curves within the study limits.

Table 2-5. SR 414 Existing Vertical Alignment

Vertical Curve PVI Station	Design Speed (mph)	2020 Posted Speed (mph)	Crest/Sag/ PI	Grade In (%)	Grade Out (%)	Existing Vertical Curve Length (feet)	Existing K Value	Existing Design Deviation (Yes, No)	Location
408+50.00	55	50	crest	(+) 0.460	(-) 3.000	1000	289	no	US 441
419+00.00	45	50	sag	(-) 3.000	(+) 0.527	600	170	no	
426+00.00	45	50	point of intersection	(+) 0.527	(+) 0.600	N/A	N/A	no	
428+00.00	45	50	PI	(+) 0.600	(+) 0.964	N/A	N/A	no	
225+00.00	45	50	crest	(+) 0.964	(+) 0.300	200	217	Curve length meets 45 mph, not 50 mph	
230+00.00	45	50	point of intersection	(+) 0.300	(-) 0.300	N/A	N/A	no	
237+25.00	45	50	point of intersection	(-) 0.300	(+) 0.300	N/A	N/A	no	
240+00.00	45	50	point of intersection	(+) 0.300	(-) 0.300	N/A	N/A	no	Rose Avenue/ Bear Lake Road
05+00.00	45	50	point of intersection	(-) 0.300	(+) 0.300	N/A	N/A	no	
07+50.00	45	50	crest	(+) 0.300	(-) 1.391	300	177	no	
12+00.00	45	50	point of intersection	(-) 1.391	(-) 1.240	N/A	N/A	no	
18+00.00	45	50	sag	(-) 1.240	(-) 0.314	300	324	no	Eden Park Road
23+00.00	45	50	crest	(-) 0.314	(-) 2.648	300	129	K-value meets 45 mph, not 50 mph	
28+40.00	45	50	sag	(-) 2.648	(-) 0.412	300	134	no	
32+50.00	45	50	sag	(-) 0.412	(+) 0.667	200	185	no	
37+00.00	45	50	crest	(+) 0.667	(-) 0.750	300	212	no	Lake Bosse
43+00.00	45	50	sag	(-) 0.750	(+) 0.688	200	139	no	

Table 2-5. SR 414 Existing Vertical Alignment

Vertical Curve PVI Station	Design Speed (mph)	2020 Posted Speed (mph)	Crest/Sag/ PI	Grade In (%)	Grade Out (%)	Existing Vertical Curve Length (feet)	Existing K Value	Existing Design Deviation (Yes, No)	Location
51+00.00	45	50	crest	(+) 0.688	(-) 0.841	200	131	K-value meets 45 mph, not 50 mph Curve length meets 45 mph, not 50 mph	Magnolia Homes
54+20.00	45	50	sag	(-) 0.841	(+) 0.936	200	115	no	Little Wekiva Canal
155+20.00	45	55	point of intersection	(+) 0.936	(+) 0.708	N/A	N/A	no	
176+65.00	45	55	sag	(+) 0.708	(+) 3.987	300	91	K-value meets 45 mph, not 55 mph	
185+90.00	45	55	crest	(+) 3.987	(-) 4.000	1040	130	K-value < Expressway	SR 434

Note:

PI = point of intersection

2.1.9 Intersections and Signalization

Three signalized intersections and one directional median opening exist at-grade along the existing corridor within the limits of the project. The western project limit includes an additional two signals along US 441 within the partial cloverleaf interchange, and the eastern project limit includes one signal along SR 434 at the single-point urban interchange. The signals associated with the interchanges are not proposed to be impacted by the proposed improvements.

Table 2-6 summarizes the signalization of the cross street intersections within the study area.

Table 2-6. Interchange and Intersection Signalization

Main Street	Cross Street	Maintaining Agency	Signal (Yes/No)
SR 414	US 441 (SR 500)	Orange County	Yes (two locations)
SR 414 (Maitland Boulevard)	Bear Lake Road/Rose Avenue	Seminole County	Yes
SR 414 (Maitland Boulevard)	Eden Park Road	Seminole County	Yes
SR 414 (Maitland Boulevard)	Magnolia Homes Road/ Lake Lotus Park Drive	Seminole County	Yes

Table 2-6. Interchange and Intersection Signalization

Main Street	Cross Street	Maintaining Agency	Signal (Yes/No)
SR 414 (Maitland Boulevard)	Gateway Drive	FDOT	No (directional median opening)
SR 414 (Maitland Boulevard)	SR 434 (Forest City Road)	Seminole County	Yes (one location)

2.1.10 Crash Data

Crash data from 2014 to 2018 were collected from west of US 441 to east of SR 434 using the state's Crash Analysis Reporting system. As shown in Table 2-7, 694 crashes were reported during the 5-year analysis period. Approximately two-thirds of the crashes occurred between just east of Eden Park Road and west of US 441. This area of the study corridor is characterized by residential neighborhoods, two signalized intersections and one interchange. There was no linear trend between the year and the number of crashes at each intersection. In the study area, the highest year (2016) had 155 crashes and the lowest year (2018) had 109 crashes (CFX 2022j).

Table 2-7. Crashes by Year (2014–2018)

Year	Total Crashes
2014	149
2015	141
2016	155
2017	140
2018	109
Total	**694**

Of the 694 crashes, 507 (approximately 73 percent) occurred in the intersections and 187 (approximately 27 percent) occurred at mid-block locations. The crash analysis methodology at the intersections included a 500-foot-wide buffer influence area to accurately capture all crashes. Crash injury severity is displayed in Figure 2-3. The results included two fatalities reported within the 5-year analysis period and another 164 crashes resulting in injury, whereas 528 (approximately 76 percent) crashes resulted in no injury or only property damage.

Figure 2-3. Crash Injury Severity

Intersection crash rates were calculated for all five intersections located within the study area. Crash rates were estimated as crashes per Million Entering Vehicles for the intersections using a methodology provided by Federal Highway Administration. Average crash rates were estimated using the total crashes that occurred in the 5-year data period at the intersections and dividing it by the number of years collected. Because traffic counts were not provided for the intersections, the average annual daily traffic approach volumes were used from FDOT's Florida Traffic Online Web Application. Table 2-8 lists the intersection crash rates.

Intersections with the highest crash rates are US 441, Bear Lake Road and Magnolia Homes Road. At US 441, approximately 38 percent of the total crashes at this intersection resulted in injury (7 percent severe) and 62 percent resulted in property damage only. At Bear Lake Road, approximately 52 percent of the total crashes at this intersection resulted in injury (10 percent severe and 1 percent fatal) and 48 percent resulted in property damage only. At Magnolia Homes Road, approximately 55 percent of the total crashes at this intersection resulted in injury (3 percent severe) and 45 percent resulted in property damage only. Further details on the crash analysis are presented in the PTAR (CFX 2022j).

Table 2-8. Intersection Crash Rates

SR 414 Intersection	Total Crashes	Average Crashes [a]	AADT (Approach Volume) [b]	Intersection Crash Rate [c]	5-Year Statewide Average Crash Rate[d]
US 441	133	26.6	39,725	1.83	0.667
Bear Lake Road/Rose Avenue	118	23.6	57,600	1.12	0.667
Eden Park Road	86	17.2	53,850	0.88	0.667
Magnolia Homes Road	79	15.8	29,150	1.49	0.667
SR 434	91	18.2	54,200	0.92	0.667

[a] Crashes/Years of Data Collected

[b] https://tdaappsprod.dot.state.fl.us/fto/

[c] https://safety.fhwa.dot.gov/local_rural/training/fhwasa1210/s3.cfm

[d] Source: Florida Average Crash Rates for Suburban Spots 2013-2017, 2-3 lanes ww Div'd Raised Median 4 legs

The mid-block crash locations are the crashes that occurred outside of the intersection influence area of 500 feet. The mid-block locations accounted for 92 crashes (approximately 27 percent) of the total crashes evaluated from the Crash Analysis Reporting system between 2014 and 2018 for the study area. The crashes were evenly distributed along the study area and not concentrated in one area. Most of the crashes were rear end, resulting in property damage only. One fatality (1 percent of all mid-block crashes) occurred, where the driver was under the influence of alcohol and driving distracted.

2.1.11 Existing Traffic Characteristics

As part of this PD&E Study, existing traffic conditions were analyzed and documented in the SR 414 Expressway Extension PD&E Study *Project Traffic Analysis Report* (CFX 2022j). A summary of existing (2019) traffic characteristics in the corridor includes identification of the traffic count locations and descriptions of daily and peak-hour traffic volumes, peak-hour and traffic directional characteristics, and operational performance. This traffic analysis covers an area larger than the project study limits. For this discussion, the traffic study limits start just west of the Hiawassee Road interchange on the SR 414 corridor (John Land Apopka Expressway), which is a six-lane divided toll road. The expressway ends after the interchange with US 441, Orange Blossom Trail. Moving east, SR 414 becomes a four-lane divided arterial referred to as Maitland Boulevard, with three at-grade signalized intersections (Bear Lake Road/Rose Avenue, Eden Park Road and Magnolia Homes Road/Lake Lotus Park Road), and one at-grade unsignalized intersection (Gateway Drive). Further east, SR 414 is a four-lane divided expressway, built as part of the I-4 Ultimate Improvement Project. In this portion of the corridor, there are grade-separated interchanges at SR 434, Maitland Summit Boulevard and Keller Road. There are also frontage roads on both sides over much of this part of the corridor. The traffic study limits end east of Keller Road, as SR 414 connects to the I-4 Ultimate Improvement Project and proceeds to the city of Maitland farther east.

The existing traffic characteristics are influenced by the construction activities that are part of the I-4 Ultimate Improvement Project, which includes significant improvements to SR 414 just east of the project study limits. The configuration of SR 414 between SR 434 and I-4 has changed several times over the last few years because of construction activities related to the I-4 and SR 414 interchange modifica-

tions associated with the I-4 Ultimate Improvement Project. Construction activities in this area are anticipated to be complete in 2021.

Traffic passing through the project corridor has endured substantial peak-period congestion along the arterial portions of the corridor between US 441 and SR 434, specifically at the signalized intersections with Bear Lake Road, Eden Park Road and Magnolia Homes Road. The traffic volumes along SR 414 (John Land Apopka Expressway) to the west have steadily increased, more than doubling in seven years. Traffic volumes peak in the morning (eastbound direction) and afternoon (westbound direction), serving commuters to the office parks in the Maitland Center, just east of the project study limits. Significant delays regularly occur during the morning and evening peak hours at the signalized intersections noted above, constraining traffic volumes.

The existing traffic conditions detailed below are for calendar year 2019. The coronavirus pandemic result has been a dramatic effect on people's travel behavior, leading to a reduction in travel. The declines in traffic began during the second week in March, after the Governor declared a state of emergency. Traffic volumes passing through the corridor have remained depressed, making traffic data collection problematic. Travel behavior is expected to return to pre-COVID-19 conditions once a vaccine has been identified and produced in adequate quantity.

2.1.11.1 Existing (2019) Traffic Counts

As part of this study, a traffic count program was conducted in October 2019 and included 72-hour directional counts at 21 locations, one 72-hour classification count, 72-hour bi-directional counts at 20 locations and 4-hour turning movement counts at nine intersections (refer to Table 2-9.). Locations were from just west of the Hiawassee Road and SR 414 (John Land Apopka Expressway) interchange (approximately 3.5 miles west of the study area) to the I-4 and SR 414 interchange (approximately 2 miles east of the study area). The directional counts were located on all the expressway and ramp segments in the study area. The bi-directional traffic counts were typically taken at the undivided roadway segments, the arterial portion of SR 414 and roadways connecting to SR 414. The turning movement counts were taken at the key at-grade intersections along SR 414.

In addition, the study traffic count program was supplemented with the CFX system counts and annual traffic counts published by FDOT, Orange County and Seminole County. Traffic counts associated with these agencies include traffic counts at locations along the project corridor as well as traffic counts at other nearby locations. Both study and agency traffic counts were used in development of a planning level travel demand model (CFX Model 3.7.0).

Table 2-9. Count Program Locations

72-Hour Directional Counts (SR 414 Ramps)	72-Hour Bi-Directional Counts (Arterials)	
	Roadway	***Location***
EB On Ramp from US 441	N/A	N/A
EB Off Ramp to SR 434	Hiawassee Road	North of SR 414
EB On Ramp from SR 434	Hiawassee Road	South of SR 414
EB Off Ramp to Maitland Summit Boulevard	US 441	North of SR 414
EB On Ramp from Maitland Summit Boulevard	US 441	South of SR 414
EB Off Ramp to Keller Road	Bear Lake Road	North of SR 414

Table 2-9. Count Program Locations

72-Hour Directional Counts (SR 414 Ramps)	72-Hour Bi-Directional Counts (Arterials)	
	Roadway	***Location***
EB On Ramp from Keller Road	Rose Avenue	South of SR 414
EB Off Ramp to WB I-4	SR 414	Between Bear Lake and Eden Park
EB On Ramp from Lake Lucien Drive to WB I-4	Eden Park Road	North of SR 414
EB Off Ramp to EB I-4	Eden Park Road	South of SR 414
WB On Ramp from EB 1-4	SR 414	Between Eden Park and Lake Lotus Park
WB On Ramp from WB I-4	Lake Lotus Park Road	North of SR 414
WB I-4 Off Ramp to North Lake Destiny Road	Magnolia Homes Road	South of SR 414
WB Off Ramp to Keller Road	SR 414	Between Lake Lotus Park and Gateway Drive
WB On Ramp from Keller Road	Gateway Drive	North of SR 414
WB Off Ramp to Maitland Summit Blvd.	SR 434	North of SR 414
WB On Ramp from Maitland Summit Blvd.	SR 434	South of SR 414
WB SR 414 to Gateway Drive	Maitland Summit Drive	North of SR 414
WB Off Ramp to SR 434	Maitland Summit Drive	South of SR 414
WB On Ramp from SR 434	Keller Road	North of SR 414
WB Off Ramp from U.S. 441	Keller Road	South of SR 414
4-Hour Turning Movement Counts (at-grade intersections)	**7-Day Classification Counts**	
Hiawassee Road and SR 414	SR 414 East of SR 434	
U.S. 441 and SR 414 EB Ramps		
U.S. 441 and SR 414 WB Ramps		
Bear Lake Road (Rose Avenue) and SR 414		
Eden Park Road and SR 414		
Magnolia Homes Road (Lake Lotus Park) and SR 414		
SR 434 and SR 414 Ramps		
Maitland Summit Boulevard and SR 414 Ramps		
Keller Road and SR 414		

Notes:

EB = eastbound

WB = westbound

2.1.11.2 2019 Annual Average Daily Traffic

The daily traffic from the various traffic count locations were used to develop existing (2019) AADT for roadways in the traffic count study area (refer to Figure 2-4). Generally, traffic volumes on SR 414 increase from west to east. The traffic volume on SR 414 (John Land Apopka Expressway) at the Coral Hill Toll Plaza was 50,360 vehicles per day and the traffic volume on SR 414 to the west of the I-4

interchange was 84,180 vehicles per day. Between these traffic count locations, the largest daily traffic volume was 59,910 vehicles per day, which occurred on SR 414 at the eastern project limit just east of SR 434. Figure 2-4 indicates that there are imbalances in traffic volume by direction, which most likely result from persistent peak-period congestion along the project corridor. Severe peak-period congestion typically results in diversion of traffic away from the corridor to other routes.

2.1.11.3 Traffic Peaking and Directionality Characteristics

The portion of the SR 414 (John Land Apopka Expressway) near the Coral Hills Toll Plaza remains uncongested, even with the extraordinary growth in recent years. Using the average traffic counts collected on three weekdays during the second week of March 2019, traffic at the Coral Hills Toll Plaza peaks between 7:00 a.m. to 8:00 a.m. and between 5:00 p.m. to 6:00 p.m. The overall peak hour occurs in the afternoon. Figure 2-5 shows the hourly distribution of traffic at the Coral Hills Toll Plaza. The proportion of traffic in the peak hour (K) was 9.7 percent, and the directional split (D) was 69.8 percent in the morning peak hour and 65.4 percent in the evening peak hour. Based on these data, twice as much traffic occurs in the peak direction as in the off-peak direction during both morning and afternoon peak hours.

Farther east in the corridor, the peaking and directional characteristics of traffic are muted by severe and recurring congestion. Figure 2-6 contains the hourly distribution of traffic on SR 414 east of the interchange with SR 434. Using the average of traffic counts collected on three weekdays in October 2019, the peak direction near the intersection is eastbound in the morning and westbound in the evening, but the peak hours are disturbed by congestion. The morning peak hour is spread over 2 hours beginning at 7:00 a.m., while the evening peak occurs at 3:00 p.m. but spreads over an approximate 5-hour period. There appears to be a significant operational problem in the westbound direction as the traffic appears to decrease at 5:00 p.m. (which occurred in all three days) but then increased again at 6:00 p.m. Traffic volumes during the middle of the day is slightly more than 1,500 vehicles per day in both directions. The proportion of traffic in the peak hour (K) was 7.4 percent. The directional split (D) was 63.3 percent in the morning peak hour and 57.7 percent in the evening peak hour.

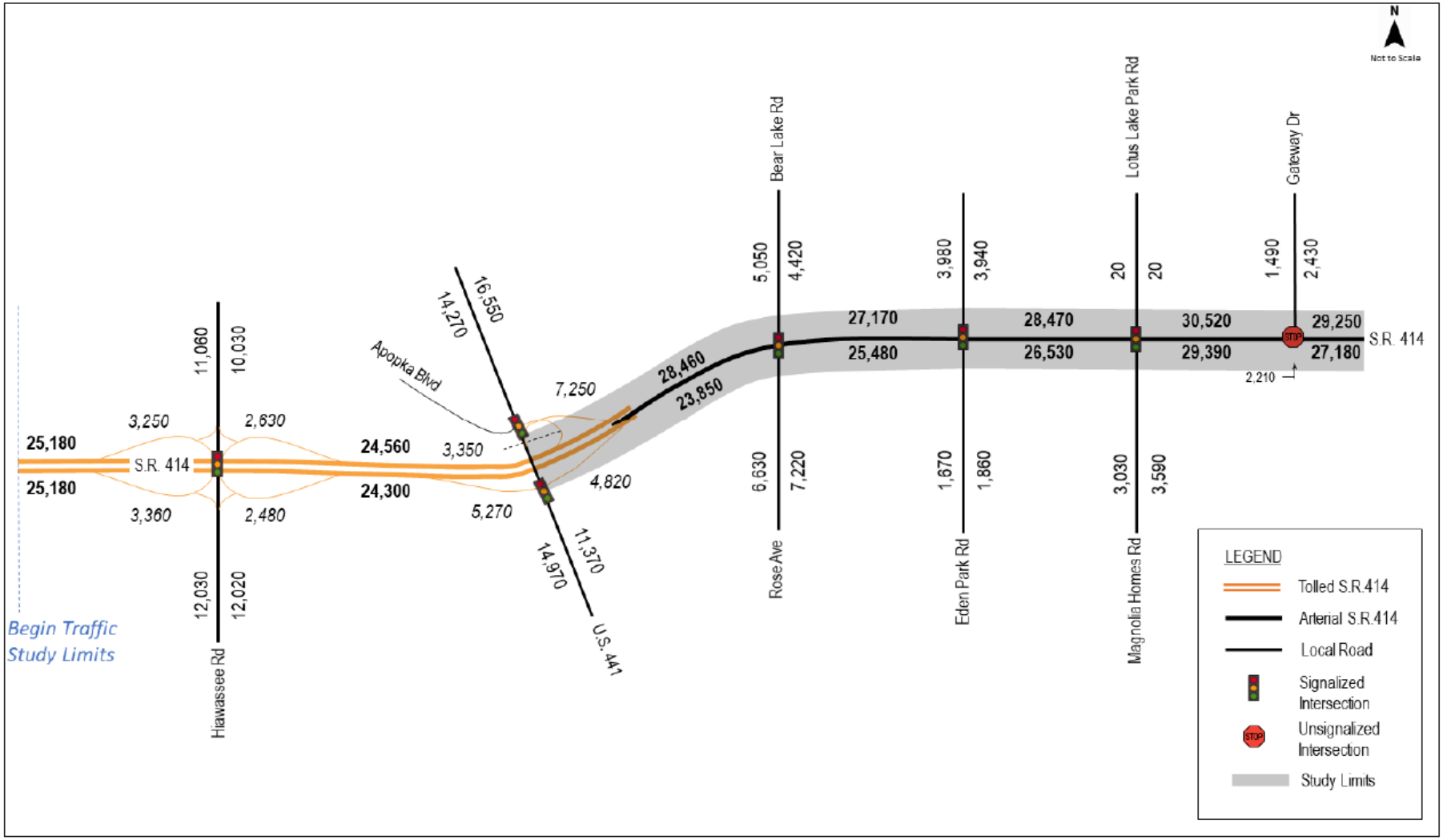

Figure 2-4a. 2019 Average Annual Daily Traffic

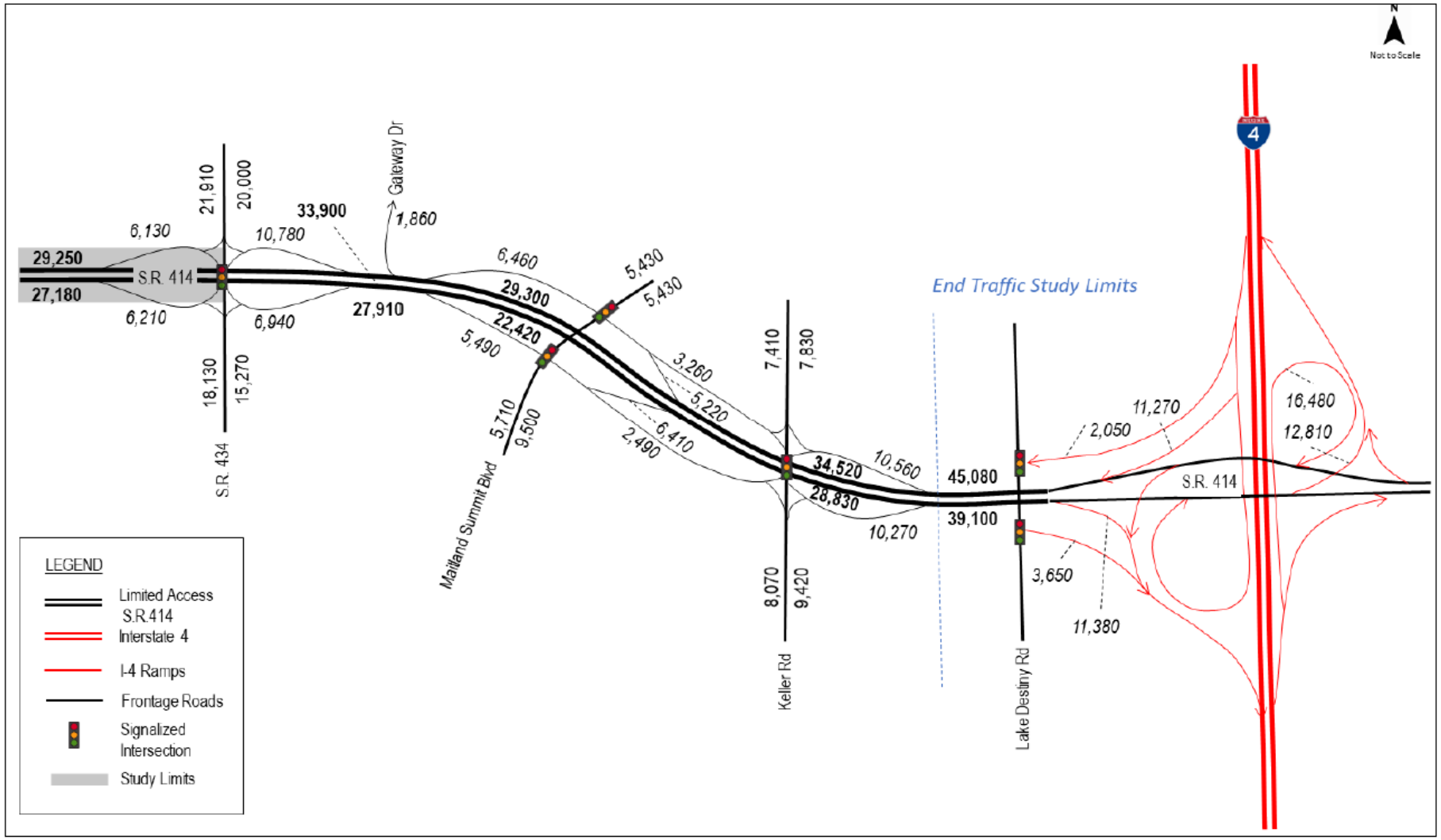

Figure 2-4b. 2019 Average Annual Daily Traffic

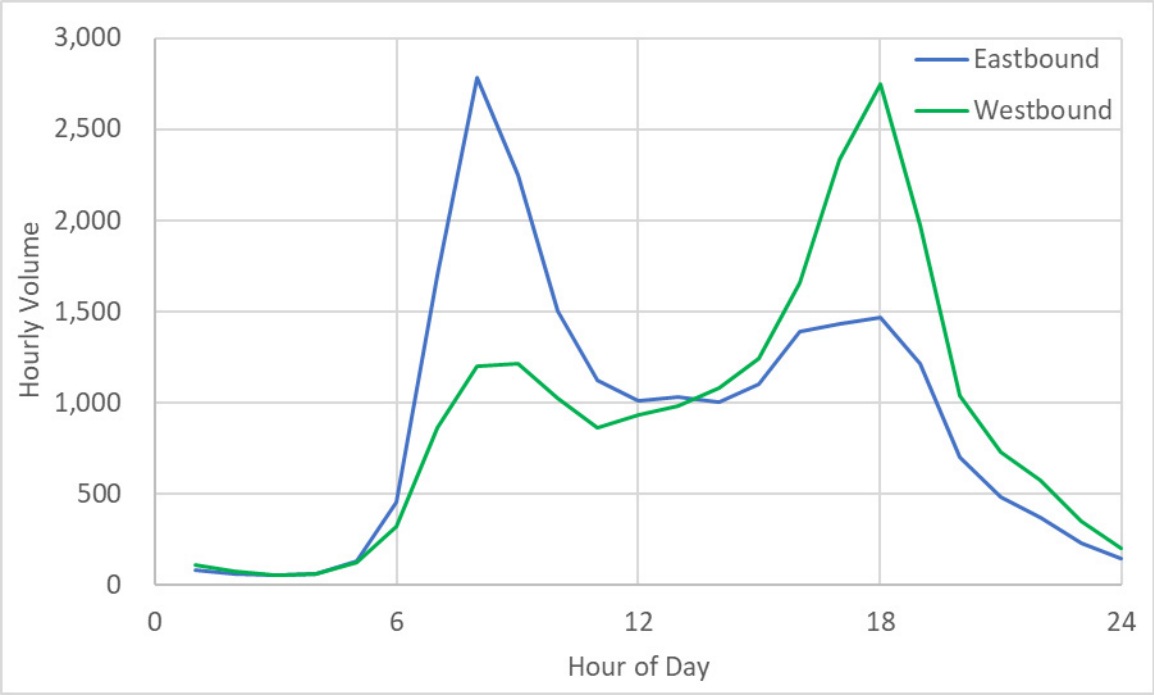

Figure 2-5. Hourly Distribution of Traffic at Coral Hills Toll Plaza
Source: Average of hourly traffic from March 12 to 14, 2019 (Tuesday to Thursday), CFX Counts

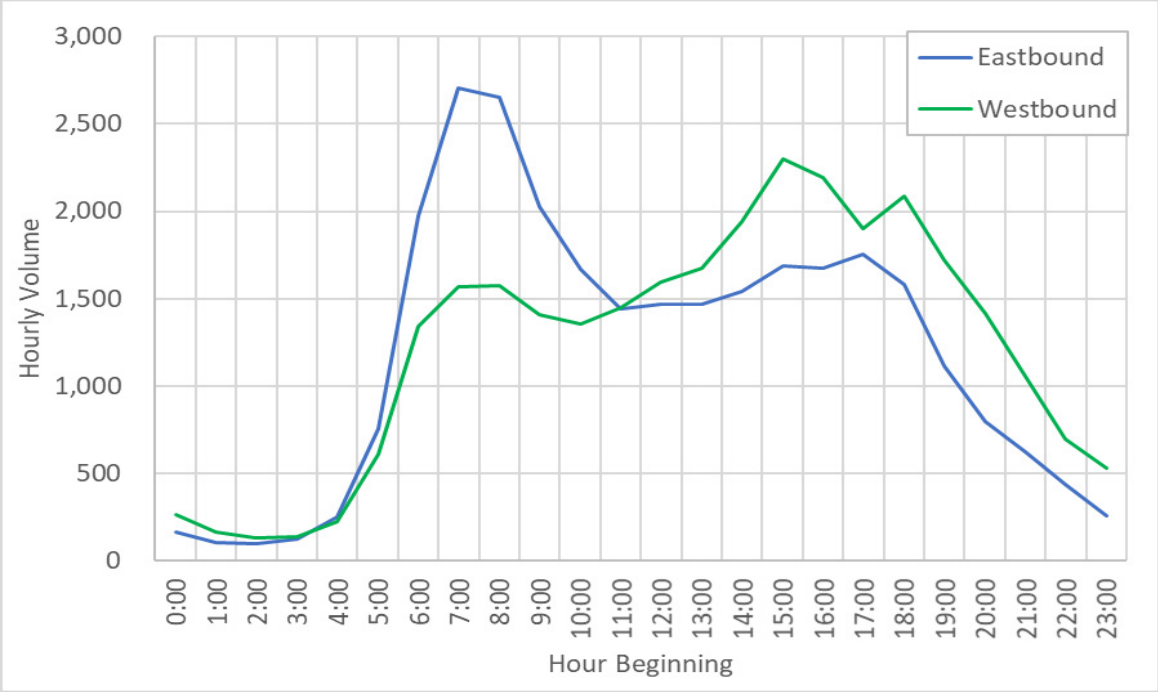

Figure 2-6. Hourly Distribution of Traffic on SR 414, West of Gateway Drive
Source: Average of hourly traffic from October 22 to 24, 2019 (Tuesday to Thursday), Traffic Counts

2.1.11.4 2020 Peak-Hour Traffic (with Turning Movements)

Figure 2-7 shows the peak-hour volumes (both morning and evening) taken from traffic counts for roadway segments; Figure 2-7 also includes the morning and evening peak-hour turning movement volumes at all at-grade intersections along SR 414. The peak-hour direction of flow is eastbound in the morning and westbound in the evening within the traffic study limits. At the western limits of the project during the morning peak hour, traffic queues were observed to extend from the Rose Avenue/ Bear Lake Road signalized intersection to the US 441 bridge. Similarly, at the eastern end of the project during the evening peak hour, traffic queues were observed to extend from the Bear Lake Road/Rose Avenue signalized intersection to the SR 434 on-ramps. East of the traffic study limits (east of Keller Road), the peak-hour directions switch so that westbound is the peak direction in the morning and eastbound in the evening, which likely indicates that the Maitland Center office parks (between Maitland Summit Boulevard and Lake Destiny Road) are a major destination.

2.1.11.5 Existing Operational Performance

Per Policy 000-525-006 Level of Service Targets for the State Highway System, the adopted FDOT LOS for state roads is LOS D. The LOS D volume (or capacity) depends on the type of facility and the number of lanes. Table 2-10 lists the volume-to-capacity ratio at the adopted LOS for all roadway segments in the study area. The volume-to-capacity ratios presented are for traffic volumes during the day (daily, AADT), morning peak hour (AM Peak) and evening peak hour (PM Peak). The only segments in the corridor for which the volume exceeds the capacity (highlighted in red) and the volume-to-capacity ratio is greater than one are at the arterial portions of SR 414, US 441 and Keller Road south of SR 414.

The LOS D volume thresholds in Table 2-10 are based on 2020 FDOT Quality/Level of Service Handbook and represent the existing traffic volumes the corridor can service and continue to maintain LOS D (FDOT 2020a). The LOS D volume thresholds change as the facility type changes along the corridor (west to east), from Expressway to Class 1 Arterial to Uninterrupted Highway. The bottom portion of the table, highlighted in gray, contains the LOS D volume results from roadways classified as arterials and connectors that intersect with SR 414 within the traffic study area.

A traffic analysis using Synchro v. 10 software was completed to evaluate the LOS operations at the signalized intersections in the traffic study corridor. Using the existing signal timings and turning movement counts, the traffic delay and LOS was determined for each of the movements through the intersections in the morning peak hour and evening peak hour (refer to Table 2-11 and Table 2-12, respectively).

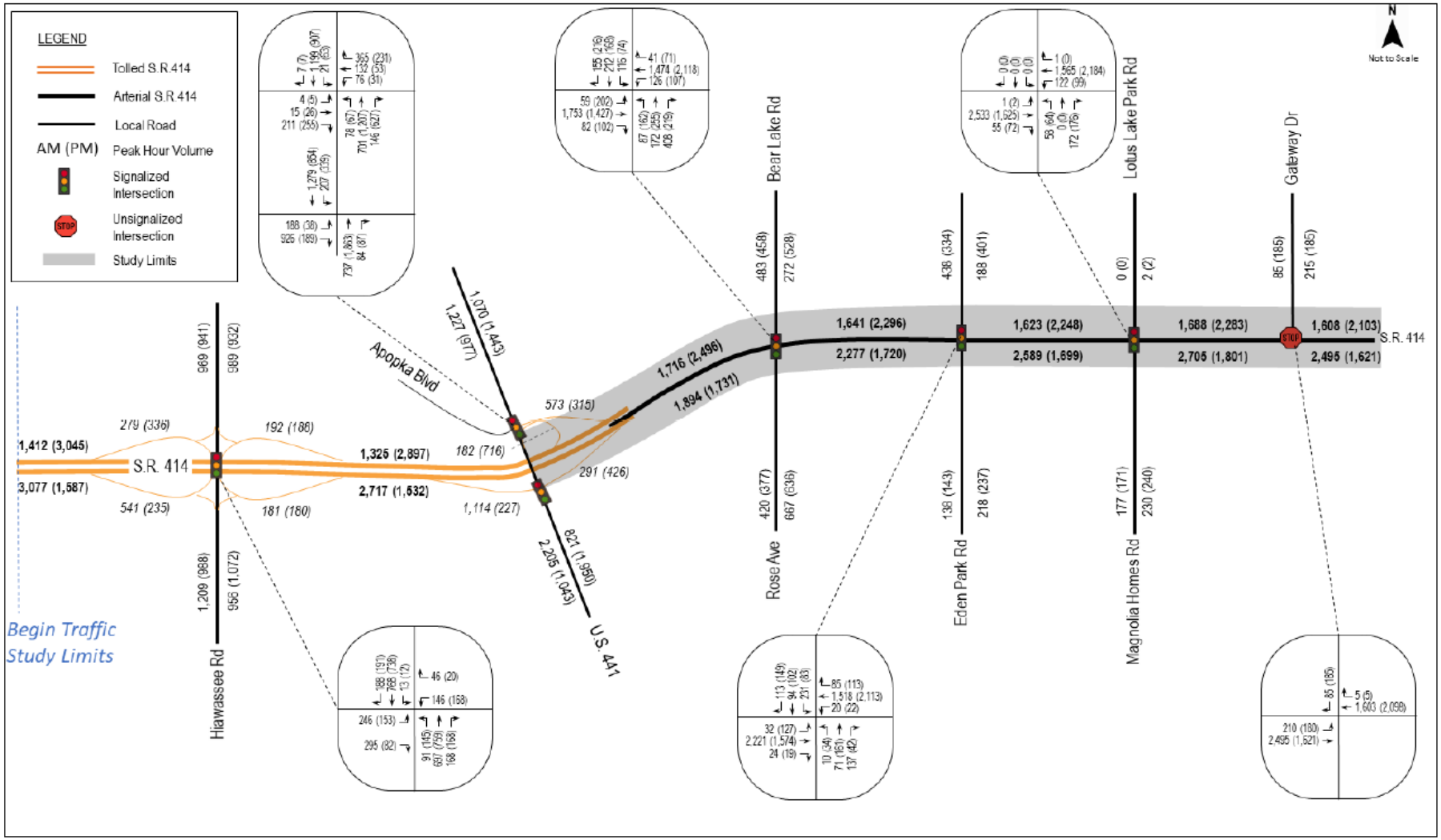

Figure 2-7a. Existing (2020) AM (PM) Peak-Hour Volumes

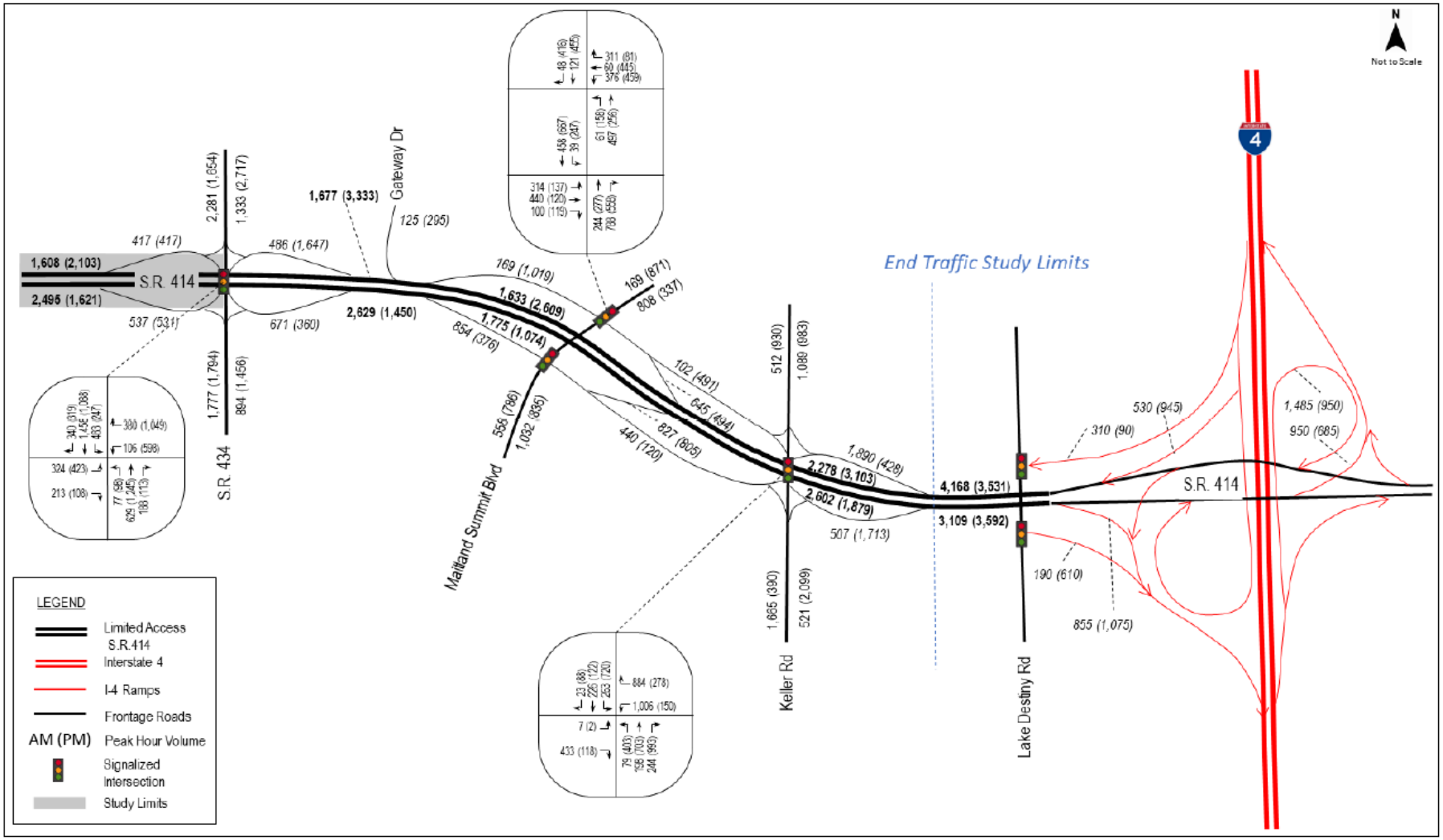

Figure 2-7b. Existing (2020) AM (PM) Peak-Hour Volumes

Table 2-10. 2019 Performance of Roadway Segments

Location	Facility Type	Lanes	LOS "D" Service Volume		Volume			Volume to Capacity		
			Daily 2-Way	Peak Hour Peak Dir	Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
SR 414, west of Hiawassee Road	Expressway	6L	123,600	5,620	50,360	3,077	3,045	0.41	0.56	0.54
SR 414, between Hiawassee Road and US 441	Expressway	6L+ 2Aux	143,600	6,620	48,860	2,717	2,897	0.34	0.41	0.44
SR 414, between US 441 and Bear Lake Road	Class I Arterial	4L	39,800	2,000	52,310	1,894	2,496	1.31*	0.95	1.25*
SR 414, between Bear Lake Road and Eden Park Road	Class I Arterial	4L	39,800	2,000	52,650	2,277	2,296	1.32*	1.14*	1.15*
SR 414, between Eden Park Road and Magnolia Homes Road	Class I Arterial	4L	39,800	2,000	55,000	2,589	2,248	1.38*	1.29*	1.12*
SR 414, between Magnolia Homes Road and Gateway Drive	Class I Arterial	4L	39,800	2,000	59,910	2,705	2,283	1.51*	1.35*	1.14*
SR 414, between Gateway Drive and SR 434 Ramps	Class I Arterial	4L	39,800	2,000	56,430	2,495	2,103	1.42*	1.25*	1.05*
SR 414, between the SR 434 Ramps	Uninterrupted Highway	4L	66,200	3,280	44,090	1,830	1,170	0.67	0.56	0.36
SR 414, between SR 434 Ramps and Maitland Summit Blvd Ramps	Uninterrupted Highway	4L + 2Aux	82,750	4,100	61,810	2,629	3,333	0.75	0.64	0.81
SR 414, between Maitland Summit Boulevard Ramps	Uninterrupted Highway	4L	66,200	3,280	51,720	1,775	2,609	0.78	0.54	0.80
SR 414, between Maitland Summit Boulevard Ramps and Keller Road Ramps	Uninterrupted Highway	4L + 2 Aux	82,750	4,100	63,350	2,602	3,103	0.77	0.63	0.76
SR 414, between Keller Road Ramps and I-4 Ramps	Uninterrupted Highway	4L + 4Aux	115,950	5,740	84,180	4,168	3,592	0.73	0.73	0.63
Hiawassee Road, south of SR 414	Class I Arterial	4L	39,800	2,000	24,050	1,209	1,072	0.60	0.60	0.54
Hiawassee Road, north of SR 414	Class I Arterial	4L	39,800	2,000	21,090	989	941	0.53	0.49	0.47
US 441, south of SR 414	Class I Arterial	4L	39,800	2,000	26,340	2,205	1,950	0.66	1.10*	0.98
US 441, north of SR 414	Class I Arterial	4L	39,800	2,000	30,820	1,227	1,443	0.77	0.61	0.72
Rose Ave, south of SR 414	Collector	2L	15,930	790	13,850	667	636	0.87	0.84	0.81
Bear Lake Road, north of SR 414	Collector	2L	13,320	680	9,470	483	528	0.71	0.71	0.78
Eden Park Road, south of SR 414	Collector	2L	13,320	680	7,920	438	401	0.59	0.64	0.59
Eden Park Road, north of SR 414	Collector	2L	13,320	680	3,530	218	237	0.27	0.32	0.35
Magnolia Homes Road, south of SR 414	Collector	2L	13,320	680	6,620	230	240	0.50	0.34	0.35
Lake Lotus Park Road, north of SR 414	Driveway	2L			40	2	2			
Gateway Drive, north of SR 414	Collector	2L	13,320	680	3,920	215	185	0.29	0.32	0.27
SR 434, south of SR 414	Class I Arterial	4L	39,800	2,000	33,400	1,777	1,794	0.84	0.89	0.90
SR 434, north of SR 414	Class I Arterial	6L	59,900	3,020	41,910	2,281	2,717	0.70	0.76	0.90
Maitland Summit Drive, south of SR 414	Collector	4L	29,160	1,470	15,210	1,032	835	0.52	0.70	0.57
Maitland Summit Drive, north of SR 414	Collector	4L	29,160	1,470	10,860	808	871	0.37	0.55	0.59
Keller Road, south of SR 414	Collector	4L	29,160	1,470	17,490	1,665	2,099	0.60	1.13*	1.43*
Keller Road, north of SR 414	Collector	4L	29,160	1,470	15,240	1,089	983	0.52	0.74	0.67

Source: 2020 FDOT Quality/Level of Service Generalized Service Volume Tables (FDOT 2020a)

* Values with asterisks indicates traffic volume exceeds roadway capacity

Table 2-11. 2019 Intersection Operation Analysis – Morning Peak (8:00 a.m. to 9:00 a.m.)

Intersection	Delay/ LOS	Eastbound			Westbound			Northbound			Southbound			Overall
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Hiawassee Rd @ SR 414 Ramps	Delay	60.3		43.1	54.0		0.9	44.6	15.1	2.4	54.2	24.5	4.0	**26.6**
	LOS	E		D	D		A	D	B	A	D	C	A	**C**
US 441@ SR 414 Eastbound Ramps	Delay	33.0		49.9					36.4	7.0	89.7	15.1		**34.4**
	LOS	C		D					D	A	F	B		**C**
US 441@ SR 414 Westbound Ramps	Delay	42.0	57.8	32.0	51.1	57.1	18.9	82.1	12.9	0.0	75.4	27.0	0.0	**26.2**
	LOS	D	E	C	D	E	B	F	B		E	C		**C**
SR 414 @ Bear Lake Rd/Rose Ave	Delay	184.1	64.8	2.5	218.3	19.1	0.1	108.2	124.9	112.1	115.0	137.0	19.8	**64.5**
	LOS	F	E	A	F	B	A	F	F	F	F	F	B	**E**
SR 414 @ Eden Park Rd	Delay	173.0	22.2	0.0	213.6	25.9	1.7	145.5	175.6	124.5	158.7	110.6	42.1	**39.8**
	LOS	F	C		F	C	A	F	F	F	F	F	D	**D**
SR 414 @ Magnolia Homes Rd	Delay	188.0	17.6	0.0	202.5	6.1	0.0	168.9	133.7			118.0		**24.9**
	LOS	F	B		F	A		F	F			F		**C**
SR 434 @ SR 414 Ramps	Delay	93.1		7.8	75.2		33.2	97.0	39.9	5.5	86.9	30.5	3.0	**41.3**
	LOS	F		A	E		C	F	D	A	F	C	A	**D**
Maitland Summit Blvd @ SR 414 EB Ramps	Delay	57.9	36.8						27.0	8.4	22.9	5.5		**23.0**
	LOS	E	D						C	A	C	A		**C**
Maitland Summit Blvd @ SR 414 WB Ramps	Delay				52.7	42.5	26.9	27.8	3.9			13.2	1.0	**24.4**
	LOS				D	D	C	C	A			B	A	**C**
Keller Rd @ SR 414 Ramps	Delay	54.7		0.5	38.8		3.9	57.0	40.9	0.2	51.1	31.5	0.0	**22.7**
	LOS	D		A	D		A	E	D	A	D	C		**C**
Lake Destiny Rd @ I-4 Ramps	Delay				44.7		0.1		17.2	7.7	44.8	6.5		**23.8**
	LOS				D		A		B	A	D	A		**C**
SR 414 @ Hope Rd	Delay	55.3	0.3			17.2	1.1						0.3	**10.8**
	LOS	E	A			B	A						A	**B**

The analysis of the roadway segments and stand-alone intersections can be misleading because it may not reflect the traffic operational issues routinely experienced. The reason is that the turning movement counts only count the traffic that clears the intersection, not the unmet demand, as there is significant queuing of traffic in the morning and evening peak hours. Cross street delays and left-turning movements on the arterial section of SR 414 are generally over the LOS standards because of long cycle lengths to accommodate the SR 414 through movements. As noted in Section 2.1.11.3, the SR 414 arterial peak-hour volumes are spread over multiple hours because of congestion and signal progression delays.

Table 2-12. 2019 Intersection Operation Analysis – Afternoon Peak (5:00 p.m. to 6:00 p.m.)

Intersection	Delay/ LOS	Eastbound			Westbound			Northbound			Southbound			Overall
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Hiawassee Rd @ SR 414 Ramps	Delay	74.8		7.4	76.2		0.8	76.0	10.5	1.7	69.3	13.7	1.9	**22.8**
	LOS	E		A	E		A	E	B	A	E	B	A	**C**
US 441@ SR 4141 Eastbound Ramps	Delay	83.3		15.3					16.3	2.8	87.1	1.8		**20.1**
	LOS	F		B					B	A	F	A		**C**
US 441@ SR 414 Westbound Ramps	Delay	54.6	71.2	28.1	58.5	65.2	19.5	111.1	18.7		93.3	16.6		**23.5**
	LOS	D	E	C	E	E	B	F	B		F	B		**C**
SR 414 @ Bear Lake Rd/Rose Ave	Delay	197.6	37.0	2.8	210.5	52.2	0.3	196.9	188.7	86.2	203.2	194.8	61.7	**75.4**
	LOS	F	D	A	F	D	A	F	F	F	F	F	E	**E**
SR 414 @ Eden Park Rd	Delay	180.5	14.2	0.0	175.8	44.2	3.3	138.2	183.3	1.6	179.4	124.0	41.6	**46.4**
	LOS	F	B		F	D	A	F	F	A	F	F	D	**D**
SR 414 @ Magnolia Homes Rd	Delay	181.0	4.5	0.1	177.7	10.6	0.0	182.1	56.1			115.7		**16.6**
	LOS	F	A	A	F	B		F	E			F		**B**
SR 434 @1 SR 414 Ramps	Delay	77.0		5.5	100.6		76.9	102.6	78.3	0.8	53.4	29.6	3.1	**62.0**
	LOS	E		A	F		E	F	E	A	D	C	A	**E**
Maitland Summit Blvd @ SR 414 EB Ramps	Delay	63.2	24.2						25.8	3.1	7.5	6.0		**13.7**
	LOS	E	C						C	A	A	A		**B**
Maitland Summit Blvd @ SR 414 WB Ramps	Delay				33.5	49.0	5.3	30.4	16.5			24.6	13.9	**28.1**
	LOS				C	D	A	C	B			C	B	**C**
Keller Rd @ SR 414 Ramps	Delay	54.5		0.1	54.0		2.5	57.7	31.1	2.3	48.9	17.2	0.1	**26.2**
	LOS	D		A	D		A	E	C	A	D	B	A	**C**
Lake Destiny Rd @ I-4 Ramps	Delay				40.5				15.4	3.9	44.8	3.5		**20.3**
	LOS				D				B	A	D	A		**C**
SR 414 @1 Hope Rd	Delay	52.5	0.4			7.3	0.9						0.3	**4.7**
	LOS	D	A			A	A						A	**A**

2.1.12 Existing Intelligent Transportation Systems Equipment

The existing ITS system backbone fiber optic cable is installed along eastbound and westbound of at-grade SR 414 (Maitland Boulevard) from west of Overland Road and continues east past US 441. The existing conduit system on SR 414 eastbound and westbound consists of eight 1-inch-diameter high-density polyethylene conduits. There is an existing closed-circuit television camera and a walk-in dynamic message sign and associated equipment located on SR 414 westbound within the project limits east of US 441. There is existing FDOT and Seminole County fiber optic cable on the south side of SR 414 between Bear Lake Road and Magnolia Homes Road. This cable crosses over to the north side of SR 414 between Magnolia Homes Road and SR 434. The traffic signals in the project limits are maintained by Seminole County and there is an ongoing project to upgrade the traffic signal controllers to advanced traffic controller-type controllers. Table 3-1 lists the existing ITS equipment in the study area. The *ITS Technical Memorandum* (CFX 2022d) further documents the existing ITS conditions.

Table 2-13. Existing ITS Equipment

Equipment Type	Direction	Location	Structure Type	Ownership
CCTV	WB	Roadside, SR 414 at STA 412+65	Pole	CFX
3-TMS	WB	Roadside, SR 414 at STA 416+80	Pole	CFX
DMS	WB	Roadside, SR 414 at STA 430+00	Full Span	CFX
CCTV	WB	Roadside, SR 414 at STA 434+30	Pole	CFX
CCTV	WB	Intersection (Bear Lake Road)	Traffic Signal Pole	FDOT, Orange/Seminole counties
2-MVDS	EB	Intersection (Bear Lake Road)	Traffic Signal Pole	FDOT, Orange/Seminole counties
VDS-AVI	EB	Intersection (Bear Lake Road)	Traffic Signal Pole	FDOT, Orange/Seminole counties
MVDS	WB	Intersection (Eden Park Road)	Traffic Signal Pole	FDOT/Seminole County
MVDS	EB	Intersection (Eden Park Road)	Traffic Signal Pole	FDOT/Seminole County
CCTV	EB	Intersection (Eden Park Road)	Traffic Signal Pole	FDOT/Seminole County
MVDS	WB	Intersection (Magnolia Homes Road)	Traffic Signal Pole	FDOT/Seminole County
MVDS	WB	Intersection (Magnolia Homes Road)	Traffic Signal Pole	FDOT/Seminole County
MVDS	EB	Intersection (Magnolia Homes Road)	Traffic Signal Pole	FDOT/Seminole County
CCTV & MVDS	EB	Intersection (Magnolia Homes Road)	Traffic Signal Pole	FDOT/Seminole County

Notes:
MVDS = microwave vehicle detection system
VDS-AVI = vehicle detection system-automatic vehicle identification
EB = eastbound
TMS = traffic monitoring station
WB = westbound

2.1.13 Drainage and Hydrology

The project is located within the Little Wekiva River Watershed, which is within the jurisdiction of the St. Johns River Water Management District. The study area contains several surface water bodies and lakes, such as Lake Bosse and the Little Wekiva Canal. The Little Wekiva Canal is an artificial canal system that flows primarily in a northerly direction into the Little Wekiva River. The Little Wekiva River is outside of the study area north of the Little Wekiva Canal (north of Lake Lotus). The existing SR 414 roadway is located within both open and closed basins, and stormwater runoff is treated in multiple permitted stormwater treatment ponds. Portions of the stormwater discharge to Long Lake, Lake Bosse and the Little Wekiva Canal, and the remainder discharges to existing wetlands.

The majority of the study area is located within the Little Wekiva Canal Basin, which the Florida Department of Environmental Protection identifies as Water Body Identification Number 3004. The Little Wekiva Canal is identified as impaired because of a biological imbalance caused by excessive concentrations of nitrate in the water. There is an adopted FDEP Basin Management Action Plan for the Little Wekiva River Basin for reducing nitrates (FDEP 2018). Further, the study area falls within Wekiva Spring and Rock Springs, both of which are an Outstanding Florida Spring. The Wekiva Spring and Rock Springs have a BMAP for the reduction of nitrates and total phosphorus. Because of the BMAPs, application of additional treatment volume and anti-degradation standards may be required. Pre-development and post-development nutrient loading calculations have been performed as part of this

project study. Preliminary calculations indicate that stormwater treatment, within the existing and proposed stormwater treatment facilities, will provide a net decrease in the total nitrogen loading from the post development conditions. The study area is also located within the Wekiva River Hydrologic Basin and Wekiva Recharge Protection Basin and is subject to special treatment requirements.

The study corridor has two existing bridge crossings including Lake Bosse, FDOT Bridge No. 770075 (MP 37.5) and the Little Wekiva Canal, FDOT Bridge No. 770074 (MP 37.8). Drainage along the existing SR 414 is characterized by a series of roadside ditches and closed storm sewer collection system with curb and gutter to convey runoff to existing CFX and FDOT ponds. The existing CFX ponds along the study corridor include Ponds 4A, 4B and 4C, and the existing FDOT ponds include Ponds A, B, C, D, E, F and G (Pond G was transferred to another owner). The *Pond Siting Report* (CFX 2022i) presents the specific details of the existing conditions.

2.1.14 Floodplains and Regulatory Floodways

The Federal Emergency Management Agency's Flood Insurance Rate Maps for Seminole County, Community Panel Numbers 12117C0145F and 12117C0140F, dated September 28, 2007, and Orange County Community Panel Numbers 12095C0140F and 12095C0145F, dated September 25, 2009, indicate that a portion of the SR 414 roadway lies within the 100-year floodplain areas Zone AE and Zone A. The Zone AE base flood elevation ranges from 63 to 65 feet and is located in the vicinities of Lake Bosse and Little Wekiva Canal. Zone A is located in the vicinity of the SR 414 and US 441 Interchange and has no base elevation but includes a 1 percent chance of flooding. Most of the study area lies in floodplain area Zone X, which is an area of minimal flood hazard.

Based on review of FEMA FIRM maps, there is one designated regulatory floodway located south of the Orange County-Seminole County border near the Lake Lotus Park parking lot and is identified in the FEMA Flood Insurance Study for Orange County (FEMA 2018) as the Little Wekiva River Regulatory Floodway. No impact to this regulatory floodway is expected as its limits end before the SR 414 ROW on the south side.

Several regional hydraulic models in addition to the FEMA Flood Insurance Study are available for the Little Wekiva Watershed including the *Little Wekiva Watershed Model Refinement* (referenced in CDM Smith and Pegasus Engineering 2016) and the *Little Wekiva River Watershed Management Plan Final Report* (CDM 2005). The *Location Hydraulics Report* (CFX 2021k) provides additional details on the existing conditions related to floodplains.

2.1.15 Geotechnical Investigation

Near-surface soils in upland areas are moderately well-drained sands (A-3 and A-2-4) with seasonal high groundwater levels between 3.5 and 6 feet deep. However, organic soil (muck) is present within wetlands, specifically at Lake Bosse, which contains muck deposits extending to extreme depths. The SR 414 Bridge at Lake Bosse is supported on open-ended pipe piles. Because of the soft muck at some foundation locations, the piles were driven to depths greater than 400 feet to achieve bearing.

2.1.16 Lighting

The existing lighting in the study area is limited, as detailed in Table 2-14.

Table 2-14. Existing Lighting

Name of Roadway	From	To	Location of Lighting
SR 414 (Maitland Boulevard) Mainline	within US 441 Interchange		Both sides (north and south)
SR 414 (Maitland Boulevard) Ramps	within US 441 Interchange		Both Sides
SR 414 (Maitland Boulevard) Mainline	east of US 441 Interchange	SR 434	None
Eastbound Exit to SR 434	Ramp Gore	Side street	Right side (south)
Westbound Entrance from SR 434	Ramp Gore	Side street	None
Bear Lake Road/Rose Avenue	South of Intersection		Co-located with utility poles
Eden Park Road	South of Intersection		Co-located with utility poles
Magnolia Homes Road/Lake Lotus Park Drive	South of Intersection		Co-located with utility poles

2.1.17 Utilities

The existing utility facilities include electric, gas, water, sewer and communications. Table 2-15 lists utilities owners and contact information as identified from a preliminary Sunshine One call in both Orange and Seminole counties and updated following initial Utility Agency Owner coordination. Data provided by utility owners has been supplemented with additional information such sources as FDOT As-Built Construction Plans to support determination of impacts and estimate relocation costs as documented in the *Utility Assessment Package* (CFX 2022m).

Table 2-15. Existing Utilities

Utility	County	Contact Information	Utility Type
AT&T	Seminole	Nancy Spence 770.918.5424	Fiber communication lines
AT&T/Distribution	Orange Seminole	Alan Reynolds 407.351.8180 Ar2916@att.com	Telephone
Black & Veatch Orlando 1F	Seminole	Janeiry Rivas 407.419.3606 rivasj@overlandcontracting.com	Fiber
Central Florida Expressway Authority	Orange	Carnot Evans 321.354.9757 cevans@dewberry.com	Fiber
CenturyLink (Lumen, Terra Technologies, and Embarq)	Seminole	Robert Godek 407.374.0465 Rob.m.godek@centurylink.com Heather Blackburn Heather.blackburn@lumen.com Eric Walls 407.907.9284 ewalls@terratechllc.net relocations@centurylink.com	Fiber, Telephone

Table 2-15. Existing Utilities

Utility	County	Contact Information	Utility Type
Charter Communications	Orange Seminole	Timothy Ross Timothy.ross@charter.com Tracey Domostoy Tracey.domostoy@charter.com	Fiber, Telephone, CATV
City of Altamonte Springs	Orange Seminole	Franklin Cabrera 407.571.8342 FRCabrera@altamonte.org	Fiber, Water, Electric, Sewer
City of Winter Park	Seminole	Jason Riegler/ For Water & Wastewater 407.599.3355 jrigler@cityofwinterpark.org	Water, Electric, Sewer
Comcast Communication/ Prev. LK CNTY CBLV	Orange Seminole	Scott Osebold Scott_osebold@comcast.com Wade Mathews 352.516.3824 Wade.mathews@cable.comcast.com CENFLR- NFL_Construction@comcast.com	CATV
Duke Energy- Distribution	Orange Seminole	Stephanie Olmo 407.905.3376 Stephanie.olmo@duke-enery.com Sam Keiser Sam.kaiser@duke-energy.com defdistributiongo@duke-energy.com	Electric - Distribution
Duke Energy Fiber	Orange Seminole	Mark Hurst 727.820.5208 Mark.hurst@duke-energy.com	Fiber
Duke Energy- Transmission	Orange Seminole	Scott Vanvelzor 813-909-1241 svanvelzor@pike.com Nick Brana 407-942-9727 Nick.Brana@Duke-Energy.com deftransmissiongov@duke-energy.com	Electric- Transmission
Lake Apopka Natural Gas	Orange	Mingo Colon 407.656.2734 mcolon@langd.org	Gas
MCI (Verizon)	Seminole	Brandon Cole Bcole8@yahoo.com MCIU01 Investigations 469.886.4091	Fiber, Communication lines
Orange County Public Works	Orange Seminole	Roger Smith 407.836.7804 Roger.smith@ocfl.com	Fiber, Traffic Signals
Orange County Utilities	Orange Seminole	Christina Crosby Christina.crosby@ocfl.net	Water

Table 2-15. Existing Utilities

Utility	County	Contact Information	Utility Type
Orange County Utilities-Waste Water	Orange Seminole		Wastewater
Seminole County Traffic Engineering	Seminole	John Brown 407.665.5644 Jbrown02@seminolecountyfl.gov	Signalization
Seminole County	Orange Seminole	Matthew Clark (UAO Rep.) 407.665.2118 Mclark02@seminolecountyfl.gov Paul Zimmerman (UAO Rep.) 407.665.2040 pzimmerman@seminolecountyfl.gov David McBroom (UAO Field Rep.) 407.416.1575 dmcbroom@seminolecountyfl.gov	Reclaimed Water, Water, Sewer
TECO Peoples Gas-Orlando	Seminole	Joan Domning 813.275.3783 jdomning@tecoenergy.com	Gas
Zayo Group	Orange Seminole	Henry Klobucar 406.490.6138 Henry.klobucar@zayo.com Dean Pate Dean.pate@zayo.com Tess Bentayou Tess.bentayou@zayo.com	Fiber

Source: Sunshine One Call https://www.sunshine811.com

Notes

CATV = cable access television

2.1.18 Existing Pavement Conditions

The original pavement was placed in 1991 based on the date of construction plans. The pavement within the western portion of the project limits from US 441 to Bear Lake Road (MP 0–0.224 and MP 36.206–36.655) was resurfaced in 2010. A site visit in January 2021 determined that this section had been recently resurfaced. The pavement from Bear Lake Road to SR 434 (MP 36.655–38.442) was paved in 2002, which was likely part of the reconstruction for the interchange at SR 434.

FDOT provided the All System Pavement Condition Forecast in May 2020 to document the current condition of pavement along SR 414 in the study area. Table 2-16 lists the pavement condition of SR 414 as of 2020. Any rating less than or equal to 6.0 is considered deficient and there are no existing pavement deficiencies identified.

Table 2-16. Existing Pavement Condition

Begin MP	End MP	County	Direction	Fiscal Year of Paving	Crack	Rutting Condition	Ride
0	0.224	Orange	SR 414 EB	(2021)*	(9.0)	(>8.0)	(8.1)
0	0.224	Orange	SR 414 WB	(2021)*	(10.0)	(>8.0)	(8.2)
36.206	36.655	Orange	SR 414 EB	(2010)	10.0	>8.0	7.1
36.206	36.655	Orange	SR 414 WB	(2010)	10.0	>8.0	7.9
36.655	36.781	Orange	SR 414 EB & WB	(2002)	10.0	>8.0	--
36.781	38.442	Seminole	SR 414 EB & WB	(2002)	8.0	>8.0	7.7

Source: FDOT's All System Pavement Condition Forecast, May 2020.

** Asterisks represent paving identified during January 2021 site visit. Pavement ratings reflect the pre-paving condition.*

2.2 Existing Bridges

2.2.1 Overview

There are four existing bridges within the project study area (refer to Table 2-17). Bridge No. 750743 carries eastbound and westbound SR 414 over US 441, Bridge No. 770074 carries eastbound and westbound SR 414 over Lake Bosse, Bridge No. 770075 carries eastbound and westbound SR 414 over Little Wekiva Canal (also referenced as Little Wekiva River Bridge) and Bridge No. 770083 at the eastern project limit carries SR 414 over SR 434.

The SR 414 bridge over US 441 is included for project consistency as there are no structural modifications proposed in the Preferred Alternative. However, there are striping changes as shown in the Concept Plans.

The SR 414 bridge over Lake Bosse was constructed in 2000 and is a six-span structure with two 11-foot-wide lanes in each direction, a 13.5-foot-wide inside shoulder in each direction next to the 19-foot-wide raised median, 12-foot-wide outside shoulders and a 5-foot-wide barrier-separated sidewalk in each direction.

The SR 414 bridge over Little Wekiva Canal was constructed in 2000 and is a single-span structure that has two 11-foot-wide lanes in each direction, a 13.5-foot-wide inside shoulder in each direction next to the 19-foot-wide raised median, 8-foot-wide outside shoulders and a 5-foot-wide, barrier-separated sidewalk in each direction. The bridge spans over the Little Wekiva Canal as well as a sidewalk and tram path from the parking lot to Lake Lotus Park.

The SR 414 bridge over SR 434 was constructed in 2000 and is a divided single-span structure that has two 12-foot-wide lanes, 12-foot-designated for future lane and 10-foot-wide outside shoulders in each direction and a 22-foot-wide median with a 19-foot-wide raised median. The bridge spans over SR 434 and is part of a single-point urban interchange.

Table 2-17. Existing Bridge Structures

Bridge No.	Mile Marker[a]	Route Carried	Bridge Over	Min. Vertical Clearance (feet)	Direction	Total Bridge Length (feet)	Deck Width (feet)	Number of Lanes
750743	MP 0.224 to 0.262	SR 414	US 441	16.5 feet	EB and WB	192.42	137.89	three WB + Ramp two EB + Lane Taper
770074	MP 37.400 to 37.534	SR 414	Lake Bosse	3.1 feet above El. 63.8 NGVD	EB and WB	700.00	129.00	2 per direction
770075	MP 37.805 to 37.818	SR 414	Little Wekiva Canal and Tram Pathway	4.8 feet (Above El. 66.8 NGVD) 10 feet (Tram) 8 feet (Sidewalk)	EB and WB	68.90	120.70	2 per direction
770083	MP 38.359 to 38.406	SR 414	SR 434	16.4 feet	EB and WB	244.80	117.80	2 per direction

[a] From FDOT Straight Line Diagram

Note:

NGVD = National Geodetic Vertical Datum of 1929

2.2.2 Current Condition and Year of Construction

Table 2-18 describes the four existing bridge structures in the SR 414 corridor. Existing bridge information was obtained from a field review, available data and plans. The sufficiency rating is derived from a formula that methodically evaluates factors that indicate the structure's ability to remain in service. A rating of 100 percent represents an entirely sufficient bridge, and a rating of 0 percent represents an entirely deficient bridge. Standard practice indicates that structures with a sufficiency rating of 80 percent or less require some rehabilitation, and those less than 50 percent require replacement. A complete listing of applicable criteria will be provided in the *Bridge Analysis Technical Memorandum* (CFX 2022b).

All the four bridges listed in Table 2-18 are classified as having a structural sufficiency rating of 90 percent or higher and none are listed as functionally obsolete.

Table 2-18. Current Structure Condition and Year of Construction

Bridge No.	Mile Marker	Route Carried	Bridge Over	Year Built/ Widened	Inspection Date	Sufficiency Rating (%)	Health Index
750743	MP 0.262 to MP 0.224	SR 414	US 441	2009	2019	90.2	99.79
770074	MP 37.400 to MP 37.534	SR 414	Lake Bosse	2000	2019	92.7	95.11
770075	MP 37.805 to MP 37.818	SR 414	Little Wekiva Canal	2000	2019	96.3	99.82
770083	MP 38.359 to MP 38.406	SR 414	SR 434	2000	2018	100	99.94

Source: FDOT Straight Line Diagram

2.3 Existing Environmental Characteristics

A desktop review of the environmental resources that included social, natural and physical characteristics within the study area was performed and is presented in the following sections.

2.3.1 Land Use

Adjacent land uses and cover types along SR 414 and adjacent to the study area consist of a diverse mixture of developed properties, natural and altered uplands, wetlands and surface water. During a site visit conducted in May 2020, these areas were assessed, with a focus on the natural vegetative communities for potential use by federal- and state-listed wildlife.

The *St. Johns River Water Management District Florida Land Use Cover Classification System (FLUCCS), 2014* along with field verification was used to classify the various land uses and land covers within the study area. Figure 2-8 presents the Existing Land Use map.

Developed areas include Residential (FLUCCS 1100, 1200, 1300), Commercial (FLUCCS 1400, 1490), Light Industrial (FLUCCS 1550), Heavy Industrial (FLUCCS 1560), Parks and Zoos (FLUCCS 1850) and Roads (FLUCCS 8140). Upland areas (vegetated) include Herbaceous Upland Non-forested (FLUCCS 3100), Upland Coniferous Forests (FLUCCS 4100), Pine Mesic Oak (FLUCCS 4140), Upland Hardwood Forests (FLUCCS 4200) and Upland Mixed Coniferous/Hardwood (FLUCCS 4340).

Wetlands and surface waters include Streams and Waterways (FLUCCS 5100), Lakes (FLUCCS 5200), Reservoirs (FLUCCS 5300), Wetland Forested Mix (FLUCCS 6300), Freshwater Marshes (FLUCCS 6410), Emergent Aquatic Vegetation (FLUCCS 6440), Mixed Scrub-Shrub Wetland (FLUCCS 6460) and Surface Water Collection Basins (FLUCCS 8370).

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 Expressway Extension
Project Development and Environment (PD&E) Study

CFX Project No. 414-227

Land Use/Land Cover

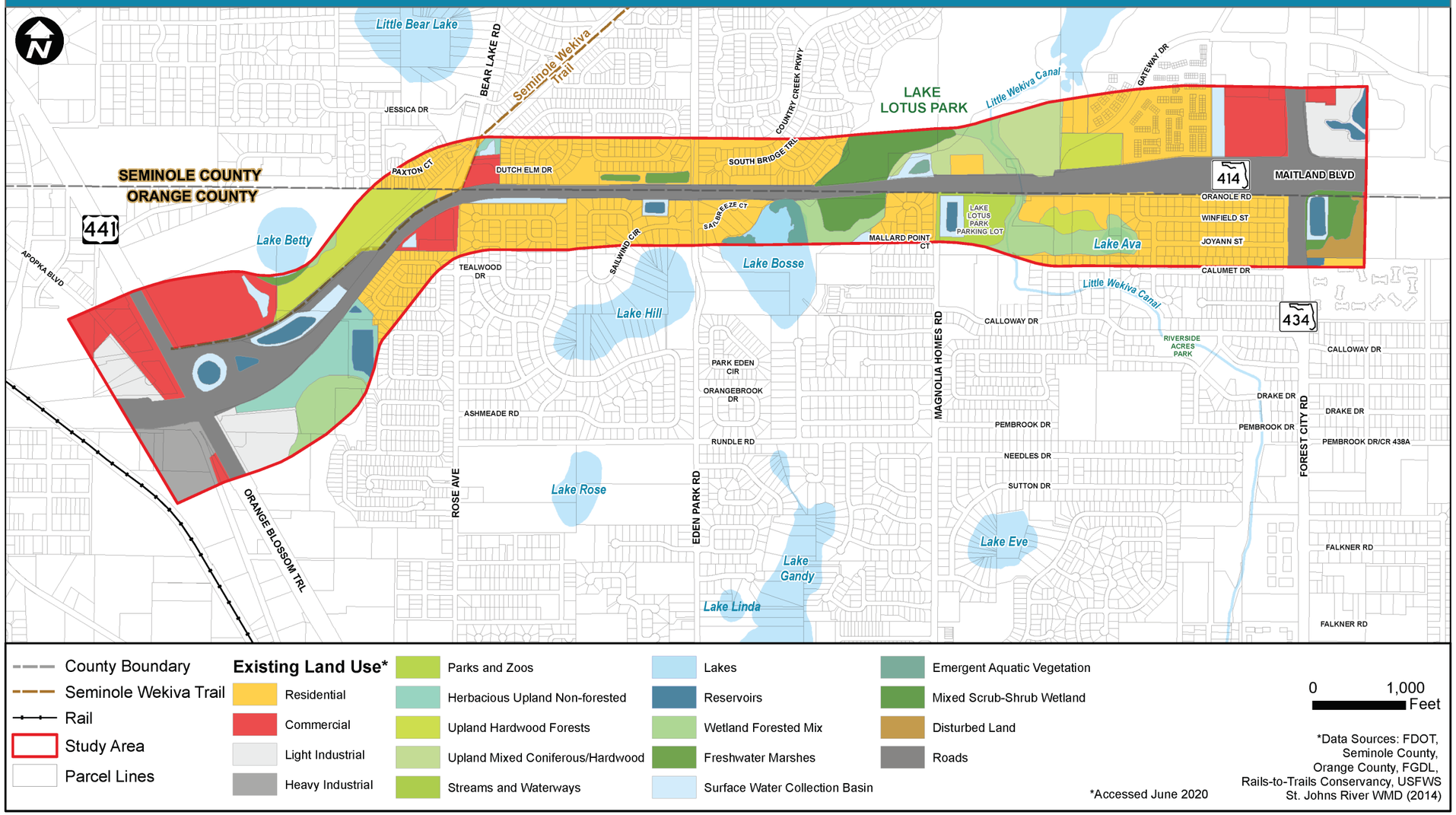

Figure 2-8. Existing Land Use Map

2.3.2 Cultural Features and Community Services

2.3.2.1 Cultural Resources

A desktop review of the SR 414 study corridor was conducted to identify any recorded or unrecorded cultural resources within 500 feet of the roadway and 750 feet of the intersection at SR 434 and the interchange at US 441. The Florida Master Site File database, historic maps, modern aerials and the Seminole County and Orange County Property Appraisers' databases were examined as part of the desktop review.

The FMSF database (updated April 2020) indicates that two linear resources, one historic structure and one archaeological site are located within the study area (refer to Table 2-19). The historic structure and archaeological site have been previously determined ineligible for the National Register of Historic Places by the State Historic Preservation Officer. The historic structure (8OR04359) was determined to have been removed and verified in a field review conducted in January 2021. One linear resource, the SCL Railroad (8OR10661/8SE02138), has been recorded in both Orange and Seminole counties. Although portions of this linear resource have been determined eligible for the NRHP, the segments in proximity to the study area have lost the majority of their historical integrity and are considered non-contributing to the overall resource group, as determined in a 2013 survey conducted by SEARCH Inc. (FMSF Survey No. 19908). Therefore, the noted portions have been determined ineligible for the NRHP within the project Area of Potential Affect. The SHPO concurred with this finding in a letter dated April 15, 2020. The second linear resource is the Orange Blossom Trail (OR11516) and has not been evaluated by the SHPO within the project APE.

One archaeological site also has been recorded within the study area. The Little Wekiva East archaeological site (8SE01663) is a low-density prehistoric ceramic scatter. This site was determined to be ineligible by the SHPO for the NRHP.

The Seminole County and Orange County Property Appraisers' databases were examined to identify any parcels containing unrecorded structures of historic age (that is, constructed prior to 1976). A total of 94 parcels were identified within the project study area.

In January 2021, a systematic pedestrian survey was performed. Areas of high archaeological probability were shovel-tested. Shovel tests measured approximately 19.7 inches in diameter and excavated to a minimum depth of 39.4 inches below the ground surface. The archaeological survey resulted in 20 shovel tests. The existing cultural resources conditions are documented in the *Cultural Resource Assessment Survey Report* (CFX 2022c).

Table 2-19. Previously Recorded Historic Resources within the SR 414 Expressway Extension Study Area

Archaeological Sites				
FMSF No.	**Name**	**Time Period**	**Surveyor Recommendation**	**SHPO Evaluation**
8SE01663	Little Wekiva East	Prehistoric lacking pottery; Prehistoric with pottery	Ineligible for NRHP	Ineligible for NRHP
Historic Structures				
FMSF No.	**Address**	**Year Built**	**Surveyor Recommendation**	**SHPO Evaluation**
8OR04359	3070 Apopka Road	Circa 1925	Ineligible for NRHP	Ineligible for NRHP
Linear Resources				
FMSF No.	**Name**	**Period of Significance**	**SHPO Evaluation**	
8SE01663	Little Wekiva East	Prehistoric lacking pottery; Prehistoric with pottery	Ineligible for NRHP	
8OR10661/ 8SE01238	SCL Railroad/ CSX Railroad	American 19th century; American 20th century	Ineligible for the NRHP/Eligible for the NRHP (ineligible within study area)	
OR11516	Orange Blossom Trail	Circa 1935 roadway	Not evaluated	

2.3.2.2 Population

The study corridor is in unincorporated Orange County, Seminole County and the cities of Altamonte Springs and Maitland. Based on information collected from the U.S. Census Bureau (2020), both Orange and Seminole counties are anticipated to experience tremendous growth. In 2010, approximately 1.1 million people resided in Orange County and 422,000 people resided in Seminole County. By 2045, the population of Orange and Seminole counties is expected to increase to approximately 1.9 million residents and 589,000 residents, respectively. This represents a population increase of 42 percent and 28 percent for Orange County and Seminole County, respectively. Additional U.S. Census Bureau data was used to determine the potential effects of the proposed improvements on populations living in the study area. Table 2-20 provides study area demographic data. Figure 2-9 presents the location and demographics for the 2015 Census Block Group Demographics in the study area.

Census block groups in the study area range in population density from 2.7 to 11.7 persons per acre and average of 6.1 persons per acre. In comparison, population densities in Orange County and in Seminole County are 2.1 persons per acre. The greatest population density in the study area is Census Block 3, Tract 021707, which is located on the north side of the study area (Seminole County), west of Lake Lotus Park. Census Tract 021707, Block Group 5 (Seminole County), may include populations where both poverty and minority rates are greater than those for Seminole County. Three census tracts may include populations where both poverty and minority rates are greater than those for Orange County.

Residents over the age of 65 are considered transportation-disadvantaged and may require special transportation considerations because of limited mobility opportunities. Approximately 11 percent of Orange County is older than 65, while 15 percent of Seminole County is older than 65. By comparison,

two block groups in the Seminole County portion of the study area exceed the county rate, while three block groups in the Orange County portion of the study area exceed the county rate.

Table 2-20. Study Area 2015 Census Data

Block Group	Tract	Population	County	Area (acre)	Population Density	% Acres in Study Area	% Minority	% Poverty	% Over 65
1	021704	2,586	Seminole	962	2.7	1%	26%	15%*	15%*
1	021707	922	Seminole	194	6.0	19%	56%*	0%	9%
3	021707	1,017	Seminole	87	11.7	35%	21%	0%	10%
5	021707	2,181	Seminole	267	8.2	34%	44%*	19%*	11%
1	021706	2,596	Seminole	883	2.9	2%	41%*	10%	22%*
Seminole County	N/A	453,429	N/A	220,484	2.1	N/A	29%	11%	15%
1	015105	3,366	Orange	699	4.8	5%	73%*	22%*	12%*
1	015103	4,910	Orange	916	5.4	14%	58%	10%*	9%
2	015103	2,211	Orange	503	4.4	14%	38%	3%	19%*
1	015104	5,575	Orange	896	6.2	7%	62%*	12%*	11%*
2	015201	7,914	Orange	955	8.3	1%	60%*	13%*	6%
Orange County	N/A	1,321,194	N/A	642,068	2.1	N/A	59%	5%	11%

* Asterisks indicate that the percentage is at or above the county-wide percentage for that demographic.

Refer to Figure 2-9 for map of block groups.

As shown on Figure 2-9, south of SR 414 is an Orange County Alternative Mobility Area. Orange County AMAs have lower impact fees than other areas of the county and are exempt from transportation concurrency requirements. The AMA was established to promote urban development and redevelopment and to maximize the use of existing public infrastructure, as noted in the Orange County Comprehensive Plan.

An Orange County Neighborhood Stabilization Area (Pine Hills) is also located south of the project corridor, overlapping a portion of the AMA (refer to Figure 2-9). The Neighborhood Stabilization Program was created by the Housing and Economic Recovery Act of 2008 to respond to rising residential foreclosures and property abandonment. The main purpose of the Neighborhood Stabilization Program is to stabilize neighborhoods negatively impacted by foreclosures.

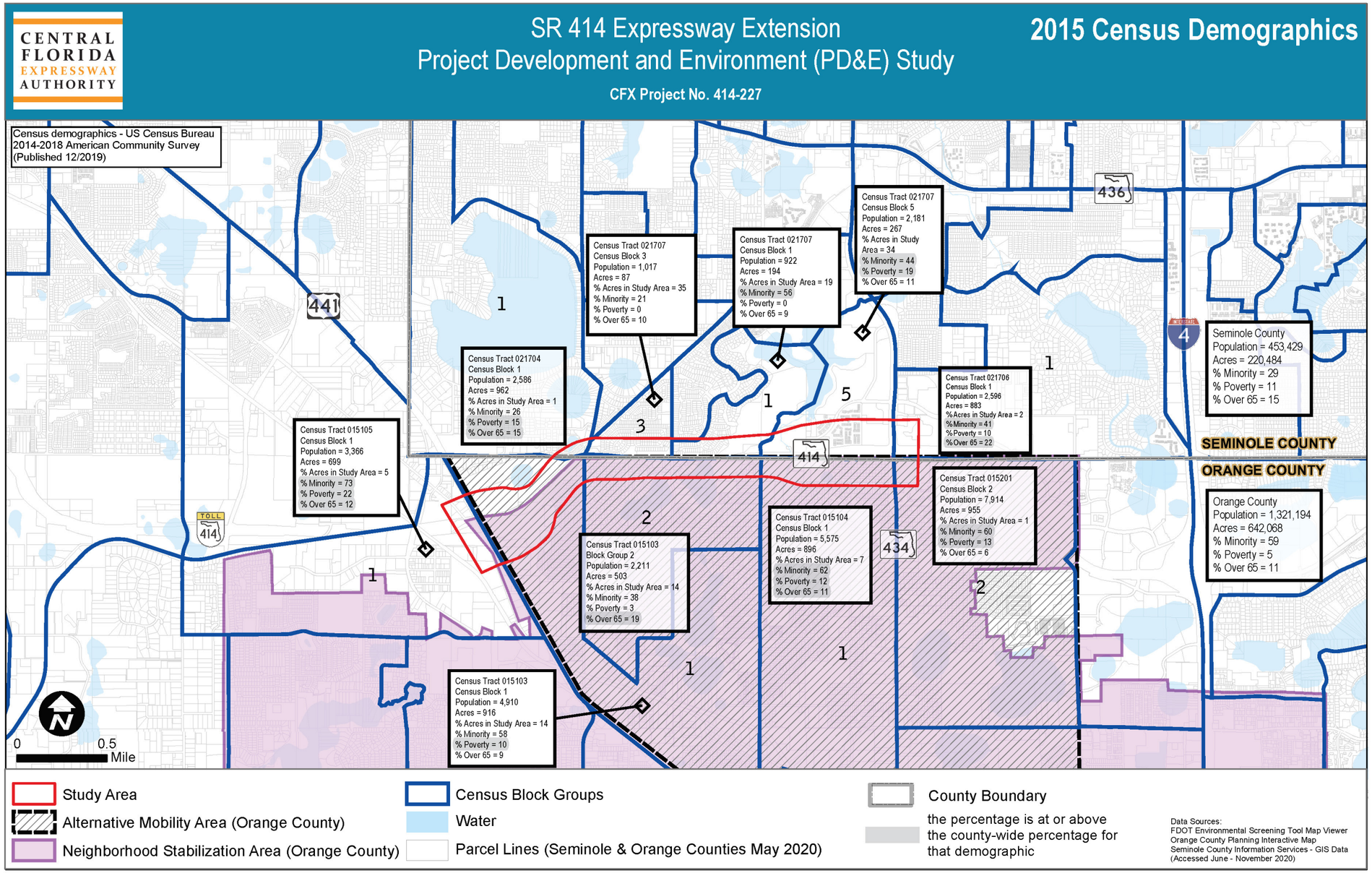

Figure 2-9. 2015 Census Demographics Map

2.3.2.3 Planned Developments

Review of the Orange and Seminole county comprehensive plans revealed the planned development projected near the project area. While there are no Developments of Regional Impact within the study area, residential land development projects are located in the northeast corner of US 441 and SR 414, as well as in the southeast corner of SR 434 and SR 414. The Polo Glen development on the north side of SR 414 near the US 441 interchange is approved as a 366-unit apartment complex..

2.3.2.4 Community Facilities

Community facilities include both private and public places that are important to the community. Public facilities include government buildings, fire and emergency protection, police protection, healthcare facilities, social service facilities, intermodal facilities, business districts and maintenance of public facilities, such as schools, community centers and cultural facilities. Private facilities may include health-care facilities, schools, religious places of worship, theme parks, grocery stores, major attractors, cemeteries, historic places and other significant quality-of-life features. A field visit was performed in April 2020 to collect corridor information including nearby social resources that could be potentially impacted by the proposed project. The field data along with a desktop review of the study area indicates that there is one community facility within the study area: Lake Lotus Park parking lot.

Table 2-21 presents community facilities within or near the study area. Details on community facilities are documented in the *Sociocultural Effects Evaluation Technical Memorandum* (CFX 2022k).

Table 2-21. Community Facilities In or Near the Study Area

Name	Location	Proximity to Study Area
Public Facilities		
Lake Lotus Park and Ride	Magnolia Homes Road	Within the study area
Schools		
Seminole State College – Altamonte Springs	850 SR 434	0.3 mile north of the study area
Riverside Elementary School	3125 Pembrook Drive	0.2 mile south of the study area
Forest City Adventist School	7563 Forest City Road	0.7 mile north of the study area
Day Care Facilities		
La Petite Academy of Orlando Day Care Center	2650 Pembrook Drive	0.4 mile south of the study area
Grocery Stores		
Publix Supermarket	851 SR 434	0.2 mile south of the study area
Churches		
Circle Community Church	2200 Pembrook Drive	0.4 mile south of the study area
Spirit of Joy Ministries	8310 Forest City Road	0.5 mile south of the study area
Time of Refreshing Christian Church	7919 Magnolia Homes Road	0.8 mile south of the study area

Table 2-21. Community Facilities In or Near the Study Area

Name	Location	Proximity to Study Area
Compass Community Church	9635 Bear Lake Road	0.4 mile north of the study area
St Andrews Presbyterian Church	9913 Bear Lake Road	0.6 mile north of the study area
Forest City Seventh-day Adventist Church	7601 Forest City Road	0.7 mile north of the study area
Mt Tabor AME Church	685 Oaklando Drive	0.6 mile north of the study area
Pentecostal Church of God	560 Hillview Drive	0.4 mile north of the study area
Assisted Living Facilities		
Green Tree Assisted Living	8207 Forest City Road	0.5 mile south of the study area
Beggs Pointe Assisted Living Facility	4711 Beggs Road	0.8 mile south of the study area

2.3.2.5 Parks and Recreation

Lake Lotus Park is located within the study area and is a nature preserve owned and operated by the city of Altamonte Springs. The park is located adjacent to SR 414 to the north. The preserve encompasses approximately 150 acres including 120 acres of woods and wetlands. Lake Lotus Park includes picnic areas, an enclosed pavilion, an education center, fishing, and a 1-mile-long trail. Weekday parking is available inside the park. However, tram service is available from the Lake Lotus Park and Ride on the south side of SR 414 on Magnolia Homes Road on weekends and during special events. As mentioned previously, the Lake Lotus Park and Ride serves as FDOT mitigation/permitting for the original SR 414 Maitland Boulevard construction and is owned by FDOT, but it is leased by the city of Altamonte Springs.

Riverside Acres Park is just south of the study area along the Little Wekiva Canal. Operated by Orange County Parks and Recreation, the park encompasses 8.1 acres and includes a playground, trails, picnic tables and fishing.

2.3.2.6 Pedestrians and Bicyclists

The study area is supported by different modes and services of travel along the SR 414 including pedestrian and bicycle facilities. As noted earlier, continuous sidewalks extend along both sides of SR 414 from US 441 to Gateway Drive. Further, sidewalks extend along all of the cross streets within the study area. The sidewalks discontinue at Gateway Drive, which limits pedestrian access to SR 434.

Undesignated bicycle lanes are present between Bear Lake Road and Gateway Drive through the use of wide shoulders along both sides of SR 414 (4 feet wide along the mainline and 8 feet wide along the bridges). In addition, bicycle lanes are present north of the study area at Eden Park Road and SR 434. Bicycle lanes are planned along Gateway Drive from SR 414 to SR 434.

2.3.2.7 Transit

There are no LYNX routes along this segment of SR 414, but service routes are present along SR 434 and US 441 in the study area. The LYNX service along SR 414 east of the study area provides a connection to SunRail.

- **23 – Winter Park/Springs Village** provides service along SR 434 from the Springs Village Shopping Center in Altamonte Springs to Edgewater Drive and Winter Park, Monday through Saturday every 60 minutes. This route makes a connection with the Winter Park SunRail Station and includes a superstop where riders can transfer to four other bus service routes.
- **106 – N US 441/Apopka** provides service along US 441 from the LYNX Central Station in downtown Orlando to Apopka, every 30 minutes Monday through Saturday and every 50 minutes on Sundays. Service is not regular and is offered between 5:25 a.m. and 7:05 p.m. Mondays through Saturdays. This route has two superstops where riders can transfer to four other bus service routes at one stop and five at the other.
- **434 – SR 434 Crosstown** is just north of the study area and provides service from the Seminole State College Altamonte Springs Campus to the University of Central Florida every 60 minutes, Monday through Saturday. The 434 bus service makes a connection at the Longwood SunRail Station and includes a superstop at the University of Central Florida.

2.3.2.8 Trails

The Seminole Wekiva Trail is adjacent to the north side of the corridor just west of Bear Lake Road. The trail begins southwest of the SR 46 and I-4 interchange in Seminole County and ends at the west end of the study corridor at US 441 and SR 414. The trail was constructed on former railroad ROW and is 14 miles long. A section of the trail north of the study corridor at the Wekiva River is also a designated part of the Florida National Scenic Trail.

The Florida Coast-to-Coast Trail, planned by the FDEP Office of Greenways and Trail, is planned through the study area along the same corridor as the Pine Hills Trail. The trail is approximately 250 miles long and links St. Petersburg (west coast) to Titusville (east coast) and includes most of the 51-mile-long East Central Regional Rail Trail. The Phase III Design Plans (dated April 29, 2020, from the Hiawassee Road/Clarcona Ocoee Road intersection to the termination of the Seminole Wekiva Trail within the study area) were submitted to CFX for review by FDOT District 5.

The Pine Hills Trail is planned as an 8-mile-long, multiuse regional trail from Pine Hills (southwest of the study area) to the Seminole Wekiva Trail. The trail is being developed in three phases along an existing 100- to 200-foot-wide Florida Power & Light powerline corridor in its alignment from State Road 50/ Colonial Drive north to the Seminole Wekiva Trail at Rose Avenue. Phase 1 construction was planned to be complete in 2018. Phase 3 is planned along the same corridor as the Coast-to-Coast Trail. On July 22, 2020, an email communication from Orange County Public Works noted that the Coast-to-Coast Trail is being designed by FDOT District 5 and will encompass Orange County's Phase 3 plans for the Pine Hills Trail, and therefore will be the same facility. In addition to the connection to the Coast-to-Coast Trail and Seminole Wekiva Trail, the Pine Hills Trail provides a connection to the West Orange Trail, Lake County's trail system via Clarcona Ocoee Road and joins the Shingle Creek Trail at its terminus at Colonial Drive (SR 50).

2.3.3 Natural Environment

2.3.3.1 Wetlands and Surface Waters

The U.S. Fish and Wildlife Service National Wetlands Inventory map (USFWS 2020a) and the SJRWMD FLUCCS codes in the 5000 and 6000 series were used to define the study area wetlands. Surface waters are derived from these data as well as photo-interpretation of current aerial photographs from ArcGIS

maps by Esri. Field surveys conducted in May and November 2020 to validate the FLUCCS data included wetland reconnaissance observations and subsequent edits to wetland classifications.

Surface waters associated with Lake Bosse, Lake Betty and Lake Lotus occur within proximity to the SR 414 ROW. These systems are hydrologically contiguous with Little Wekiva Canal, which crosses under SR 414 via Bridge No. 770075. Additional hydrologic connectivity of the Lake Bosse flow way is maintained under Bridge No. 770074.

The *Natural Resources Evaluation Report* (CFX 2022g) presents further details on the existing natural resources.

2.3.3.2 Listed Species

The project is situated within a developed, suburban corridor. Land use mapping from the SJRWMD and field reconnaissance indicates residential uses predominate the land surrounding the proposed project. Wildlife habitat with the potential to support protected wildlife species occurs within the study area, including wetland and upland habitat. The Little Wekiva Canal downstream of SR 414 (Maitland Boulevard) is in an SJRWMD Riparian Habitat Protection Zone associated with the Wekiva River Hydrologic Basin. The RHPZ is established to conserve biodiversity in the Wekiva ecosystem and restricts development activities that degrade ecosystem functions, including land clearing, construction of dwellings and other buildings, and alteration of surface water flows. The highest quality wildlife habitat within the study area is associated with Lake Lotus Park, which contains forested wetlands, marshes and upland forested systems.

Several federally listed wildlife and plant species have the potential to occur in the project study area based on review of the USFWS Information for Planning and Consultation Portal (USFWS 2020b). Federally listed wildlife species with potential to occur in the study area include wood stork (*Mycteria americana*), Eastern indigo snake (*Drymarchon corais couperi*), sand skink (*Neoseps reynoldsi*); Florida scrub-jay (*Aphelocoma coerulescens*), red-cockaded woodpecker (*Picoides borealis*) and Everglade snail kite (*Rostrhamus sociabilis plumbeus*). Surveys for federally listed wildlife and plant species was conducted in early May and November 2020; no federally listed wildlife and plant species (based on the Information for Planning and Consultation report) were observed within the study area. The project area does not fall within USFWS designated critical habitat for any species. The project area occurs entirely within the USFWS consultation areas of the Florida scrub-jay (*A. coerulescens*) and Everglade snail kite (*R. sociabilis*) and partially within the consultation area of the sand skink (*N. reynoldsi*). However, suitable habitat for these species does not occur within the study area.

State-listed species with reasonable potential to occur in the study area include the gopher tortoise (*Gopherus polyphemus*), Florida sandhill crane (*Antigone canadensis pratensis*), state-listed wading birds, Florida pine snake (*Pituophis melanoleucus mugitus*), short-tailed snake (*Lampropeltis extenuata*) Florida burrowing owl (*Athene cunicularia* floridana), and southeastern American kestrel (*Falco sparverius paulus*). A species-specific survey for gopher tortoises was conducted within upland habitat in the project ROW and at the locations for proposed pond alternatives. The survey identifies the potential for the gopher tortoise to occur in the study area, but also for protected commensal species, such as the Eastern indigo snake and Florida pine snake. No gopher tortoise burrows or commensal species were observed during the May and November 2020 field surveys. Sandhill cranes have been previously documented foraging in the project vicinity.

The Florida Fish and Wildlife Conservation Commission records indicate a bald eagle nest (No. OR084), occurs to the south of the project limits on the east side of Lake Bosse. This nest was last surveyed by FWC in 2017 and was documented as an active nest; the Florida Audubon Society last surveyed this nest in 2019 and documented it as occupied. Project biologists surveyed the area in November 2020 and the nest was observed to be active. The existing SR 414 ROW is approximately 900 feet from the documented location of this nest. However, the proposed project is outside of the 330-foot-wide primary and 660-foot-wide secondary protective zones of the nest; therefore, no permitting is expected to be required for this nest. FWC records indicate a historic bald eagle nest (No. OR026) is located along the south side of SR 414 just east of the US 441 and SR 414 Interchange. This nest was last recorded as active in 1993 (FWC 2020). The area surrounding the historic eagle nest has since been cleared and developed into the Rose Pointe Subdivision.

Black bears are well-documented within the area and one mortality has been documented within this segment of SR 414. In 2015, a vehicle collision killed a juvenile black bear on SR 414, west of the SR 434 and SR 414 intersection. The potential for habitats to support additional protected species is low because of the highly developed residential and commercial nature of the corridor.

2.3.3.3 Unique Characteristics

A segment of the Little Wekiva River is listed as a state of Florida Outstanding Florida Water. However, the Outstanding Florida Water segment occurs where the river flows through the Wekiva River Aquatic Preserve, which is approximately 5 miles north of the project study area. As noted previously, the SJRWMD Little Wekiva River RHPZ falls within the study area. No other unique natural resources characteristics fall within the study area.

2.3.4 Physical Environment

2.3.4.1 Air Quality

The study area is in both Seminole and Orange counties and is designated by the U.S. Environmental Protection Agency to be in attainment of the National Ambient Air Quality Standards for all of the criteria air pollutants (ozone, nitrogen dioxide, particulate matter [2.5 micrometers in diameter and 10 micrometers in diameter]), sulfur dioxide, carbon monoxide, and lead. As such, the State Implementation Plan conformity requirements of the Clean Air Act are not applicable to the project.

2.3.4.2 Noise

There are two land uses within the project study area for which there are Noise Abatement Criteria and for which there is a potential for future predicted traffic noise with the improvements to approach, meet or exceed the NAC—residences and park land (Lake Lotus Park). The residences are considered Activity Category B land uses and the park is considered an Activity Category C land use. Existing FDOT highway traffic noise barriers stand between SR 414 and most of the residences. The barriers will be considered in the noise analysis of the No-Build Alternative (for which the existing barriers would remain) and one Preferred Alternative. The *Noise Study Report* further documents existing conditions related to noise (CFX 2022h).

2.3.4.3 Contamination

The project elements that could be impacted by soil and/or groundwater contamination include:

- ROW acquisition
- Soil excavation for drainage improvements
- Soil excavation for pavement construction
- Soil excavation for mast arm signal pole foundations
- Soil excavation for bridge foundation construction including pile caps and drilled shafts
- Excavation dewatering

Data pertaining to potential sources of contamination, as discussed in the *Contamination Screening Evaluation Report,* were reviewed for this study (CFX 2022e). The contamination screening study area consists of all potentially contaminated sites within 500 feet, all non-landfill solid waste sites within 1,000 feet, and all solid waste landfills, Comprehensive Environmental Response, Compensation, and Liability Act or National Priorities List sites within 0.5 mile from the outside edge of the existing SR 414 ROW. The study also evaluated the proposed pond sites extending from US 441 to SR 434. Field reconnaissance of the study area occurred on February 9, 2021, to document existing conditions and to evaluate whether current land uses could result in hazardous material or petroleum product contamination of environmental media.

The potential contamination sites in or near of the study area were rated as having one of four risk levels: none, low, medium, or high. The risk ratings are defined as follows:

- No Risk: Upon review of available information and a limited site visit, there is no indication that hazardous waste or materials would impact construction of the proposed project. This does not preclude the possibility that hazardous waste or materials could have been handled on a site, only that information collected during this investigation suggests that hazardous waste has not historically existed on the site and, therefore, should not be expected to impact the proposed project.
- Low Risk: Site in which hazardous waste or materials existed or currently exist; however, based on available information, there is no evidence there would be any contamination encountered during construction of the proposed project.
- Medium Risk: Site that has known or suspected soil or groundwater contamination but will not likely require remediation or monitoring. However, a possibility exists that hazardous waste or materials may create problems during construction of the proposed project.
- High Risk: Site that has known hazardous materials or waste that were stored or handled onsite and/or soil or groundwater contamination exists that is likely to have an impact on roadway construction activities. Further assessment will be required to determine the extent and level of contamination, as it would impact the proposed project.

The contamination screening evaluation indicated a total of 19 sites with some risk of contamination impacts to this project. Of the 19 potential sites, 4 sites were determined to have a Medium Risk rating. The Level I CSER further details existing contamination conditions. Table 2-22 lists the potential Medium Risk contamination sites within the contamination screening study area.

Table 2-22. Potential Contamination Sites

Site No.	Site Name and Address	Risk Rating	Hazardous Waste/ Petroleum Product	Description
1	Cheap Dave's Auto Salvage 3070 Apopka Blvd.	Medium	HW/P	A Phase II Activities Update, dated May 2000, documents an elevated organic vapor analyzer reading (90 parts per million), no secondary containment for used oil and fuel storage areas, and a site stormwater design that may result in an offsite discharge. The assessment reported some soil cleanup level exceedances, but reportedly did not reveal a substantial risk for environmental impacts.
11	Historical Atlantic Coast Line Railroad – Sylvan Lake to Oakland	Medium	HW	The railroad intersects South Orange Blossom Trail approximately 640 feet north of the SR 441 and SR 414 intersection and runs parallel to SR 414.
12	7-Eleven Food Store #32862 8830 Rose Ave.	Medium	P	As of Nov. 2, 2000, two unleaded gas tanks are onsite. During the most recent inspection on Oct. 21, 2019, this site was found to be compliant. No contamination impacts were documented in the public file.
19	Historical Citrus Groves Study Area	Medium	HW	Citrus groves are visible on the easternmost and westernmost portions of the study area from prior to 1940 through 1995. The eastern areas were redeveloped in the late 1990s and early 2000s with residential neighborhoods, the former Classic Drivers Mart (Site No. 15) facility and the SR 414 (Maitland Boulevard) expansion at SR 434. The groves on the western end of the study area, adjacent to the former rail line, appear unmaintained by 2009.

Notes:

HW = hazardous waste

P = petroleum product

3. Future Conditions

3.1 Future Land Use

Review of future land use maps for Orange and Seminole counties indicates that the future land use of the study area is expected to remain similar to the existing condition. The proposed project includes expanding an existing roadway corridor within an existing transportation network, and no ROW acquisition is anticipated. Stormwater as a result of the proposed improvements will be treated using the existing drainage ponds, which are expected to be modified with no additional ponds outside the existing ROW anticipated.

The purpose of the proposed project is to accommodate anticipated east-west travel demands forecasted for the study region. Additionally, there is a need in the region to relieve existing and future congestion. While regional growth is forecasted, it is not anticipated to occur because of the implementation of the proposed project. The proposed project is to support already forecasted growth and the needs that result from the growth. Therefore, no future land use changes are anticipated because of the project.

3.2 Future Context and Functional Classification

The future context classification must consider the regional and local travel demand on the roadway and the challenges and opportunities of each roadway user as well as the transportation characteristics for the Preferred Alternative to understand who uses or could use the roadway. The future functional classification must consider the role that a particular roadway plays in serving the flow of vehicular traffic through the network. Functional classification and context classification should be considered together when determining the role and function of a roadway.[2]

The proposed SR 414 Elevated Expressway will connect to the existing limited-access SR 414 (John Land Apopka Expressway) which has a functional classification of Urban Principal Arterial Expressway. Therefore, the future functional classification of the SR 414 Elevated Expressway is anticipated to remain Urban Principal Arterial Expressway. Context classification does not apply to limited-access facilities.

The introduction of an elevated toll facility will separate through traffic from local traffic along SR 414 (Maitland Boulevard), which allows the design speed along the at-grade SR 414 (Maitland Boulevard) facility to be reduced from 55 mph to 45 mph. Existing SR 414 (Maitland Boulevard) is an urban principal arterial and provides local access. The future function classification of SR 414 (Maitland Boulevard) is expected to remain as an urban principal arterial as it is expected to continue to serve a large percentage of travel between cities and other activity centers.

The project corridor is almost fully developed, with only one planned development noted near the western end of the corridor. Therefore, land use surrounding the project corridor in the build condition is expected to be similar to the existing condition. The future roadway users of SR 414 (Maitland Boulevard) are also expected to remain similar to the existing condition including bicyclists and pedestrians. The improved bicycle lanes combined with the reduced speed along SR 414 (Maitland

[2] https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/roadway/completestreets/files/fdot-context-classification.pdf?sfvrsn=12be90da_2

Boulevard) may increase bicyclist activity. Given the transportation characteristics, the future FDOT context classification of SR 414 (Maitland Boulevard) is expected to remain the same as the existing condition (refer to Table 2-2).

3.3 Future Traffic Demand

Traffic demand information is based on the *Project Traffic Analysis Report* (CFX 2022j).

3.3.1 Future Year Traffic Model Development

Design traffic for the SR 414 Expressway Extension PD&E Study was forecasted using version CFX Model 414, which was developed for the purpose of evaluating the proposed project. This model was based on the model developed specifically for evaluating for the CFX Lake/Orange County Connector, which incorporated updates/revisions to the CFX model from previous studies and based on the Central Florida Regional Planning Model (v 6.1). CFX Model 414 was validated for a 2017 base year with a concentration on the sub-area of Orange, Seminole and Lake counties. The 2017 base year was used because of the construction activities associated with the I-4 Ultimate Project. The I-4 Ultimate Project resulted in a reconfiguration of the I-4 and SR 414 (Maitland Boulevard) interchange and its supporting roadway network, which altered travel patterns in the study area. The 2017 base year model reflects the study area transportation projects completed by 2017.

The model design traffic forecast year was set to 2045. Once the model was validated for the 2017 base year, the CFX Model Lake/Orange County Connector was updated to incorporate the planned design traffic forecast year (2045) network projects in the study area. The future year networks in the model contain the transportation improvements identified in the CFX, FDOT and county work programs, as well as the improvements included in the cost feasible plan from MetroPlan Orlando's *2040 Long Range Transportation Plan* (MetroPlan Orlando 2017). The design traffic forecast year 2045 network improvements of note include:

- eight-lane SR 414 from US 441 to SR 434 (Build Alternative)
- six-lane SR 429 from Seidel Road to SR 414
- ten-lane I-4 Ultimate Improvement from SR 408 to SR 434
- four-lane Wekiva Parkway/SR 429 from Mt. Plymouth Road to I-4

The No-Build Alternative future network included the six-lane SR 414 from US 441 to SR 434.

To assess the impact of the proposed SR 414 Expressway Extension project as a future toll facility, the forecasts were based on the use of a coefficient of toll. The coefficient converts cost (toll) to time based on average incomes in the study area incorporated as a time penalty and is applied to all toll facilities in the model. The Build Alternative was evaluated with and without tolls. The alternatives assumed one toll location on the expressway extension with all-electronic toll collection. For the analysis, the toll rate was set to $0.18 per mile in 2017 dollars for design traffic, consistent with the toll rate established for other planning studies. The toll rate is equivalent to a $0.50 toll.

3.3.2 Traffic Analysis

Using the calibrated model, traffic forecasts were developed for the project's Design Year (2045) for both No-Build and Build Alternatives. Figures 3-1 and 3-2 present the AADT for the 2045 No-Build and

Build Alternatives. The traffic analysis shows that the SR 414 Expressway Extension will help traffic conditions in the study area in the build condition over the existing and no-build conditions.

The roadway segment LOS analysis was conducted in the AM Peak and PM Peak hours for the No-Build and Build Alternatives using the projected Directional Design Hour Volumes and the 2020 FDOT Quality and Level of Service Handbook tables (FDOT 2020a). Table 3-1 summarizes the No-Build and Build Alternatives peak-hour segment LOS.

The analysis indicates that the arterial roadway segments between US 441 and SR 434 are projected to operate at LOS F in 2045 in the no-build condition during the peak hour and peak direction. In 2045, the arterial segments of SR 414 between Bear Lake Road/Rose Avenue and SR 434 west ramps operate at LOS F in the AM Peak Hour in the build condition. However, under the Build Alternative all segments are projected to operate better than the existing condition. Additionally, all cross streets along the project corridor are projected to operate at an LOS D or better in the AM and PM peak hours, except for Rose Avenue south of SR 414, which is projected to operate at LOS E in the AM peak hour.

Table 3-1. 2045 No-Build LOS and 2045 Build LOS

Location	Direction	2045 No-Build LOS		2045 Build LOS	
		AM Peak Hour LOS	PM Peak Hour LOS	AM Peak Hour LOS	PM Peak Hour LOS
Expressway					
SR 414, between SR 441 Ramps	Eastbound	B	B	C	B
	Westbound	B	B	B	C
SR 414 Expressway Extension	Eastbound	N/A	N/A	D	C
	Westbound	N/A	N/A	C	D
SR 414, between SR 434 Ramps	Eastbound	B	B	D	B
	Westbound	B	B	B	D
SR 414 Arterial					
Between US 441 and Bear Lake Road	Eastbound	F	C	C	C
	Westbound	C	F	C	C
Between Bear Lake Road and Eden Park Road	Eastbound	F	C	F	C
	Westbound	C	F	C	F
Between Eden Park Road and Magnolia Homes Road	Eastbound	F	C	F	C
	Westbound	C	F	C	F
Between Magnolia Homes Road and Gateway Drive	Eastbound	F	C	F	C
	Westbound	C	F	C	F
Between Gateway Drive and SR 434 Ramps	Eastbound	F	C	F	C
	Westbound	C	F	C	F

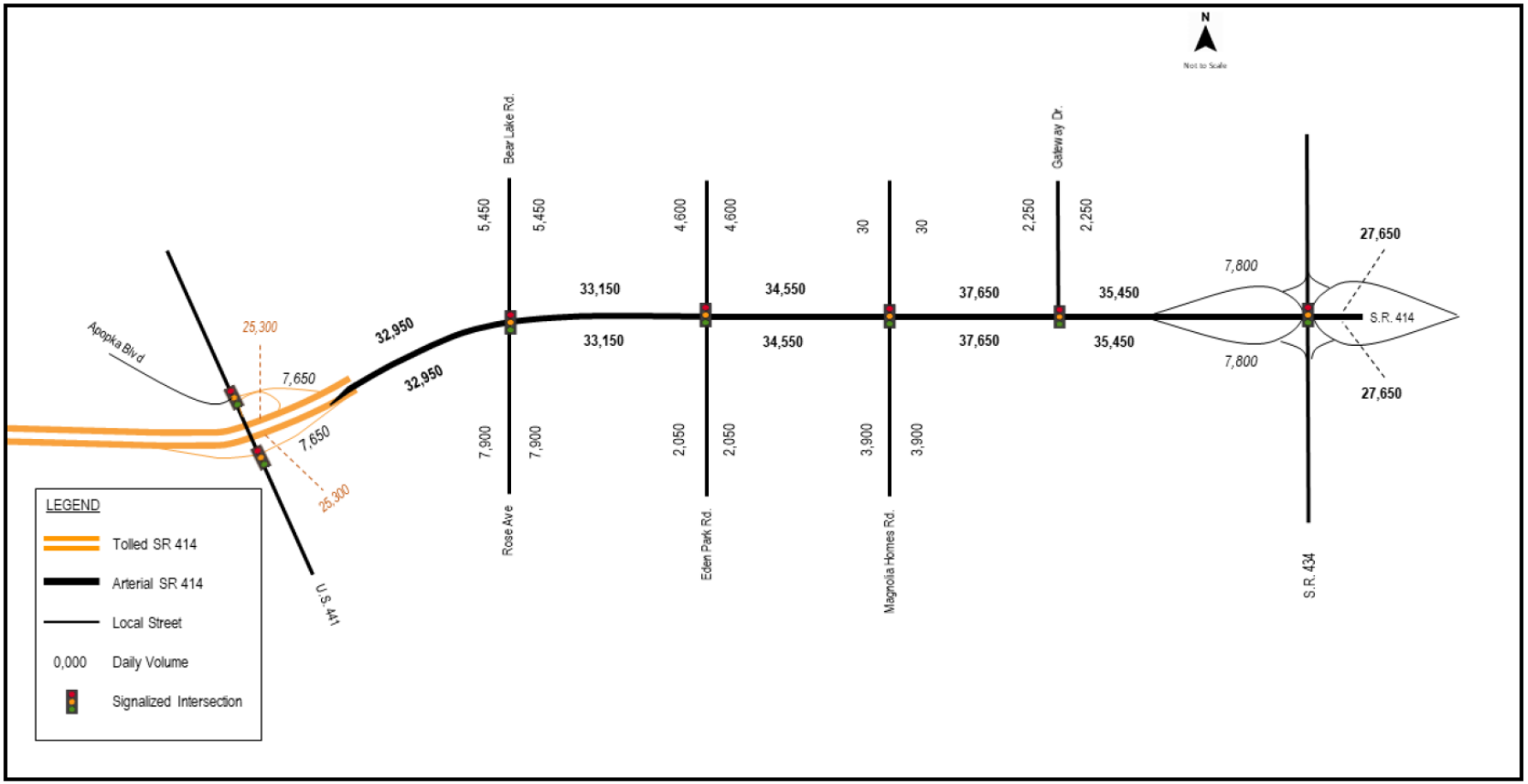

Figure 3-1. 2045 No-Build Alternative AADT

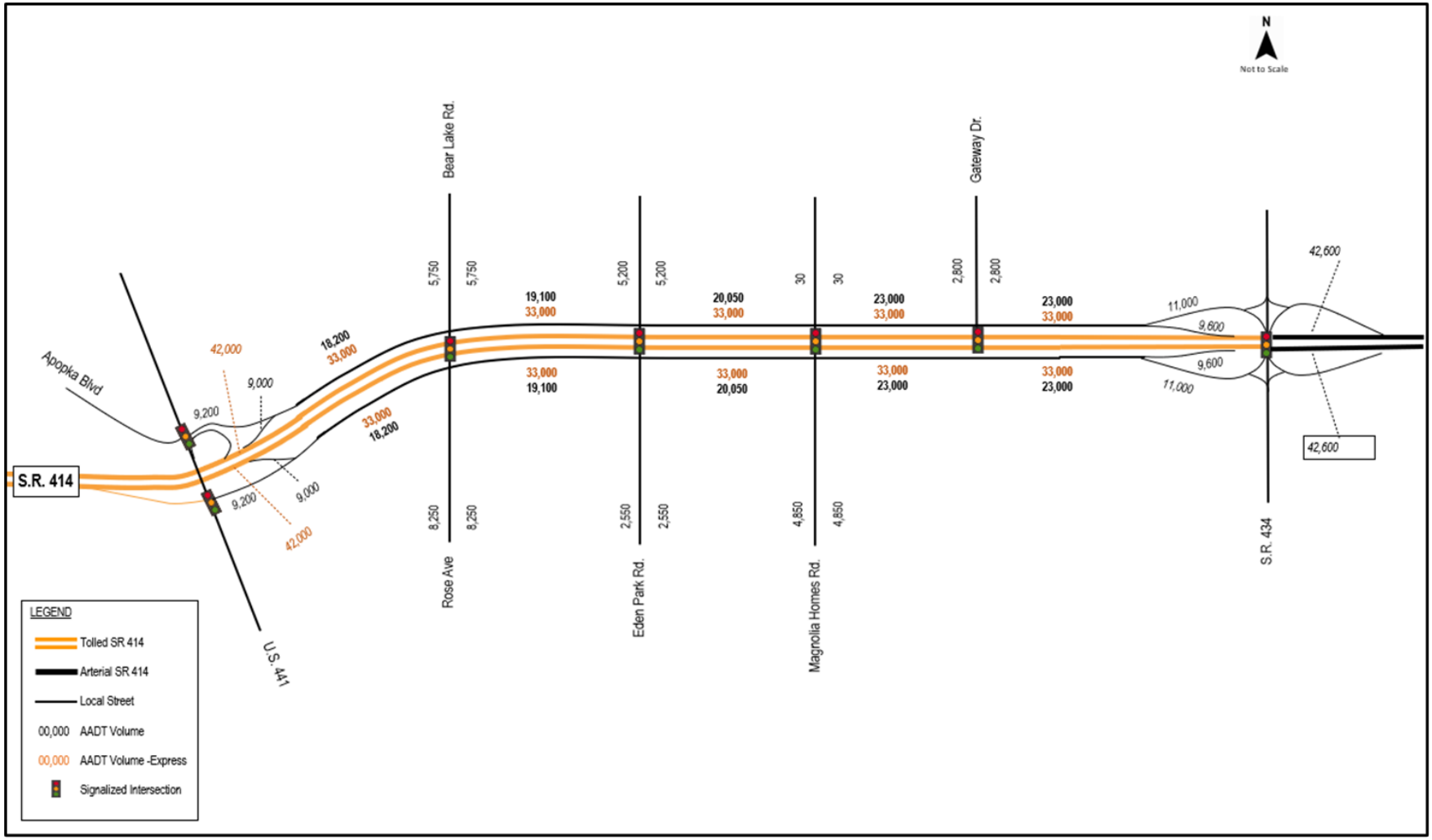

Figure 3-2. 2045 Build Alternative AADT

4. Design Controls and Criteria

The SR 414 Expressway Extension PD&E Study incorporates project elements with various design requirements. The existing four-lane SR 414 (Maitland Boulevard) facility will remain an at-grade urban principal arterial with local access and will be maintained by FDOT and applying FDOT standards. The proposed expressway extension will be a limited-access facility and will apply CFX standards. The development of this project will be guided by the CFX, American Association of State and Highway Transportation Officials, FDOT and National Cooperative Highway Research Program design criteria and guidance listed below:

- CFX Design Guidelines (CFX 2021b)
- CFX Signing and Pavement Marking Details and CADD Files (CFX 2021a)
- CFX ITS Design Standards (CFX 2021c)
- A Policy on Geometric Design of Highways and Streets (AASHTO 2011a)
- Roadside Design Guide (AASHTO 2011b)
- Research Report 835: Guidelines for Implementing Managed Lanes (TRB 2016)
- FDOT Design Manual (FDOT 2021c)
- FDOT Standard Plans for Road and Bridge Construction (FDOT 2021d)
- FDOT *Drainage Manual* (FDOT 2021e)

Tables 4-1 through 4-3 list design criteria for all the facilities proposed in the SR 414 PD&E Study.

Table 4-1. SR 414 (Maitland Boulevard) (Urban) Design Criteria

Roadway Classification: Context Classification:	Urban Principal Arterial Other C3R-Suburban Residential and C3C-Suburban Commercial	Source		Comments
		FDOT[a]	CFX[b] AASHTO[c]	
Design Traffic				
Proposed Design Speed	45 mph (Existing Posted Speed = 50 - 55 mph therefore 50 mph criteria is also provided in tables)	-	-	Consistent with As Built Design Speed (Field Review)
Access Class	3	X		Straight-Line Diagram 75011002 & 77002000
Allowable Design Speed	35 - 55 mph	X		FDM Ch. 201, Table 201.5.1 Note: As-Built Construction Plans at 45 mph
	min. 30 mph for Major Urban Arterial		X	AASHTO pg. 2-58 (FDM Ch. 122, Table 122.5.1)
Design Vehicle	WB-62FL/ WB-67	X		FDM Ch. 201, Section 201.6.2
Design Year	2045		X	Scope of Services
Lane, Median & Border Widths				
Travel Lanes & Aux. Lanes	12 ft @ 50 mph 11 ft @ 45 mph	X		FDM Ch. 210, Table 210.2.1
	10 ft - Urban Arterial		X	AASHTO pg. 7-29 (FDM Ch. 122, Table 122.5.2)
Bicycle Lane	7 ft buffered lane (min. 4 ft) 7 ft buffered keyhole (min. 5 ft)	X		FDM Ch. 223, Section 223.2.1.1 and Section 223.2.1.3
Lane Configuration	4 (2/direction)		X	Scope of Services
Cross Slope	-0.02, -0.02, -0.03 Turn Lane, Bike Lane, match adj. thru lane	X		FDM Ch. 210, Figure 210.2.1
	Minimum 0.015		X	AASHTO pg. 7-29 (FDM Table 122.5.11)
Cross Slope - Bridge Section	-0.02 (no slope break)	X		FDM Ch. 260, Section 260.4
Max Lane Rollover	4.0% between adjacent through lanes; 5.0% between through lane & Aux. lane	X		FDM Ch. 210, Section 210.2.4 & Table 210.2.2
Shared Use Path	12 ft (Std.), Minimum 10 ft	X		FDM Ch. 224, Table 224.4
Median Width	30 ft @ 50 mph 22 ft @ 45 mph (19.5 ft @ 45 mph w/ constrained R/W) min. 30 ft to provide U-turns	X		FDM Ch. 210, Table 210.3.1 & FDM Ch. 212, Table 212.9.1
Border Width	29 ft @ 50 mph 14 ft @ 45 mph	X		FDM Ch. 210, Table 210.7.1
Sidewalk and Back slope				
Sidewalk Width	6 ft (up to 8 ft when demand is demonstrated)	X		FDM Ch. 222, Table 222.1.1
	min. 5 ft, or passing sections required		X	AASHTO pg. 4-56
Drop-off Hazard for Pedestrians	Protection required if conditions meet Case 1 or Case 2 within 2 ft of the path edge	X		FDM Ch. 222, Figure 222.4.1
Front and Back slope (Curbed)	1:2 or to suit property owner. Not flatter than 1:6.	X		FDM Ch. 215, Table 215.2.3
Drop-off Hazard ($D_s \leq 45$mph)	6 ft or greater with a slope steeper than 1:3 within 22 ft of the travel way requires protection	X		FDM Ch. 215, Figure 215.3.3
Roadway Shoulder Widths				
Median/Left Shldr (not curbed)	8 ft Total/ 0 ft Paved Pave 4-ft in sag V.C; low side of SE	X		FDM Ch. 210, Table 210.4.1
	none - Urban Arterial 4 ft - Rural Arterial, 4-lane divided		X	AASHTO pg. 4-10, pg. 7-13 (FDM Table 122.5.3)
Median/Left Shldr adjacent to Barrier Wall	6 ft min. @ 50 mph 10 ft adj to continuous barrier 2.5 ft @ Curbed 45 mph	X		FDM Ch. 260, Figure 260.1.1 FDM Ch. 210, Table 210.4.1 FDM Ch. 260, Figure 260.1.3
Outside Cross Slope	-0.06%	X		FDM Ch. 210, Section 210.4.1
Median/Left Cross Slope	-0.05%	X		FDM Ch. 210, Section 210.4.1
Bridge Shoulder Widths				
Outside	4.0 ft (Existing median sep.) 2.5 ft min.; 7' with bike lane; 8 ft for bridges >500 ft @ 45 mph	X		FDM Ch. 260, Table 260.9.1 FDM Ch. 260, Figure 260.1.4
Median/Left	1.5 ft (Existing median sep.) 2.5 ft min. (Proposed median barrier); 6 ft for 2-lane bridges >500 ft @ 45 mph	X		FDM Ch. 260, Table 260.9.1 FDM Ch. 260, Figure 260.1.4
Roadside Slopes				
Front Slope	Height of Fill - Rate 0-5 ft - 1:6 5-10 ft - 1:6 to CZ, then 1:4 10-20 ft - 1:6 to CZ, then 1:3 > 20 ft - 1:2 with guardrail	X		FDM Ch. 215, Table 215.2.3
Back Slope	1:4 or 1:3 with standard width trapezoidal ditch and 1:6 front slope.	X		FDM Ch. 215, Table 215.2.3
Transverse Slope	1:10 (freeway) 1:4 (others)	X		FDM Ch. 215, Table 215.2.3

Table 4-1. SR 414 (Maitland Boulevard) (Urban) Design Criteria

Roadway Classification: Context Classification:	Urban Principal Arterial Other C3R-Suburban Residential and C3C-Suburban Commercial	Source		Comments
		FDOT[a]	CFX[b] AASHTO[c]	
Grades				
Max Grade (Flat Terrain)	6.0% @ 45-50 mph	X	X	FDM Ch. 210, Table 210.10.1 AASHTO pg. 7-29
Max Change Grade Change w/o Vertical Curve	0.60% @ 50 mph 0.70% @ 45 mph	X		FDM Ch. 210, Table 210.10.2
Req'd Base Clearance	3 ft	X		FDM Ch. 210, Sect 210.10.3
Minimum Distance between VPI's	250 ft	X		FDM Ch. 210, Sect 210.10.1.1
Minimum Grade	0.30%	X		FDM Ch. 210, Sect 210.10.1.1
Sight Distance				
Min. Stopping Sight Distance	425 @ 50 mph 360 @ 45 mph		X	AASHTO Table 3-1, pg. 3-4 (FDM Table 122.5.7)
Decision Sight Distance (B-Stop on Urban, E-Direction change on Urban)	910 ft, 1,030 ft @ 50 mph 800 ft, 930 ft @ 45 mph		X	AASHTO Table 3-3, pg. 3-7
Horizontal Curves				
Max Deflection w/o Horizontal Curve	0° 45' 00"	X		FDM Ch. 210, Section 210.8.1
Max Deflection Through Intersection	3° 00' @ 45 mph	X		FDM Ch. 212, Table 212.7.1
Max Superelevation (emax)	e max 10% @ 50 mph e max 5% @ 45 mph	X		FDM Ch. 210, Table 210.9.1
Transitions	80/20 transition split (50/50 min)	X		FDM Ch. 210, Section 210.9.1
Slope Rate	1:150 @ 45 mph (emax=0.05) 1:200 @ 50 mph (emax=0.10; 2-Lane)	X		FDM Ch. 210, Table 210.9.3
Length of Curve	Desired 750 ft @ 50 mph 675 ft @ 45 mph not less than 400ft	X		FDM Ch. 210, Table 210.8.1
Compound Curve Ratio	1.5:1 Open Highways ; 2:1 Turning Roadways	X		FDM Ch. 210, Section 210.8.2.2
Max Curvature	10° @ 50 mph (e max 10%) 8° 15' @ 45 mph (e max 5%)	X		FDM Ch. 210, Table 210.9.1 and Table 210.9.2
Max Curvature for NC (0.02)	R= 8,337 ft @ 50 mph R= 2,083 ft @ 45 mph	X		FDM Ch. 210, Table 210.9.1 and Table 210.9.2
Lane Drop Taper	L = WS @ >/= 45 mph	X		FDM Ch. 210, Section 210.2.5
Vertical Curves				
K Crest	136 @ 50 mph 98 @ 45 mph	X	X	FDM Ch. 210, Table 210.10.3 (FDM Table 122.5.8)
Min Length Crest Curve	300 ft @ 50 mph 135 ft @ 45 mph	X		FDM Ch. 210, Table 210.10.4
K Sag	96 @ 50 mph 79 @ 45 mph	X	X	FDM Ch. 210, Table 210.10.3 (FDM Table 122.5.8)
Min Length Sag Curve	200 ft @ 50 mph 135 ft @ 45 mph	X		FDM Ch. 210, Table 210.10.4
Clear Zone				
Travel Lanes	24 ft	X		FDM Ch. 215, Table 215.2.1
Auxiliary Lanes	14 ft	X		FDM Ch. 215, Table 215.2.1
Vertical Clearance				
Roadway over Roadway	16'-6"	X	X	FDM Ch. 260, Table 260.6.1 AASHTO pg. 7-38, 10-21
Overhead Sign Structure	17'-6" (new signs) 17'-0" (existing)	X	X	FDM Ch. 210, Section 210.10.3 AASHTO pg. 7-7, 38, 8-4
Overhead DMS	19'-6" (new signs) 19'-0" (existing)	X		FDM Ch. 210, Section 210.10.3
New Signal Span Wire/Mast Arm	17'-6" (new signs) 17'-0" (existing)	X		FDM Ch. 210, Section 210.10.3
Drainage	Min. 2 ft between the design flood stage and the lower members of the bridge	X		FDM Ch. 260, Section 260.8.1

Table 4-1. SR 414 (Maitland Boulevard) (Urban) Design Criteria

Roadway Classification: Context Classification:	Urban Principal Arterial Other C3R-Suburban Residential and C3C-Suburban Commercial	Source		Comments
		FDOT[a]	CFX[b] AASHTO[c]	
Lateral Offsets				
Conventional Lighting	20 ft from Travel Lane @ 50 mph 4 ft from face of curb @ 45 mph	X		FDM Ch. 215, Table 215.2.2
ITS Pole and Above Ground Fixed Objects	Outside Clear Zone @ 50 mph 4 ft from face of curb @ 45 mph	X		FDM Ch. 215, Table 215.2.2
Traffic Control Overhead Sign Supports	Outside Clear Zone	X		FDM Ch. 215, Table 215.2.2
Aboveground Utilities - Existing	Not required to be relocated unless the edge of traveled way is being moved closer; or they have been hit 3 times in 5 years	X		FDM Ch. 215, Table 215.2.2
Aboveground Utilities - New or Relocated	Outside Clear Zone @ 50 mph 4.0 feet @ 45 mph	X		FDM Ch. 215, Table 215.2.2
Canal Hazards	Not less than 60 ft from edge of travel @ 50 mph Not less than 40 ft from edge of travel @ 45 mph	X		FDM Ch. 215, Section 215.3.2
Bridge Piers and Abutments	Outside Clear Zone @ 50 mph; The greater of the following @ 45 mph: 16 ft from edge of travel (nearest lane); 4 ft from face of curb (if outside aux): 6 ft from edge of aux lane (if median aux)	X		FDM Ch. 215, Table 215.2.2

[a] FDOT Design Manual (2021)

[b] Central Florida Expressway Authority Design Guidelines (2021)

[c] AASHTO Greenbook (2011)

Table 4-2. SR 414 Expressway Extension Design Criteria

Roadway Classification: Context Classification:	Limited Access Express Lanes C3R-Suburban Residential and C3C-Suburban Commercial	Source		Comments
		FDOT[a]	CFX[b] AASHTO[c] FHWA[d]	
Design Traffic				
Design Speed - Express Lanes	50 mph	X		Scope of Services
Design Vehicle	WB-62FL/ WB-67	X		FDM Ch. 201, Section 201.6.2
Design Year	2045		X	Scope of Services
Lane, Median & Border Widths				
Express Lanes	12 ft	X		FDM Ch. 211, Section 211.2
Cross Slope	-0.02, -0.02	X		FDM Ch. 211, Figure 211.2.1
Cross Slope - Bridge Section	-0.02 uniform slope; two-way traffic may be crowned	X		FDM Ch. 260, Section 260.4
Max Breakover at Terminals D_s >35mph	5.00%	X		FDM Ch. 211, Table 211.2.2
Min. Median Width	26 ft with barrier	X		FDM Ch. 211, Table 211.3.1
	4 - 6 ft, constrained Continuous viaduct should be min. shldr + barrier		X	AASHTO, pg. 7-14, pg. 8-16
Border Width	Min. 10 ft from back of roadside barrier for maintenance	X		FDM Ch. 211, Section 211.6.1
Express Lane Shoulder Widths				
1-lane Outside Shldr	12 ft Total/ 10 ft Paved (apply Travel Lane criteria)	X		FDM Ch. 211, Table 211.4.1
1-lane Median/Left Shldr	8 ft Total/ 4 ft Paved (apply Travel Lane criteria)	X		FDM Ch. 211, Table 211.4.1
2-lane Outside Shldr	14 ft Total/ 12 ft Paved		X	CFX Ch. 211, Section 211.4
2-lane Median/Left Shldr	12 ft Total/ 12 ft Paved		X	CFX Ch. 211, Section 211.4
Outside Cross Slope	-0.06	X		FDM Ch. 211, Section 211.4.2
Median/Left Cross Slope	-0.05	X		FDM Ch. 211, Section 211.4.2
Bridge Shoulder Widths				
1-lane	6 ft Inside/ 12 ft outside	X	X	FDM Ch. 260, Figure 260.1.1 CFX Ch. 211, Section 211.4
2-lane	6 ft Inside (Min.)/ 12 ft outside		X	CFX Ch. 260, Figure 260.1.1 CFX Ch. 211, Section 211.4
Roadside Slopes				
Front Slope	1:6 for fill to 5' 1:6 to clear zone & 1:4 for fills 5' to 10' 1:6 to clear zone & 1:3 for fills 10' to 20' 1:3 with guardrail for fills over 20' and must include shoulder gutter		X	CFX Section 306.5, pg. 3-14
Back Slope	1:4 or 1:3 with standard width trapezoidal ditch and 1:6 front slope.	X		FDM Ch. 215, Table 215.2.3
Transverse Slope	1:10 (freeway) 1:4 (others)	X		FDM Ch. 215, Table 215.2.3
Grades				
Max Grade (Flat Terrain)	4.00%	X		FDM Ch. 211, Table 211.9.1
Max Change Grade Change w/o Vertical Curve	0.60%	X		FDM Ch. 210, Table 210.10.2
Minimum Distance between VPI's	5 x Design Speed = 250 ft		X	CFX Ch. 211, Section 211.9.1
Sight Distance				
Min. Stopping Sight Distance (for Expressways)	425 ft	X	X	AASHTO Table 3-1, pg. 3-4 & FDM Ch. 211, Table 211.10.2
Decision Sight Distance (B-Stop on Urban, E-Direction change on Urban)	910 ft, 1030 ft		X	AASHTO Table 3-3, pg. 3-8

Table 4-2. SR 414 Expressway Extension Design Criteria

Roadway Classification: Context Classification:	Limited Access Express Lanes C3R-Suburban Residential and C3C-Suburban Commercial	Source		Comments
		FDOT[a]	CFX[b] AASHTO[c] FHWA[d]	
Horizontal Curves				
Max Deflection w/o Horizontal Curve	0° 45' 00"	X		FDM Ch. 211, Section 211.7.1
Max Superelevation (emax)	0.10	X		FDM Ch. 210, Section 210.9
Transitions	80/20 transition split (50/50 min)	X		FDM Ch. 210, Section 210.9.1
Slope Rate	1:200	X		FDM Ch. 210, Table 210.9.3
Length of Curve	1,500 ft, not less than 750 ft @50 mph	X		FDM Ch. 211, Table 211.7.1
Compound Curve Ratio	1.5:1 Open Highways ; 2:1 Turning Roadways	X		FDM Ch. 210, Section 210.8.2.2
Max Curvature	8° 15' (e max 10%)	X		FDM Ch. 210, Table 210.9.1 and Table 210.10.1
Max Curvature for NC (0.02)	R= 8,337 ft	X		FDM Ch. 210, Table 210.9.1 and Table 210.10.1
Lane Drop Taper	L = WS @ >/= 45 mph	X		FDM Ch. 210, Section 210.2.5
Vertical Curves				
K Crest	185 (Int.), 136 (Exp.)	X	X	FDM Ch. 211, Table 211.9.2 CFX requires Interstate criteria unless approved by CFX Chief of Infrastructure
	84		X	AASHTO Table 3-34, 3-36, 6-3 (FDM Ch. 122, Table 122.5.8)
Min Length Crest Curve	1,000 ft 1,800 (within Interchanges)	X		FDM Ch. 211, Table 211.9.3
	Reduction in vertical curve length can be approved by CFX Chief of Infrastructure.		X	CFX Ch. 211 Footnote Table 211.9.3
K Sag	115 (Int.), 96 (Exp.)	X	X	FDM Ch. 211, Table 211.9.2 CFX requires Interstate criteria unless approved by CFX Chief of Infrastructure
	96		X	AASHTO Table 6-3, pg. 6-4 (FDM Ch. 122, Table 122.5.8)
Min Length Sag Curve	800 ft	X		FDM Ch. 211, Table 211.9.3
	Reduction in vertical curve length can be approved by CFX Chief of Infrastructure.		X	CFX Ch. 211 Footnote Table 211.9.3
Clear Zone				
Travel Lanes	24 ft	X		FDM Ch. 215, Table 215.2.1
Auxiliary Lanes	14 ft	X		FDM Ch. 215, Table 215.2.1
Vertical Clearance				
Roadway over Roadway Travel Lanes and Bike Lanes and/or Shoulders	16'-6"	X		FDM Ch. 260, Table 260.6.1
Roadway over Roadway Median Under Bridge	14'-0" Concrete Barrier = 0 ft. setback Guardrail = 5 ft. setback from face of barrier	X		FDM Ch. 260, Figure 260.6.5
Overhead Sign Structure	17'-6" (new signs) 17'-0" (existing)	X		FDM Ch. 210, Section 210.10.3
Overhead DMS	19'-6" (new signs) 19'-0" (existing)	X		FDM Ch. 210, Section 210.10.3
New Signal Span Wire/Mast Arm	17'-6" (new signs) 17'-0" (existing)	X		FDM Ch. 210, Section 210.10.3
Lateral Offsets				
Conventional Lighting	20 ft from Travel Lane	X		FDM Ch. 215, Table 215.2.2
ITS Pole and Above Ground Fixed Objects	Outside Clear Zone	X		FDM Ch. 215, Table 215.2.2
Traffic Control Overhead Sign Supports	Outside Clear Zone	X		FDM Ch. 215, Table 215.2.2
Aboveground Utilities - Existing	Not required to be relocated unless the edge of traveled way is being moved closer; or they have been hit 3 times in 5 years	X		FDM Ch. 215, Table 215.2.2
Aboveground Utilities - New or Relocated	Outside Clear Zone	X		FDM Ch. 215, Table 215.2.2
Canal Hazards	Not less than 60 ft from edge of travel	X		FDM Ch. 215, Section 215.3.2
Bridge Piers and Abutments	Outside Clear Zone	X		FDM Ch. 215, Table 215.2.2

[a] FDOT Design Manual (2021)

[b] Central Florida Expressway Authority Design Guidelines (2021)

[c] AASHTO Greenbook (2011)

Table 4-3. Interchange and Slip Ramp Design Criteria

Roadway Classification	Interchange Ramps and Slip Ramps	Source		Comments
		FDOT[a]	CFX[b] AASHTO[c]	
Design Traffic				
Design Speed	50 mph - Directional and Slip Ramps 35 mph - Outer Cloverleaf 30 mph - Loop	X		FDM Ch. 201, Table 201.5.2
Design Vehicle	WB-62FL/ WB-67	X		FDM Ch. 201, Section 201.6.2
Lane & Border Widths				
1-Lane Ramp	15 ft	X		FDM Ch. 211, Section 211.2.1
2-Lane Ramp	12 ft	X		FDM Ch. 211, Section 211.2.1
Cross Slope	-0.02	X		FDM Ch. 211, Figure 211.2.1
Max Breakover at Terminals	5% for D_s >/= 35mph; 6% for Ds < 35mph	X		FDM Ch. 211, Table 211.2.2
Border Width	Min. 10 ft from back of roadside barrier for maintenance	X		FDM Ch. 211, Section 211.6.1
Ramp Shoulder Widths				
	Without Shoulder Gutter			
1-lane Outside Shldr	6 ft Total/ 4 ft Paved	X		FDM Ch. 211, Table 211.4.1
1-lane Median/Left Shldr	6 ft Total/ 2 ft Paved	X		FDM Ch. 211, Table 211.4.1
2-lane Outside Shldr	12 ft Total/ 10 ft Paved (Interstate)	X		FDM Ch. 211, Table 211.4.1
2-lane Median/Left Shldr	8 ft Total/ 4 ft Paved (Interstate)	X		FDM Ch. 211, Table 211.4.1
	Shoulder Cross Slopes			
Outside	-0.06	X		FDM Ch. 211, Section 211.4.2
Median/Left	-0.05	X		FDM Ch. 211, Section 211.4.2
Bridge Shoulder Widths				
Outside	1 Lane Ramp 6 ft 2 Lane Ramp 10 ft	X		FDM Ch. 260, Figure 260.1.1
Median/Left	6 ft	X		FDM Ch. 260, Figure 260.1.1
Roadside Slopes				
Front Slope	1:6 for fill to 5' 1:6 to clear zone & 1:4 for fills 5' to 10' 1:6 to clear zone & 1:3 for fills 10' to 20' 1:3 with guardrail for fills over 20' and must include shoulder gutter		X	CFX Section 306.5, pg. 3-14
Back Slope	1:4 or 1:3 with standard width trapezoidal ditch and 1:6 front slope.	X		FDM Ch. 215, Table 215.2.3
Transverse Slope	1:10 (freeway) 1:4 (others)	X		FDM Ch. 215, Table 215.2.3
Grades				
Max. Grade (Flat Terrain)	5% @ 50 mph 7% @ 30 mph	X		FDM Ch. 211, Table 211.9.1
Max Grade Change Without Vertical Curve	0.6% @ 50 mph 1.0% @ 30 mph	X		FDM Ch. 210, Table 210.10.2
Req'd Base Clearance	3 ft	X		FDM Ch. 210, Section 210.10.3
Sight Distance				
Min. Stopping Sight Distance	425 ft @ 50 mph 200 ft @ 30 mph	X	X	FDM Ch. 211, Table 211.10.2
Decision Sight Distance (B-Stop on Urban, E-Direction change on Urban)	910 ft, 1030 ft @ 50 mph 490 ft, 620 ft @ 30 mph		X	AASHTO Table 3-3, pg. 3-7
Entrance/Exit Ramps				
Ramp Terminals	Entrance - Parallel w/ 300 ft Taper Exit - Taper at 4 deg break		X	CFX Section 211.13
Spacing between terminals	500 ft between EXIT and ENT 1,000 ft between EXIT-EXIT or ENT-ENT		X	AASHTO Figure 10-68
$L_{acceleration}$ (45 mph to 50 mph)	-		X	AASHTO Table 10-3
$L_{deceleration}$ (50 mph to 45 mph)	175 ft		X	AASHTO Table 10-5

Table 4-3. Interchange and Slip Ramp Design Criteria

Roadway Classification	Interchange Ramps and Slip Ramps	Source		Comments
		FDOT[a]	CFX[b] AASHTO[c]	
Horizontal Curves				
Max Deflection w/o Horizontal Curve (no Curb and Gutter)	2° 00' 00" @ 30 mph 0° 45' 00" @ 50 mph	X		FDM Ch. 211.7.1
Max Superelevation (emax)	0.10	X		FDM Ch. 210, Section 210.9
Transitions	80/20 transition split (50/50 min)	X		FDM Ch. 210, Section 210.9.1
Slope Rate	1:200 @ 50 mph 1:175 @ 30 mph	X		FDM Ch. 210, Table 210.9.3
Length of Horizontal Curve	750 ft @ 50 mph 675 FT @ 45 mph min. 400 ft	X		FDM Ch. 211, Table 211.7.1
Compound Curve Ratio	1.5:1 Open Highways ; 2:1 Turning Roadways	X		FDM Ch. 210, Section 210.8.2.2
Max Curvature	8° 15' @ 50 mph 24° 45' @ 30 mph	X		FDM Ch. 210, Table 210.9.1 and Table 210.10.1
Max Curvature for NC (0.02)	R= 8,337 ft @ 50 mph R= 3,349 ft @ 30 mph	X		FDM Ch. 210, Table 210.9.1 and Table 210.10.1
Vertical Curves				
K Crest	136 @ 50 mph 31 @ 30 mph	X		FDM Ch. 211, Table 211.9.2
Min Length Crest Curve	300 ft @ 50 mph 90 ft @ 30 mph	X		FDM Ch. 211, Table 211.9.3
K Sag	96 @ 50 mph 37 @ 30 mph	X		FDM Ch. 211, Table 211.9.2
Min Length Sag Curve	200 ft @ 50 mph 90 ft @ 30 mph	X		FDM Ch. 211, Table 211.9.3
Clear Zone				
Multilanes	24ft @ 50mph 12ft @ 30 mph	X		FDM Ch. 215, Table 215.2.1
Single lane	14 ft @ 50 mph 10 ft @ 30 mph	X		FDM Ch. 215, Table 215.2.1
Vertical Clearance				
Roadway over Roadway	16'-6"	X		FDM Ch. 260, Table 260.6.1
Overhead Sign Structure	17'-6" (new signs) 17'-0" (existing)	X		FDM Ch. 210, Section 210.10.3
Overhead DMS	19'-6" (new signs) 19'-0" (existing)	X		FDM Ch. 210, Section 210.10.3
New Signal Span Wire/Mast Arm	17'-6" (new signs) 17'-0" (existing)	X		FDM Ch. 210, Section 210.10.3
Drainage	Min. 2 ft between the design flood stage and the lower members of the bridge	X		FDM Ch. 260, Section 260.8.1
Lateral Offsets				
Conventional Lighting	20 ft from Travel Lane, or Clear Zone width whichever is less	X		FDM Ch. 215, Table 215.2.2
ITS Pole and Above Ground Fixed Objects	Outside Clear Zone	X		FDM Ch. 215, Table 215.2.2
Traffic Control Overhead Sign Supports	Outside Clear Zone	X		FDM Ch. 215, Table 215.2.2
Aboveground Utilities - Existing	Not required to be relocated unless the edge of traveled way is being moved closer; or they have been hit 3 times in 5 years	X		FDM Ch. 215, Table 215.2.2
Aboveground Utilities - New or Relocated	Outside Clear Zone	X		FDM Ch. 215, Table 215.2.2
Canal Hazards	Not less than 60 ft from edge of travel	X		FDM Ch. 215, Section 215.3.2
Bridge Piers and Abutments	Outside Clear Zone	X		FDM Ch. 215, Table 215.2.2

[a] FDOT Design Manual (2021)

[b] Central Florida Expressway Authority Design Guidelines (2021)

[c] AASHTO Greenbook (2011)

5. Alternatives Analysis

The SR 414 Expressway Extension PD&E Study is being conducted to enhance mobility, accommodate projected traffic needs and improve overall safety along the study corridor. The PD&E Study consists of the development and evaluation of alternatives to address the project's purpose and need. As part of the project development process, alternatives were developed to evaluate potential improvements along SR 414 (Maitland Boulevard) and the addition of four new SR 414 express lanes. This section documents the analysis of each alternative.

5.1 No-Build Alternative

The No-Build Alternative for the study area involves the construction of previously programmed improvements to SR 414 (Maitland Boulevard) to increase capacity and improve mobility. The No-Build Alternative is no longer programmed (funded) for construction. The improvements under the No-Build Alternative, as they relate to this PD&E Study, offer a series of advantages and disadvantages to the study area.

5.1.1 Advantages

- Reduced noise to the homes, businesses and outdoor uses at Lake Lotus Park along SR 414 (Maitland Boulevard) resulting from a new facility. As the No-Build Alternative involves widening and increased traffic to accommodate future traffic demand, additional noise impacts would occur with the No-Build Alternative.
- No increased aesthetic impacts anticipated.
- Less construction impacts with at-grade widening.

5.1.2 Disadvantages

- Multimodal improvements may not be feasible without additional ROW beyond what is needed for roadway widening.
- There would be less efficient movement of people and goods, reducing overall quality of life.
- Congestion would increase on SR 414 (Maitland Boulevard) in later years of the study period.
- No safety enhancements would be realized through reduction of incidences associated with reduced congestion.
- No regional system connectivity would be provided between the existing SR 414 (John Land Apopka Expressway) and I-4.

The previously programmed improvements to SR 414 (Maitland Boulevard) do not meet the capacity requirements for the 2045 traffic demand as discussed in Section 3. The No-Build Alternative is not recommended as it does not meet the purpose and need for the project to accommodate future travel demand and improve system connectivity. However, the No-Build Alternative shall remain under consideration throughout the PD&E Study including the public hearing. The final selection of an alternative considers all impacts as well as the public hearing comments.

5.2 Transportation System Management and Operations Alternative

Transportation Systems Management & Operations alternatives are defined as low capital cost transportation improvements designed to maximize the use and efficiency of the existing transportation system through improved system management that may or may not include capacity improvements. The various forms of TSM&O activities include:

- Traffic signal improvements
- Intersection improvements
- Widening of parallel arterials
- Ridesharing programs
- High occupancy vehicle lanes
- Reversible flow roadway systems
- Transit improvements
- Intelligent Transportation System
- Improvements to signing, marking, and roadway lighting

TSM&O improvements may be considered as part of the Build Alternative, including intersection improvements, ITS improvements, signing, marking and lighting. TSM&O improvements are compatible with the proposed improvements including the addition of high-speed toll lanes and are included in the Build Alternative. ITS enhancements, intersection improvements, and signing, marking, and lighting modifications are being analyzed as part of the Build Alternative.

5.3 Multimodal Considerations

The project study area is served by different modes of travel including public transit service. The multimodal transportation facilities planned or under consideration for the study area are provided in the following.

5.3.1 Transit

No regularly scheduled fixed-service LYNX routes exist along SR 414 in the study area. Just east of the project corridor (at Maitland Summit Boulevard) is the LYNX NeighborLink 652 service, which serves the Maitland SunRail Station and the Maitland Center. The Maitland SunRail Station is located just south of SR 414 approximately 3.5 miles east of the study area. The NeighborLink 652 service operates Monday through Friday during morning and evening peak times. Should LYNX consider extending this service west into the study area in the future, the improved bicycle facilities would enhance access to bus stops and improve multimodal connections to the Maitland SunRail Station and other SunRail stations. Additionally, the improved mobility along SR 414 (Maitland Boulevard) would make bus transit more reliable and feasible along the project corridor.

5.3.2 Bicycle Lanes and Sidewalks

From Bear Lake Road to Gateway Drive, there are 4-foot-wide bicycle lanes adjacent to the outside travel lanes and 5-foot-wide sidewalks separated from the bicycle lanes by a curb and sodded area. The City of Altamonte Springs *City Plan 2030* proposes the addition of bike lanes from Gateway Drive to SR 434 (City of Altamonte Springs 2010). Additionally, MetroPlan Orlando's *2045 MTP Cost Feasible Plan*

includes multimodal (complete streets) improvements along SR 434 from SR 414 (Maitland Boulevard) to SR 436 (MetroPlan Orlando 2021). The I-4 Ultimate Project includes a new bicycle/pedestrian bridge over I-4 accessible from North Lake Destiny Road on the south side of SR 414. The Preferred Alternative includes 7-foot-wide buffered bicycle lanes adjacent to the outside travel lanes in both directions and maintain the existing 5-foot-wide sidewalks.

5.4 Alternatives Analyzed

Build alternatives were developed considering multiple solutions of achieving the project goals of the PD&E Study. The project goals include additional benefits to the community, such as reduced congestion, enhanced mobility options for longer trips, multimodal enhancements, avoidance of ROW impacts to residences, and improved vehicle, pedestrian and bicyclist safety. This can be accomplished by avoiding and minimizing environmental impacts and implementing aesthetic design elements, such as landscaping and lighting.

The development of build alternatives include typical sections, alignments and intersection configurations for the at-grade SR 414 (Maitland Boulevard) and SR 414 Elevated Expressway facilities. Initial options were developed, and a qualitative analysis was conducted to eliminate non-viable options. A quantitative analysis of the viable alternatives was then evaluated to consider environmental effects, ROW needs and cost considerations.

5.4.1 Typical Section and Alignment Analysis

Seven initial alternatives were developed and analyzed as part of this PD&E Study. The evaluation of typical section alternatives is documented in the *Typical Section Technical Memorandum* (CFX 2022I). The typical section analysis considered the feasibility of the proposed typical section for construction. The goal of the typical section evaluation was to identify the viable typical section options with the least overall impacts within the existing ROW.

The following design constraints were considered in the development of typical section and alignment options for the proposed improvements:

- **Right-of-Way:** The proposed typical section options should maximize use of the existing 118 feet (typical) of ROW.
- **Context Sensitive:** Multimodal accommodations for pedestrians and bicyclists should be maintained or improved and should not preclude the opportunity to extend the shared use path on the north side of SR 414.
- Access and Level of Service of Existing SR 414 (Maitland Boulevard): Local access and intersection LOS will be maintained or improved.
- Access Between Existing SR 414 (Maitland Boulevard) and Proposed SR 414 Expressway Extension: Locations of slip ramps will be refined during the alignment alternatives analysis.
- **Emergency Management Access:** All elevated facilities propose outside shoulders of 12 feet for emergency use.
- **Landscaping/Hardscape Features:** For the Preferred Alternative, landscaping features will be provided throughout the corridor and evaluated in the design phase.

Other considerations included the elevated express lanes shoulder width, as the horizontal stopping sight distance for the curve over Bear Lake Road requires additional width to meet the 50-mph criteria.

Alternatives eliminated included an at-grade alternative for the SR 414 Elevated Expressway within the median of SR 414 (Maitland Boulevard) because while it provided uninterrupted travel along the expressway, traffic from the local cross streets would not be able to cross SR 414 (Maitland Boulevard). Another alternative considered included an adjacent corridor to SR 414 (Maitland Boulevard). However, because SR 414 (Maitland Boulevard) is mostly developed, this alternative would result in significant community impacts and was eliminated from further consideration. Another eliminated alternative included individual overpasses at each of the existing intersections. However, because of the limited spacing between each intersection this alternative was not feasible and therefore, eliminated.

Two typical section options were developed for the at-grade SR 414 (Maitland Boulevard) and five typical section options were developed the SR 414 Elevated Expressway. All options include the potential to implement barrier-mounted noise walls (as needed) on the expressway bridges. Two typical sections for the elevated expressway were considered viable alternatives. Each typical section option was qualitatively evaluated, and each option was rated against the following desirable criteria:

- Minimizes cost per mile – estimated costs for the typical section were developed
  - High = Lower cost compared to other alternatives
  - Low = Higher cost compared to other alternatives
- Improves corridor capacity – preliminary modeling was performed to provide comparative daily volume/capacity ratio in the Design Year
  - High = meets capacity demand
  - Low = does not meet capacity demand
- Minimize maintenance lifecycle costs – some options require additional equipment and annual maintenance costs
  - High = inexpensive maintenance
  - Low = expensive maintenance

Table 5-1 describes each typical section and summarizes the results of the qualitative analysis of each.

Table 5-1. Qualitative Evaluation of Typical Section Options

Typical Section Option	Number of Lanes per Direction (Expressway/ Maitland Boulevard)	Improves Corridor Capacity (Volume/Capacity Ratio)	Minimizes Cost per Mile	Minimizes Maintenance Lifecycle Costs	Viable Option
1 – Existing Condition with Bike Lanes	0/2	Low (1.50)	High	High	No, does not meet purpose and need
2 – No-Build Alternative	0/3	Low (1.25)	High	High	No, does not meet purpose and need
3 – Elevated Express Lanes (One Lane per direction)	1/2	Low (1.20)	Medium	High	No, does not meet purpose and need

Table 5-1. Qualitative Evaluation of Typical Section Options

Typical Section Option	Number of Lanes per Direction (Expressway/ Maitland Boulevard)	Improves Corridor Capacity (Volume/Capacity Ratio)	Minimizes Cost per Mile	Minimizes Maintenance Lifecycle Costs	Viable Option
4 – Elevated Express Lanes (Two Lanes per direction)	2/2	High (0.95)	Low	High	Yes
5 – Elevated Express Lanes (Two Reversible Lanes)	2R/2	Low (1.13)	Medium	Medium	No, does not meet purpose and need
6 – Elevated Convertible Express Lanes (Three Lanes with Movable Barrier)	3C/2	Low (1.14)	Low	Low	Yes
7 – Elevated Express Lanes (One Lane per direction) and Three At-grade Lanes per direction	1/3	Medium (1.06)	Medium	High	No, does not provide improved traffic operations compared to Option 4

For the at-grade SR 414 (Maitland Boulevard), all typical section options except the No-Build Alternative would include buffered bicycle lanes and meet FDM criteria. The number of local access lanes on SR 414 Maitland Boulevard varies by alternative as shown in Table 5-1. As a result of the typical section analysis, Typical Section Options 4 and 6 improve the corridor capacity at a low cost per mile and, therefore, were carried forward as viable typical section options.

The alignment analysis was evaluated based on the maximum viable typical section footprint of 118 feet wide and ROW constrained to allow for the pier placement associated with the elevated bridge. To maximize the use of the existing typical section of 118 feet, the proposed alignment for both the at-grade and elevated facilities is along the centerline of the existing ROW. The piers for the elevated SR 414 bridge are proposed within the median of the at-grade SR 414 (Maitland Boulevard) facility.

5.4.2 Interchanges

Because the two interchanges at US 441 and SR 434 in the project corridor were not part of the Preferred Alternative, no interchange alternatives were developed. Modifications to the interchanges result from the elevated expressway typical section. Therefore, refinements to the interchanges are for the purposes of tying back into the existing interchanges.

5.4.3 Intersection Alternatives Evaluation

The Preferred Alternative includes intersection improvements as recommended in the *Project Traffic Analysis Report* (CFX 2022j). Intersection exhibits are presented in the Preliminary Concept Plans (refer

to Appendix A). As a result of these analyses, no roundabouts are recommended in the study corridor and the existing intersection geometry at the cross streets will be maintained. The existing signals will be modified and further evaluated in the design phase to accommodate the proposed SR 414 Elevated Expressway to ensure proper sight distance is provided.

The FDOT's Intersection Control Evaluation process was followed for the study to evaluate potential intersection control types and is documented in the *Project Traffic Analysis Report* (CFX 2022j). Considering the future traffic along SR 414 (Maitland Boulevard) combined with its FDOT context classification of C3R – Suburban Residential (from east of Bear Lake Road to the SR 414 off ramp), all major intersections within the study limits were evaluated for future improvements. The ICE process quantitatively evaluates several intersection control alternatives and ranks these alternatives based on their operational and safety performance.

The first phase of the ICE evaluation resulted in recommending Displaced Left Turn as the best control type for the intersections, except Gateway Drive. However, because of the piers in the median associated with the SR 414 Elevated Expressway, there would be sight distance conflicts associated with the DLT control type. In addition, the DLT configuration would have major ROW impacts to adjacent land uses along SR 414. The ICE screening process requires consideration of environmental issues and constraints at each intersection. While the DLT intersection control type is best for traffic operations at the intersections, because of the ROW impacts and sight safety distance issues, the recommendation is to remain with the existing traffic signal control for all intersections, except Gateway Drive.

Based on traffic forecasts, the intersection of SR 414 and Gateway Drive (west of SR 434) is recommended for signalization prior to the Design Year (2045) for sight distance and safety reasons. A signal is anticipated for Gateway Drive to provide adequate sight distance in consideration of the new grade separated elevated expressway and the associated median piers. Therefore, a Continuous Green T-Intersection is under consideration for Gateway Drive, where the eastbound SR 414 (Maitland Boulevard) traffic has a continuous green cycle for the northbound movement and the eastbound SR 414 traffic to northbound Gateway Drive includes a directional signal for the left turn. The pedestrian crossing along eastbound SR 414 (Maitland Boulevard) would be controlled with a pedestrian-activated signal (to be further evaluated and determined during the design phase).

Table 5-2 presents the results and recommendations of the study's ICE evaluation.

Table 5-2. ICE Evaluation Results

Intersection	Existing Control	ICE Process Recommendation	ICE Considerations	Final Control Type Recommendation	Other Intersection Improvements
Bear Lake Road/Rose Avenue	Traffic Signal	Displaced Left Turn	ROW impacts and sight distance issues because of elevated expressway piers in median	Traffic Signal	Extend WB left-turn lane length from 560 to 675 feet to provide peak storage
Eden Park Road	Traffic Signal	Displaced Left Turn	ROW impacts and sight distance issues because of elevated expressway piers in median	Traffic Signal	Maintain existing turn lanes
Magnolia Homes	Traffic Signal	Displaced Left Turn	ROW impacts and sight distance issues because of elevated	Traffic Signal	Maintain existing turn lanes

Table 5-2. ICE Evaluation Results

Intersection	Existing Control	ICE Process Recommendation	ICE Considerations	Final Control Type Recommendation	Other Intersection Improvements
Road/Lake Lotus Park Drive			expressway piers in median		
Gateway Drive	None	N/A	N/A	Traffic Signal	Provide actuated pedestrian signal

5.5 Viable Alternatives

As a result of the typical section, alignment and intersection configuration evaluations, two viable alternatives were evaluated for the Build Alternative.

Viable Alternative 1 includes:

- SR 414 (Maitland Boulevard): Maintains the pavement footprint of the four-lane facility but shifts and restripes the lanes to provide a 7-foot-wide buffered bike lane; includes Type F curb and gutter in the median with split concrete barrier wall offset 8 feet from the median curb and gutter.
- SR 414 Elevated Expressway: Uses Typical Section Option 4 that constructs a four-lane, grade-separated facility in the existing median with four 12-foot-wide express lanes (two per direction) separated by median barrier.

Viable Alternative 2 includes:

- SR 414 (Maitland Boulevard): Maintains the pavement footprint of the four-lane facility but shifts and restripes the lanes to provide a 7-foot-wide buffered bike lane; includes Type F curb and gutter in the median with split concrete barrier wall offset 8 feet from the median curb and gutter.
- SR 414 Elevated Expressway: Uses Typical Section Option 6 that constructs a three-lane, grade-separated facility in the existing median with three 12-foot-wide express lanes separated by a movable barrier wall across a 12-foot-wide median. Morning peak traffic is controlled by two lanes eastbound and one lane westbound, and afternoon peak traffic is controlled by one lane eastbound and two lanes westbound. A movable barrier would be shifted approximately 12 feet via a specialty vehicle twice daily.

Table 5-3 summarizes the qualitative evaluation for the Build Alternatives.

Table 5-3. Build Alternatives Qualitative Evaluation Summary

Evaluation Criteria	Viable Alternative 1[a]	Viable Alternative 2
	Potential Impacts	
Potential ROW Impacts	None	None
Community Use Parcels Impacted	None	None
Non-Residential Parcels Impacted	None	None
Residential Parcels Impacted	None	None
Potential Non-Residential Relocations	None	None
Potential Residential Relocations	None	None

Table 5-3. Build Alternatives Qualitative Evaluation Summary

Evaluation Criteria	Viable Alternative 1[a]	Viable Alternative 2
	Potential Impacts	
Potential Wetland Impacts	Low	Low
Potential Surface Water Impacts	Low	Low
Potential Contamination Impacts	Medium	Medium
Compatible with Left-Turn Lanes	Yes	Yes
Meets Traffic Demand	Yes	Yes
Elevated Expressway Constructions Costs	High	Medium
Capital/Operating Costs	None	High

[a] Viable Alternative 1 indicates the Build Alternative.

5.6 Recommended Viable Alternative

Viable Alternative 1 construction costs are higher but are offset by Viable Alternative 2's significant capital and operating costs associated with the movable barrier wall. Additionally, greater capacity is provided by Build Alternative 1, which also provides for safer incident management. Therefore, the recommended viable alternative is Viable Alternative 1, which is the Build Alternative. The Build Alternative was presented for public input at the Public Alternatives Workshop held on February 10, 2021.

5.6.1 Refinements

Based on stakeholder input, there is interest in improving multimodal mobility throughout the project corridor. In particular, a connection between Lake Lotus Park and the Seminole Wekiva Trail was desirable for recreational purposes. Additional refinements to the Build Alternative are ongoing to evaluate further bicycle and pedestrian improvements.

5.7 User Benefits

The need for improvements on the existing facility is documented in Section 1.2. Implementing the proposed improvements associated with the Build Alternative will result in the following user benefits:

- Reduce congestion
- Improve safety
- Create mobility choices
- Avoid and minimize environmental impacts
- Reduce emergency service response time

5.8 Relocations

Because ROW is not anticipated, no relocations or displacements of people are expected as a result of the Build Alternative.

5.9 Aesthetics and Landscaping

Aesthetics include consideration of community and environmental character, community values, sensitive areas, visual features and overall compatibility of the project within the regional context. The eastern and western ends of the study corridor include commercial and industrial areas surrounding the interchanges at US 441 and SR 434, while the majority of the corridor includes residential neighborhoods that are mostly accessible from the corridor's intersections. Most residential properties lie behind existing noise walls along SR 414, limiting the view of the existing roadway from many residences. Where SR 414 (Maitland Boulevard) abuts Lake Lotus Park, the roadway is lined by natural landscape to the north that is heavily treed. Just west of Lake Lotus Park on the south side of the roadway is Lake Bosse, which is visible from SR 414 (Maitland Boulevard). The lake is surrounded by trees and residential properties that back up to the lake. A portion of the Seminole Wekiva Trail runs along the north side of SR 414 (Maitland Boulevard) from US 441 to Bear Lake Road. The viewshed from the trail in the project corridor includes a grassy landscape with stormwater ponds, power lines, SR 414 (Maitland Boulevard) and residential neighborhoods. Lake Lotus Park and Lake Bosse are important visual features along the project corridor. The Seminole Wekiva Trail and Lake Lotus Park are sensitive areas to the community, with many bicyclists and pedestrians traveling between the two areas for recreation.

The Build Alternative will change the viewshed along the study corridor with the implementation of the proposed improvements. The new toll lanes are proposed to be elevated approximately 30 feet above the at-grade SR 414 (Maitland Boulevard) along the entire project corridor, altering the viewshed along SR 414 (Maitland Boulevard). The SR 414 Elevated Expressway will be visible above the existing noise walls that currently limit the view of the roadway from many residential neighborhoods along the project corridor. Because of its height, the SR 414 Elevated Expressway will be visible to residences that are distant from the project corridor. The elevated expressway may be visible from Lake Lotus Park where the existing condition does not include a view of a roadway because of the heavily treed landscaping surrounding the park. Depending on the time of day, the SR 414 Elevated Expressway will cast a shadow over the at-grade SR 414 (Maitland Boulevard) travel lanes, sidewalks and bicycle lanes, changing the viewshed for all travel modes using the corridor.

The proposed improvements incorporate enhancements to aesthetics including opportunities for landscaping and hardscaping. Potential hardscape treatments will consist of cosmetic improvements to bridge structures, such as the use of color pigments in the concrete, texturing the surfaces, modifications to fascia walls, beams, and surfaces, or more pleasing shapes for columns and caps. Typical design elements for aesthetic hardscape features are documented in the *Bridge Analysis Technical Memorandum* (CFX 2022b) and will be further evaluated in the design phase. During the design phase, both standard and unique aesthetic enhancements will be considered based on community input.

General guidelines to define potential impacts and provide standards for development of aesthetic treatments have been developed by CFX (2020b), with specific categories including:

- Features/Color Theme/Textures
- Bridge Structures Treatments and Piers
- Existing Landscape/Proposed Mitigation
- Miscellaneous Structures: Noise Walls, Bridge Crash Barriers, Roadway Median Barrier
- Miscellaneous Features: Lighting, Fencing, Maintenance Fences, Fire Protection, Signage

Coordination between FDOT and CFX will continue during the design phase to determine if any aesthetic treatments to existing features along the corridor should be changed and to determine maintenance responsibilities.

5.10 Utility Impacts

Numerous utility companies have utilities located within the project corridor. The existing utilities within the study area are documented in Section 2.1.17. Major utilities, including electric, gas, water, sewer, telecommunications, fiber optics and cable television, currently run within the existing ROW of the SR 414 corridor.

A detailed listing of the existing utilities is documented in the *Utility Assessment Package* (CFX 2022m).

Adjustment of utility services will attempt to minimize major inconveniences to the customers. As a result, mitigation measures to the maximum extent feasible will include the following:

- The accurate location of all underground facilities to confirm a clear or conflict determination
- The accurate location of all aerial facilities to confirm a clear or conflict determination
- An innovative design approach to avoid the utility facilities and minimize impacts
- The Utility Work by Highway Contractor Agreement option for unavoidable relocation of the water and sewer facilities
- Minimizing the duration of unavoidable service disruptions
- Allowing service disruption only during periods of no or minimum usage
- Maintaining utility connections in temporary locations
- Installing alternative or new facilities before disconnecting the existing facilities
- Completion of the necessary utility work prior to the start of roadway construction or prioritize the utility work to avoid the first phases of roadway construction
- Removing Occupational Safety and Health Administration crane conflicts; utilize low overhead construction techniques

Conservative utility relocation estimates were requested as part of the utility coordination process, and subsequent follow-up with the Utility Agency Owners. The total combined estimated cost for relocations regardless of the UAO's potential for reimbursement is $2.3 million.

Additional coordination was held with the utility companies that are identified as requiring relocations including the A-FIRST pipeline (city of Altamonte Springs) and Duke Energy Transmission. During the Study, alternative relocations for these utilities including outside of the project ROW were coordinated and will be further evaluated during design. Coordination efforts are documented in the *Utility Assessment Package* (CFX 2022m) including documentation of construction constraints. Exact locations of existing utilities and the extent of impacts will be determined during the final design phase of this project.

5.11 Safety

The projected traffic in the study area will be better served by the Preferred Alternative with less traffic congestion on the existing roadway network. Because LOS declines are correlated with an increase in roadway crashes, implementing the Preferred Alternative will provide the necessary capacity to meet the projected traffic demand through the Design Year (2045) and result in improved safety versus the No-Build Alternative. Further, the SR 414 (Maitland Boulevard) design speed will be reduced from 55 mph to 45 mph. Research conducted by the Insurance Institute for Highway Safety indicates that

lowering the speed limit by 5 mph on city streets can improve safety for motorists, pedestrians and bicyclists alike (AASHTO 2018a). Therefore, the Preferred Alternative is expected to improve safety for all travel modes along the at-grade SR 414 (Maitland Boulevard). Additionally, the Preferred Alternative will improve emergency response time and facilitate evacuation of the region.

As noted previously, 5-foot-wide sidewalks are located on both sides of SR 414 along with a 4-foot-wide undesignated bicycle lane, west of Gateway Drive. The proposed improvements along SR 414 (Maitland Boulevard) include 7-foot-wide bicycle lanes adjacent to the outside lane in each direction, allowing for a safety buffer between motorized vehicle travel lanes and bicycle lanes.

5.12 Bridge Analysis

A preliminary analysis of the proposed bridge improvements is presented in the *Bridge Analysis Technical Memorandum* (CFX 2022b) and identifies a variety of elevated expressway alternatives. The basis of analyses for existing bridge conditions was limited to field review, available plans and data and latest roadway analyses. Evaluations were performed by considering bridge geometry, vertical clearances, available load ratings, condition ratings, current FDOT and CFX standards and implications of associated impacts the proposed roadway improvements would have on these structures.

5.12.1 Structural Systems

The Build Alternative for the SR 414 Expressway Extension was developed to ensure viable median pier placement adjacent to left-turn lanes and clear spanning of existing intersections. Per *FDOT Design Manual* Section 260.6, a minimum vertical clearance of 16 feet 6 inches must be provided over roadways. A minimum vertical clearance of 14 feet 0 inches is required from face of curb to the lateral offset distance for curb-and-gutter facilities and over the setback distance when a barrier is required. The Draft Typical Section Package (refer to Appendix B) includes minimum vertical clearance locations for the profile development and provides a preliminary sketch of each side street crossing.

A variety of superstructure systems are generally viable for the elevated expressway including Florida-I beams, Florida U-beams, steel plate or steel tub girders and segmental concrete box girders. These alternatives were reviewed for aesthetics, constructability, economic and maintenance of traffic considerations. The significant length of the SR 414 Elevated Expressway bridge lends itself to the economy of scale needed for a segmental box girder alternative. Furthermore, a constant-width cross section and ability to use overhead construction equipment to erect segmental boxes also favors construction within a very tight SR 414 median from a maintenance of traffic perspective. It also provides improved aesthetics. In contrast, an I-girder system, which is generally considered more cost-effective, is also viable but will require the use of mixing concrete and steel girders because of the proposed span configuration needs. Curvature and larger spans will require need for temporary shoring and falsework. This will have greater impact on MOT on SR 414, especially at the intersections. Steel tub girders and concrete U-girders will also require temporary shoring and falsework and also do not appear to provide any cost or aesthetic advantages to the spectrum of I-girder and segmental box girder alternatives considered. Therefore, the evaluation primarily focused on a segmental box girder and an I-girder-type structural system for the Preferred Alternative for the purpose of this document.

5.13 Environmental Analysis

5.13.1 Economic and Community Development

A review of the most recently adopted county comprehensive plans (2030 Orange County Comprehensive Plan and the adopted Seminole County Vision 2020 Comprehensive Plans) was performed for this evaluation. The plans provide a forecast of planned land use changes and economic impacts and help to evaluate the economic impacts related to the proposed improvements.

The adopted 2030 Orange County's Comprehensive Plan shows that the study area is within the County Urban Boundary Area. Approximately half of the study area is within an Orange County Alternative Mobility Area (refer to Figure 2-9). The Orange County AMA is exempt from transportation concurrency requirements and promotes urban development and redevelopment to maximize the use of existing public infrastructure. The proposed project does not include additional ROW that would impact the AMA. Economic enhancement of the AMA is expected because of increased mobility and access to the area. The adopted Seminole County Vision 2020 Comprehensive Plan shows that the study area is within the County Urban Boundary and further notes that SR 434 within the study area is an Urban Corridor. The Urban Corridor incentivizes a mixed development pattern consistent with the Central Florida Regional Growth Vision. The proposed improvements are expected to enhance economic development of the SR 434 Urban Corridor by improving mobility and access to the area.

The SR 414 corridor provides regional connectivity between Orange and Seminole counties (greater Orlando area) and Lake County (Apopka), providing system linkage to designated Strategic Intermodal Systems including SR 429 and I-4. The project improvements will provide enhanced mobility of people and goods along this corridor and may also provide a positive economic effect for regional freight mobility. The project supports regional plans for a transportation network that connects workforce residences with concentrated areas of economic activity. In that way, the limited-access SR 414 facility will facilitate commuting to regional economic centers, including the Maitland Center Office Park located on the eastern end of the corridor, the city of Altamonte Springs and downtown Orlando.

5.13.2 Community Impacts and Cohesion

Community cohesion is a term used to assess the sense of belonging residents feel toward their community or neighborhood. This may include a resident's commitment to the community or attachment to neighbors, community institutions or particular subgroups (FDOT 2020b).

This project involves improvements to the existing SR 414 roadway, which serves as a physical barrier between the north and south sides of the roadway. The roadway already serves as a boundary from which development patterns have established. Therefore, adding limited-access toll lanes to the center of the existing SR 414 will not further isolate a portion of an ethnic group or neighborhood nor further separate residences from any community services facility. Additionally, the project area is divided by the Seminole and Orange County line, which acts as a boundary for county services including schools. The project corridor is mostly a limited-access roadway and has only one median opening (at Gateway Drive) for opposing traffic flow to access adjacent properties. Access to adjacent openings for opposing traffic flow must be done through the existing signalized intersections. The addition of the elevated expressway is not expected to change any existing median openings or intersections. Access to existing community facilities in the Preferred Alternative will be maintained and is anticipated to be similar to the existing condition.

5.13.3 Cultural Resources

An archaeological survey has been performed on the corridor and is documented in the *Cultural Resource Assessment Survey* (CFX 2022c). The survey consisted of a pedestrian survey and systematic shovel testing within the project construction footprint. Extensive ground disturbance from buried utilities, drainage features and development have affected much of the proposed corridor and archaeological testing was constrained to the edges of the SR 414 ROW. A total of 20 shovel tests were performed yielding only one positive result for cultural material: a flake fragment of coastal plain chert was collected from Shovel Test 75 and recorded as an Archaeological Occurrence. An AO by definition is ineligible for consideration in the NRHP.

The architectural survey resulted in the identification and evaluation of 24 historic resources within the SR 414 APE, including two previously recorded resources and 22 newly recorded resources. The previously recorded resources are both linear resources: SCL Railroad (8OR10661) and the Orange Blossom Trail (OR11516). The newly recorded resources include one resource group, Monroe Manor Subdivision (8OR11668), and 21 structures. No existing or potential historic districts were identified. Based on the results of the current survey, both linear resources are recommended as ineligible for consideration in the NRHP as neither maintain enough historic integrity. Monroe Manor is also not recommended for consideration in the NRHP neither individually nor as a contributing resource to a historic district, as the historic buildings within the group are not excellent examples of the architectural styles they represent nor associated with a prominent architect.

Based on the results of the archaeological and historical survey, the SR 414 Expressway Extension will have no effect on listed cultural resources or cultural resources eligible for listing in the NRHP. No further analysis is recommended.

5.13.4 Parks and Recreation

As noted previously, Lake Lotus Park is a nature preserve owned and operated by the city of Altamonte Springs, located adjacent to SR 414 to the north. The preserve encompasses approximately 150 acres including 120 acres of woods and wetlands, and includes picnic areas, an enclosed pavilion, an education center and a 1-mile-long trail. A minor grade-separated overpass exists over the Little Wekiva Canal to allow for an access road between the Lake Lotus Park and Ride lot and Lake Lotus Park.

The proposed improvements are not anticipated to encroach upon the park boundary. However, the Preferred Alternative will change the viewshed from the park grounds as the elevated expressway will be visible from the park where the existing condition does not include a roadway view. Additionally, increased traffic noise within the park grounds is anticipated.

5.13.5 Pedestrian and Bicycle Facilities

As noted previously, 5-foot-wide sidewalks are located on both sides of SR 414 along with a 4-foot-wide undesignated bicycle lane, west of Gateway Drive. Bicyclists will benefit from the improved bicycle lanes that are part of the Preferred Alternative. Proposed improvements include 7-foot-wide bicycle lanes adjacent to the outside lane in each direction, allowing for a safety buffer between motorized vehicle travel lanes and bicycle lanes. The improvements will give bicyclists safer access to nearby transit and to the existing Seminole Wekiva Trail along the north side of the corridor just west of Bear Lake Road as well as planned trails that allow for further regional mobility including the Florida Coast-to-Coast Trail and Pine Hills Trail. Pedestrian mobility will remain the same as the existing condition. Stakeholder

comments include sidewalk widening or consideration of a shared use path along the north side of the corridor. Because of the limited ROW, the proposed improvements do not include enhancements to the existing sidewalks and therefore the pedestrian mobility will remain the same as the existing condition.

5.13.6 Wetlands

The estimated wetland impacts for the proposed improvements are provided in the *Natural Resources Evaluation Report* (CFX 2022g).

For the Preferred Alternative, approximately 1 acre of wetlands and less than 0.5 acre of surface water impacts are expected to wetland systems considered jurisdictional by the FDEP State 404 Program and SJRWMD. The wetlands are mixed forested and herbaceous wetland communities. These wetlands have been impacted by the existing SR 414 and adjacent infrastructure. Nuisance/exotic vegetation and vines have become established along the edge. The surface waters contain emergent aquatic vegetation and mixed scrub-shrub species. These have also been impacted by the existing SR 414 and adjacent infrastructure.

Potential direct impacts to mixed forested wetlands are extremely minor and result from the placement of fill as well as the placement of support piers for the proposed elevated roadway associated with the existing bridge over Lake Bosse. Surface water impacts include the south side and north side of Little Wekiva Canal and result in less than 0.5 acre of impacts. This system is channelized on the south side of SR 414 and forms a natural stream profile on the north side of SR 414.

Potential indirect impacts anticipated to occur as a result of the Preferred Alternative may include shading and light from the elevated roadway structure. Potential indirect impacts will be assessed during the design and permitting phase when more design elements are known. Secondary impacts of migrating edge effects will likely occur. At locations where natural areas meet development, edge effects such as increased cover of nuisance/exotic vegetation and changes in microclimate generally take place. The wetlands within the Preferred Alternative project footprint already experience edge effects because of the existing SR 414 road surface and infrastructure. While the severity of these edge effects should not increase, it is expected that these effects would migrate to the new transitional area between remaining wetlands and new construction. Because of to the developed nature of the surrounding area, no cumulative impacts are anticipated to occur.

Avoidance and minimization measures have been conducted through the selection of the Preferred Alternative. Coordination will be ongoing through the PD&E Study and subsequent design phases for permitting potential impacts. All necessary measures will be taken to avoid and/or minimize impacts to wetlands to the greatest extent practicable during project design. Proposed stormwater treatment facilities will be prepared to meet the required stormwater water quality and quantity criteria.

The project area is in an SJRWMD Riparian Habitat Protection Zone associated with the Wekiva River Hydrologic Basin. Future coordination with the SJRWMD will be required to address potential impacts of 0.23 acres to the RHPZ during design and permitting phases of the Alternative.

CFX will address wetland and/or surface water impacts and provide appropriate wetland mitigation in future phases of this project. Practicable measures to avoid or minimize impacts will be further addressed during final design for the project. Best Management Practices will be used for erosion control during construction to minimize impacts to any wetlands and surface waters that are affected by the proposed project, and unavoidable impacts to wetlands and surface waters will be mitigated

pursuant to 373.4137 Florida Statutes to satisfy all mitigation requirements of Part IV, Chapter 373 Florida Statutes and *United States Code* Title 33, Section 1344, should state and/or federal regulations require it. Therefore, no substantial impacts to wetlands and/or surface waters are anticipated as a result of the Preferred Alternative.

5.13.7 Threatened and Endangered Species and Habitat

Wildlife habitat with potential to support protected wildlife species occurs within the study area, including wetland and upland habitat comprising an RHPZ surrounding Little Wekiva River, downstream of SR 414 (Maitland Boulevard). The highest quality wildlife habitat within the study area is associated with Lake Lotus Park, which contains forested wetlands, marshes and upland forested systems. A complete evaluation of the Threatened and Endangered Species is in the *Natural Resources Evaluation Report* (CFX 2022g).

The majority of the Preferred Alternative impacts will be to Roads and Highways (FLUCCS 8140) and Surface Water Collection Basins (FLUCCS 8370); these land uses are already developed and comprise approximately 80 percent of the existing project area. The remaining impacts are to natural habitats including Non-forested Uplands (FLUCCS 3000 series) and Forested Uplands (FLUCCS 4000 series), Surface Waters (FLUCCS 5000 series) and Wetlands (FLUCCS 6000 series), with the potential for the largest area of impact to Herbaceous Uplands Non-forested.

Indirect, secondary and cumulative impacts associated with the proposed project would be minor because a roadway already exists. Farther from the roadway, in areas currently designated for potential offsite stormwater treatment, secondary impacts of increased nuisance/exotic vegetation are anticipated.

5.13.7.1 Federally Listed Species

Federally listed species that may be affected, but are not likely to be adversely affected by the project include the Eastern indigo snake (*Drymarchon corais couperi*) and wood stork (*M. americana*).

The project is anticipated to have no effect on the following federally listed species:

- Sand skink (*N. reynoldsi*)
- Florida scrub-jay (*A. coerulescens*)
- Red-cockaded woodpecker (*D. borealis*)
- Everglade snail kite (*R. sociabilis plumbeus*)

None of the above listed species was observed during the field visit.

5.13.7.2 State Listed Species

Animal species included on the *Florida's Official Endangered and Threatened Species* list, maintained by the FWC and are protected by Florida state law, Title 68A-27 of the Florida Administrative Code.

There is no adverse effect anticipated on the following state-protected species:

- Gopher tortoise (*G. polyphemus*)
- Florida sandhill crane (*A. pratensis canadensis*)
- Southeastern American kestrel (*F. sparverius paulus*)
- Wading birds including the little blue heron (*Egretta caerulea*) and roseate spoonbill (*Platalea ajaja*)

There is no effect anticipated on the following state-protected species:

- Short-tailed snake (*L. extenuate*)
- Florida pine snake (P. melanoleucus mugitus)
- Florida burrowing owl (Athene cunicularia floridana)

None of the above listed species was observed during the field visits. The project will have no effect on the bald eagle (*Haliaeetus leucocephalus*) or various state-protected bat species. There is no adverse effect anticipated to the Florida black bear (*Ursus americanus floridanus*). These two species or groups of animals that may occur in the project vicinity are not listed as threatened, endangered or species of special concern but receive other legal protection.

5.13.7.3 Protected Plant Species

Based on USFWS online information, 11 federally listed plant species have the potential to occur along the project corridor if suitable scrub habitat were present. Near the existing roadway, the dominant vegetation is bahia grass (*Paspalum notatum*), which is regularly mowed. The project area is highly urbanized with some vegetated areas near potential offsite pond locations. However, they have been impacted by their proximity to the existing roadway. Therefore, there is no effect on the 11 federally protected plant species, with narrow habitat requirements for sandhills, scrub and scrubby flatwoods, which are absent from the Preferred Alternative area.

5.13.8 Mitigation Measures

The following mitigation measures are proposed to minimize any adverse impacts to address protected species and wetlands-related impacts including:

- Best Management Practices will be used for erosion control during construction to minimize impacts to any wetlands and surface waters that are affected by the proposed project.
- Unavoidable impacts to wetlands and surface waters will be mitigated pursuant to 373.4137 FS to satisfy all mitigation requirements of Part IV, Chapter 373 FS and 33 USC 1344 should state and/or federal regulations require it.
- If necessary, CFX will implement the USFWS-approved Standard Protection Measures for the Eastern Indigo Snake during design and construction for the protection of the Eastern indigo snake. These measures specify education of the contractor concerning avoidance of indigo snakes and post-construction reporting.
- CFX will follow the FDOT Supplemental Standard Specification 7-1.4.1 Additional Requirements for the Florida black bear to minimize human-bear interactions associated with construction sites during project construction.
- A gopher tortoise burrow survey within suitable tortoise habitat will be conducted prior to construction.
- Impacts to suitable foraging habitat for the federally protected wood stork will be mitigated through the purchase of wetland credits from a USFWS-approved mitigation bank pursuant to Section 373.4137, FS, or as otherwise agreed to by CFX and the appropriate regulatory agencies.
- Practicable measures to avoid or minimize impacts will be further addressed during final design for the project.

- During the permitting phase, any required species-specific surveys will be determined after the Preferred Alternative is identified and coordination with USFWS will take place as applicable.

5.13.9 Essential Fish Habitat

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act of 1996 (50 Code of Federal Regulations Section 600.920), as amended through January 12, 2007, and as administered by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service, federal agencies must consult with NMFS regarding any of their actions authorized, funded or undertaken, or proposed to be authorized, funded or undertaken that may adversely affect essential fish habitat. As stated in the PD&E Manual Part 2, Chapter 17, NMFS has designated FDOT to conduct EFH consultations in Florida pursuant to 50 CFR § 600.920(c) in a July 19, 2000, letter to Federal Highway Administration and FDOT.

No EFH is documented within or adjacent to the project limits; therefore, no EFH will be impacted.

5.13.10 Air Quality

An air quality analysis is being performed for the Opening Year (2025) and Design Year (2045) for the proposed improvements. The analysis is documented in the *Air Quality Technical Memorandum* (CFX 2022a).

The project is in an area that is designated attainment for all National Ambient Air Quality Standards under the criteria provided in the Clean Air Act. Therefore, the Clean Air Act conformity requirements do not apply to the project.

5.13.11 Noise

A traffic noise study was performed in accordance with Code of Federal Regulations, Title 23, Part 772 (23 CFR 772) Procedures for Abatement of Highway Traffic Noise and Construction Noise using methodology established by FDOT in the PD&E Manual, Part 2, Chapter 18 (June 2020) and FDOT's *Traffic Noise Modeling and Analysis Practitioners Handbook* (FDOT 2018). The analysis is documented in the *Noise Study Report* (CFX 2022h).

The purpose of the noise study was to identify noise-sensitive sites that would be impacted with the proposed project and evaluate abatement measures at impacted noise-sensitive sites. The field measurements for sound along the project corridor were obtained at two locations: eastbound side of SR 414 south of the Rose Pointe subdivision and eastbound side of SR 414 on Oranole Road. These field measurements were used as inputs into a computer model used to predict existing as well as future design year traffic noise levels with and without proposed roadway improvements. Traffic noise levels were predicted for the project's existing year (2019) and the design year (2045) No-Build and Preferred Alternatives. Within the study area, the following four types of land use have the potential to be impacted by traffic noise—residences, recreational areas, a trail and the exterior use of an office building.

Existing FDOT highway traffic noise barriers stand between SR 414 and most of the residential areas along the project corridor. The barriers were considered in the noise analysis of the No-Build Alternative and the Preferred Alternative. The locations of the noise barriers are presented in Attachment 2 and exist at residential subdivisions. Two noise barrier scenarios were evaluated: the first scenario would provide a noise barrier inside the SR 414 ROW and the second scenario would provide both a noise

barrier inside the ROW and a noise barrier on the edge of the elevated toll facility (that is, on structure). The noise barrier within the SR 414 ROW was evaluated at heights ranging from 8 to 22 feet, and the noise barrier on the edge of the elevated toll facility was evaluated at a height of 8 feet, following the requirements of FDOT's Noise Policy. In the existing condition (year 2019) with the existing roadway geometry, traffic noise is predicted to range from 37.7 to 76.3 decibels. The project's traffic noise is predicted to range from 40.5 to 78.3 dB(A) for the design year (year 2045) No-Build Alternative with the programmed improvements to SR 414. Finally, traffic noise is predicted to range from 44.0 to 76.5 dBA with the Preferred Alternative. The predicted traffic noise levels associated with the Preferred Alternative in 2045 would approach, meet or exceed the noise abatement criteria, but the levels are not predicted to increase substantially (that is, greater than 15.0 dB(A) over existing levels).

The results of the highway traffic noise analysis indicate that the Preferred Alternative would impact 46 properties with residential land use and the Seminole Wekiva Trail in the design year (2045). Noise abatement measures evaluated for the impacted properties included traffic management measures, alignment modifications, buffer zones and noise barriers. However, further evaluation indicates that a noise barrier inside the ROW (Scenario 1) may be feasible and reasonable for 10 of the 46 impacted residences. These 10 properties are associated with the Rose Pointe subdivision located on the south side of SR 414 just east of the US 441 interchange (refer to Attachment 2 for the potential noise barrier location). There appear to be no feasible and reasonable measures to abate predicted traffic noise impacts for the remaining 36 residences or the Seminole Wekiva Trail. Table D-1 provides further details of the potential noise barrier associated with the Preferred Alternative.

Construction of feasible and reasonable noise abatement measures at the noise-impacted locations identified in Table 5-4 are contingent upon the following conditions:

- Detailed noise analyses during the final design process support the need, feasibility and reasonableness of providing abatement.
- Cost analysis indicates that the cost of the noise barrier(s) will not exceed the cost reasonable criterion.
- Community input supporting types, heights and locations of the noise barrier(s) is provided to CFX.

Table 5-4. Summary of the Potential Noise Wall included in the Preferred Alternative

Noise-Sensitive Area	Number of Impacted Receptors	Proposed Barrier Height/ Length (feet)	Preliminary Noise Barrier Location	Number of Benefited Receptors [a]		Total Cost of Barrier [b]	Cost Per Benefited Receptor [c]
				Impacted	Total		
Rose Pointe Subdivision	14	16 / 807	Inside ROW along SR 414 Maitland Boulevard	10	10	$387,360	$38,736

[a] Receptors with a predicted reduction of 5 dB(A) or more are considered benefited.

[b] Estimated cost based on a unit cost of $30 per square foot.

[c] FDOT cost reasonable criterion is $42,000 per benefited receptor

5.13.12 Contamination

The CSER identified 19 sites that have some risk of contamination impacts to the project. However, only four sites were assigned a Medium Risk rating, including historical citrus groves (Site 19), which are

located sporadically throughout the project corridor. Additionally, eight pond site alternatives were evaluated, where three were assigned a Medium Risk rating.

Medium Risk sites are recommended for Level II Impact to Construction Assessments, including soil and groundwater testing, if ROW acquisition or subsurface work is proposed on or adjacent to them. Level II Assessments may be required for the Medium Risk pond sites, depending on the final pond locations and configurations.

6. Public Involvement and Project Coordination

A comprehensive Public Involvement Program was initiated as part of this PD&E Study. The following sections summarize the public involvement and project coordination activities completed during this study.

6.1 Agency Comments

An Advanced Notification Package was prepared by CFX and distributed through the Florida State Clearinghouse on April 27, 2020. The AN Package included a Preliminary Environmental Discussion to give stakeholders an opportunity to provide input and become involved in the project. The AN was distributed to 62 stakeholders. As a result of the AN distribution, nine comments were received. Table 6-1 summarizes agency/stakeholder comments received.

Table 6-1. AN Comments Received

Stakeholder/Agency	Comment Date	Comment Summary
Florida Department of Environmental Protection	4/27/20	Confirmed AN Package received.
MetroPlan Orlando	4/28/20	I have reviewed the attached information and have no specific questions or comments.
Orange County Transportation Planning Division Planning, Environmental and Development Services Department	5/21/20	Signal maintenance: ▪ Existing signals owned by FDOT; maintained by Seminole County ▪ I-4 Ultimate improvements; local road signal at SR 434 to be maintained by City of Maitland Signal inspection ▪ Future interagency agreements and coordination Assessment/ documentation: ▪ Water quality and quantity impacts; floodplain; infrastructure related to stormwater utilities
City of Altamonte Springs City Engineer	6/1/20	Support for project need. Recreation Areas: ▪ Working with FDOT to take ownership of Lake Lotus Park parking lot – Critical that the amount of parking in this area is not decreased as a result of this project. – Tram access under the SR 414 bridge will need to be maintained. ▪ Continue coordination with Orange County who is moving forward with an improvement to the Little Wekiva River adjacent to Lake Lotus Park parking area. Please be sure to take into account the design of this project into your study as well. ▪ A connection between Lake Lotus Park and the Seminole Wekiva Trail would be very beneficial for recreational purposes; Please consider providing a multi-use path that is at least 10 feet wide on the north side of the corridor.
Southeast Regional Office, Habitat Conservation,	6/4/20	▪ The project is likely to impact forested and herbaceous freshwater wetlands, marshes and surface waters.

Table 6-1. AN Comments Received

Stakeholder/Agency	Comment Date	Comment Summary
National Oceanic and Atmospheric Administration Fisheries | U.S. Department of Commerce		▪ There will be no impact to Essential Fish Habitat or federally managed fisheries in the unnamed wetlands, nor impacts to Endangered Species Act listed species under National Marine Fisheries Service purview. ▪ Construction activities may impact adjacent wetlands through sedimentation and runoff; to minimize these impacts, NMFS recommends the applicant utilize best management practices. ▪ Mitigation for unavoidable impacts to freshwater wetlands should be offset by purchasing appropriate credits from a mitigation bank, or through another suitable mitigation strategy to ensure functional values are offset in the same watershed as the impact.
Office of the Regional Administrator, U.S. Environmental Protection Agency, Region 4, NEPA Section, Chief Strategic Programs Office	6/11/20	▪ EPA recommends that new or enhanced stormwater management facilities be considered to maximize the collection and treatment of stormwater to prevent receiving waters from experiencing secondary impacts from the proposed new construction. ▪ EPA suggests that CFX consider the potential adverse effect of construction, urban runoff and hydrologic modifications on surface and groundwater and the potential benefits of wetlands such as absorption of various pollutants, including excess nutrients and sediment, before these pollutants reach rivers, lakes and other water bodies. Where applicable, EPA also recommends that CFX consider vegetated buffers or filter strips along stream corridors to stabilize the banks, trap sediments and nutrients and reduce peak flows. ▪ EPA recommends meaningful public involvement that enables transportation professionals to develop systems, services and solutions that meet the needs of the community and the vulnerable populations that potentially may be temporarily or permanently impacted by the project. We also recommend that CFX consider strategies to help communicate effectively with Limited English Proficiency individuals within the affected community.
Florida State Clearing House Coordinator	6/18/20	▪ Florida State Clearinghouse staff has reviewed the proposal under the following authorities: Presidential Executive Order 12372; § 403.061(42), Florida Statutes; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321-4347, as amended. ▪ The state has no objections to the subject project and, therefore, it is consistent with the Florida Coastal Management Program. ▪ Please refer to comments provided earlier by state agencies during the Efficient Transportation Decision Making review period. ▪ The state's final concurrence of the project's consistency with the FCMP will be determined during any environmental permitting processes, in accordance with Section 373.428, Florida Statutes.
Historic and Cultural Preservation Department Cultural Resource Specialist Muscogee (Creek) Nation	6/23/20	We would definitely like to engage in government-to-government consultation once or if this undertaking will acquire federal involvement.
Owner of CVS at SR 414 and Bear Lake Road	5/19/20	Seeking information as to a sign in the median of SR 414 detailing closures

6.2 Advisory Group Coordination

Additional agency coordination and outreach for the project is also facilitated through the development of special advisory groups for the project that include an Environmental Advisory Group and a Project Advisory Group. The EAG provides input on potential environmental impacts as a result of the project alternatives. The PAG provides input in the project alternatives and informs the project team of local knowledge, issues and concerns. The project study team met with each advisory group separately on December 8, 2020, and August 31, 2021, which included 15 EAG members (45 total EAG members) and 11 PAG members (49 total PAG members). The following describes general input received from each advisory group.

6.2.1 Summary of EAG Input – December 8, 2020

- General consensus that an elevated facility would reduce natural environment impacts.
- Ongoing sedimentation issue with the Wekiva River should be addressed.
- Adjacent residential properties are close to the corridor, which could be challenging.
- Deep geological feature in the segment of the alignment east of Lake Bosse that could cause design challenges.
- Questioned the possibility to extend the elevated expressway to I-4.
- Existing 5-foot-wide sidewalk should be wider because SR 414 is a busy road; requested an 8-foot- to 12-foot-wide sidewalk for future access and connectivity.
- Minority populations noted on both sides of Maitland Boulevard and concerns for air quality effects on those populations as well as to pedestrians and nearby green spaces.
- Prioritize high-performing native plants and plants local to this region; consider mowing schedules that balance driver visibility needs and the needs of native plants; plant no more than 20 percent of each plant genus in an area to improve diversity.
- Noted that the U.S. Army Corps of Engineers is going through a period of flux, but based on the latest available information does not appear that any waters within the study area are under the jurisdiction of the USACE.
- Orange County currently preparing for a water quality improvement project at Magnolia Homes Road, east of Lake Lotus parking area; concerned that stormwater from the proposed project may impact their project.
- Do not want to see any new stormwater ponds between Lake Bosse to Lake Lotus Park.

6.2.2 Summary of EAG Input – August 31, 2021

- Consider porous pavement opportunities and lighting that does not affect insect populations.
- Consider incidental take permits instead of mitigation banks for wetland impacts.
- Wildlife fencing does not appear feasible because of constraints.
- As the study progresses, it should be noted that FDEP is currently updating the stormwater design and operation regulations for environmental resource permitting.

6.2.3 Summary of PAG Input – December 8, 2020

- Lake Lotus Park includes parcels set aside for mitigation and should be considered a constraint.

- Buffered bike lanes should be included on Maitland Boulevard.
- Concern about bicyclist safety on bike lanes at the current posted speed of 50 mph on Maitland Boulevard.
- Consider a bicycle/pedestrian connection from Lake Lotus Park to the Seminole Wekiva Trail.
- Questioned access to the elevated facility from SR 434 and US 441; suggested additional signage to alert drivers on how to access SR 434 from the elevated expressway.
- Questioned if lighting would be present underneath the elevated expressway for Maitland Boulevard.
- Concern regarding additional weaving movements associated with the I-4 Ultimate project and if this project would exacerbate the problem.
- Potential utility conflict with the Seminole County water main on the north side of Maitland Boulevard.
- Concern regarding the visual impacts from the height of the elevated expressway.
- Bicycle connections east of SR 434 and the ability for this project to address the lack of bicycle connectivity in that area.
- Seminole/Orange County boundary runs along Maitland Boulevard in the study area; students living south and north of the study area do not need to cross Maitland Boulevard to access their schools.
- Project noted as a good connection between SR 429 and I-4.
- Questions on cost of projects and toll implementation.

6.2.4 Summary of PAG Input – August 31, 2021

- Existing interconnected potable water main with Orange County near Bear Lake Road.
- Appreciated the close coordination and communication throughout the project.
- Please continue to coordinate with FDOT regarding A-FIRST pipeline impacts.
- Request monitoring of sedimentation issues associated with Little Wekiva River and potential to return area to pre-construction conditions.

6.3 CFX Environmental Stewardship Committee

The CFX Environmental Stewardship Committee's primary function is to assist the CFX Board in fulfilling its responsibilities by providing oversight and guidance for the protection of the natural environment through conservation and sustainable practices. The ESC meets as required to review projects and programs designed to support the responsible use and protection of the natural environment and provide guidance to CFX staff and consultants. The following summarize the ESC comments on this project.

6.3.1 Summary of ESC Input – October 2020

- Updated Stakeholder list
- Erosion issues surrounding Little Wekiva Canal
- Evaluate trail connectivity opportunities
- Minimize impacts to wetlands and habitats associated with Lake Bosse and Lake Lotus
- Geotechnical and archaeological issues associated with Lake Bosse bridge

- Noise and aesthetic impacts to surrounding residents

6.3.2 Summary of ESC Input – June 2021

- Preliminary per mile cost for elevated viaduct and bridge construction

6.3.3 Summary of ESC Input – August 19, 2021

- Motorist access to express lanes from US 441 and SR 434
- Minimize wetland and surface water impacts
- Traffic incident maintenance of traffic consideration
- Motioned to approve Preferred Alternative for CFX Board approval

6.4 Summary of Public Meetings

6.4.1 Alternatives Public Workshop

A virtual Alternative Public Workshop was held on Wednesday, February 10, 2021, from 6:00 p.m. to 7:30 p.m. using the ON24 platform. The virtual meeting was held to allow the community to view study information and submit their comments regarding project alternatives and other study materials.

Public meeting invitation letters were sent on Tuesday, February 16, 2021, by email to 49 elected officials and their aides, as well as to 66 local, regional, state, and federal agency contacts. They were also mailed to 1,671 property owners and tenants along the corridor and 14 people who asked to be added to the study's mailing list.

A total of 104 attendees signed into the ON24 platform for the alternatives public workshop. A total of 151 total questions and comments were received through the ON24 Q&A chat function. Most questions or comments were from residents seeking clarification about what to expect regarding construction timeline, noise mitigation and various safety precautions for homes, drivers, and pedestrians. Public meeting comments received during the Alternative Public Workshop were considered in the evaluation of the project alternatives.

6.4.2 Public Hearing

A hybrid Public Hearing was held on March 31, 2022, to provide the public an opportunity to view the study information and express their views concerning the location, conceptual design, and potential environmental impacts of the proposed improvements. The hybrid Public Hearing included two options for interested parties to attend, either in-person or virtual. The in-person hearing took place at the Wekiva High School (2501 Hiawassee Road, Apopka FL, 32703) from 5:30 p.m. to 7:30 p.m., and included an informal open house in the school's cafeteria where participants could view displays, watch a looped video presentation, submit comments, and discuss comments or questions with the study team representatives between 5:30 p.m. and 6:30 p.m. The Public Hearing presentation and oral comment period was held in the school's auditorium from 6:30 p.m. to 7:30 p.m., which included a recorded presentation on the study and a comment period where audience members could provide oral comments to CFX representatives. The Public Hearing presentation and oral proceedings were recorded by a court reporter and are provided in a verbatim transcript in the project files. A simultaneous virtual session was hosted from 5:30 p.m. to 7 p.m. through an online meeting platform, ON24. Participants were able to view a presentation about the study, discuss comments or questions with the study team representatives and submit comments through the platform's chat box. Participants were asked if they wanted their comments read aloud to CFX representatives during the in-person Public Hearing.

The Public Hearing invitation letters were mailed on Tuesday, February 22, 2022, to 1,747 property owners and tenants along the corridor, as well as 14 people who asked to be added to the study's mailing list. Invitations were also emailed to 49 elected officials and their aides, 66 local, regional, state, and federal agency representatives, and 120 other interested parties. Details of the Public Hearing were also posted on the study webpage and at CFX Headquarters.

This study's draft environmental and engineering reports were placed on public display between February 28, 2022, and April 14, 2022, on the study's webpage and at the following locations:

- Central Florida Expressway Authority
  4974 ORL Tower Road, Orlando, FL 32807
- Seminole State College
  Altamonte Springs Campus Library
  850 South SR 434, Altamonte Springs, FL 32714

The PD&E Study documents were also available for review at the in-person Public Hearing.

A total of 158 attendees attended either the virtual or in-person Public Hearing. Of those attendees, 84 individuals signed in at the in-person meeting and 74 attended the virtual meeting. A total of 83 written or oral comments were received during the public comment period that ended on April 11, 2022, as follows:

- 10 comment cards (in-person Public Hearing during Open House)
- 2 verbal comments to the court reporter (in-person Public Hearing during Open House)
- 15 verbal comments (in-person Public Hearing oral proceedings)
- 23 virtual comments
  - 13 read aloud (in-person Public Hearing oral comments)
- 33 comments via email

Based on the comments received during the public comment period, the majority of the comments involved similar themes including support for traffic relief and reducing congestion with the proposed travel lanes, support for maintaining existing access to neighborhoods as proposed, noise concerns with existing noise and future noise levels, concerns about property values decreasing as a result of the proposed project, enhanced aesthetics and landscaping as potential mitigation, and bicyclist safety concerns with no physical barrier between the travel lanes and pedestrian safety concerns with the existing sidewalk width and minimal existing distance between the curb and the sidewalk. More detail on the public comments received as part of the official Public Hearing comment period are provided under separate cover in the project's Comments and Coordination Report.

7. Preferred Alternative

This section summarizes the results of the preliminary design analysis that includes a discussion of the Preferred Alternative (refer to Appendix A and B).

7.1 Typical Sections

7.1.1 Roadway Typical Sections

The proposed four-lane typical for at-grade SR 414 (Maitland Boulevard) maintains the pavement footprint of the existing four-lane facility but shifts and restripes the lanes to provide a 7-foot-wide buffered bike lane and proposed Type F curb and gutter in the median. Cross slope correction/overbuild is anticipated to shift the crown 4 feet to provide 3 percent slope across the outside lane. The proposed design speed is 45 mph.

The greatest change for at-grade SR 414 (Maitland Boulevard) will be the reconstruction of the existing grassy median. The proposed median will contain a continuous median barrier to provide pier protection and will be paved because the sunshade of the viaduct precludes vegetative landscaping opportunities. The Preferred Alternative proposes split concrete barrier wall offset 8 feet from the median curb and gutter. The concept maintains or improves all turning movements. The left-turn lane typical provides 11-foot-wide left-turn lanes in the median and the resulting barrier wall offset is reduced to 2 feet adjacent to the left-turn lane and 5 feet on the opposite side of the median.

The Draft Typical Section Package (refer to Appendix B) details the variety of shoulder treatments that are proposed such as curb and gutter, paved shoulder and shoulder barrier wall. The existing ramps at the US 441 Interchange and SR 434 have been designed to meet or exceed their existing design speed. The proposed access ramps create a new connection to/from SR 414 Expressway Extension to/from at-grade SR 414 (Maitland Boulevard) and the design speed is 50 mph. Table 7-1 provides ramp descriptions and design speeds.

Table 7-1. Preferred Alternative Ramp Summary

Ramp Name	Description (Interchange: Ramp Movements)	Design Speed
Ramp A	434/SR 414 (Maitland Boulevard): WB Entrance Ramp	40 mph
Ramp B	434/SR 414(Maitland Boulevard): EB Exit Ramp	40 mph
Access Ramp A	434 Access Ramp A from WB SR 414 (Maitland Boulevard) to SR 414 (Maitland Boulevard)	Varies 45 to 50 mph
Access Ramp B	434 Access Ramp B from EB SR 414 (Maitland Boulevard) to EB SR 414 Expressway	Varies 45 to 50 mph
Ramp W	441/SR 414 (Maitland Boulevard): EB Entrance Ramp	45 mph
Ramp X1	441/SR 414 (Maitland Boulevard): WB Exit Ramp	45 mph

Table 7-1. Preferred Alternative Ramp Summary

Ramp Name	Description (Interchange: Ramp Movements)	Design Speed
Access Ramp W	441 Access Ramp W from EB SR 414 Expressway to SR 414 (Maitland Boulevard)	Varies 45 to 50 mph
Access Ramp X	441 Access Ramp X from WB SR 414 (Maitland Boulevard) to SR 414 Expressway	Varies 45 to 50 mph

7.1.2 Bridge Typical Sections

The Preferred Alternative consists of an elevated SR 414 Expressway in the median from east of US 441 to west of SR 434, with four 12-foot-wide express lanes (two lanes per direction) separated by a median barrier wall. The viaduct does not have any structural impacts to the existing bridge at US 441. The viaduct requires modifications to the existing six-span SR 414 bridge over Lake Bosse. The viaduct will straddle the existing SR 414 bridge over Little Wekiva Canal using pier placements beyond existing bridge and approach slab ends. The existing lane and shoulder configuration on the SR 414 bridge over SR 434 will be modified to accommodate the express lanes and the auxiliary on/off lanes to the at-grade SR 414 (Maitland Boulevard). Minimum vertical clearance of 16 feet 6 inches will be provided in accordance with FDOT requirements. Preliminary intersection spans are shown in the Draft Typical Section Package (refer to Appendix B), and proposed bridge characteristics are listed in Table 7-2.

7.1.2.1 SR 414 Elevated Expressway Extension

The proposed SR 414 Elevated Expressway Extension is more than 1.67 miles (8,842 feet) long. The elevated expressway will cross four intersections (at Bear Lake Road/Rose Avenue, Eden Park Road, Magnolia Homes/Lake Lotus Park Road and Gateway Drive), and it will span two water features (at Lake Bosse and Little Wekiva Canal). The alignment will follow the existing SR 414 alignment in the median, which includes a curved alignment at the beginning of the viaduct followed by a generally tangent alignment to the eastern terminus. The anticipated span configuration is based on economical ranges for applicable structures type and constructability considerations. Span selection at Lake Bosse required particular attention based on knowledge from challenges faced at the time of its original construction. The proposed substructure includes hammerhead piers supported on a pile cap and deep pile foundations. Final configuration of the pile cap, number and type of piles will vary throughout the alignment based on span and site conditions.

7.1.2.2 SR 414 Over Lake Bosse

The proposed typical section for the crossing over Lake Bosse includes modification to the existing bridge by removing almost 40 feet of the structure in the median. This includes converting the existing single bridge at Lake Bosse into two separate bridges. The resulting bridges will each provide 6-foot-wide inside shoulders, 8-foot-wide outside shoulders and two travel lanes per direction. The existing 5-foot-wide sidewalks would remain on each side. Lake Bosse is a non-navigable waterway for both recreational and commercial use, which allows for viaduct pier placement to avoid the existing piers. The minimum low member vertical clearance exceeds the minimum 2.0 feet criteria and provides 4.8 feet above the 50-year design flood elevation of 63.81 feet NGVD.

Table 7-2. Proposed Bridge Characteristics

Bridge ID No.	Bridge Location	Direction	Structure Length (feet)	Deck Width (feet)	Shoulder Width (feet)		Min. Vertical Clearance (feet)	Number of Spans	Max Span (feet)	Superstructure Type	Substructure Type
					Inside	Outside					
B-1	SR 414 Expressway Extension Viaduct Over S.R. 414	EB & WB	8,842.3	89.00	6	12	16.50	58	300.00	twin precast segmental box girders	hammerhead pier with PT pier cap on 24-inch steel pipe piles
B-2A (770074L)	SR 414 Over Lake Bosse (Modification)	EB	700.0	48.84	6	8	2.00	6	210.00	72-inch Florida bulb tee and steel plate girders with 8-inch deck	20-inch concrete-filled pipe pile bents
B-2B (770074L)	SR 414 Over Lake Bosse (Modification)	WB	700.0	48.84	6	8	2.00	6	210.00	72" Florida bulb tee and steel plate girders with 8-inch deck	20-inch concrete-filled pipe pile bents
B-3 (770075)	SR 414 Over Little Wekiva Canal (Modification)	EB & WB	68.9	121.00	6	8	4.80	1	68.90	prestressed concrete beams with 8-inch deck	18-inch square prestressed concrete pile bent behind MSE walls
B-4 (770083)	SR 414 Over 434	EB & WB	245.0	117.08	6	8	16.65	1	245.00	steel plate girders with 8" deck	24-inch square prestressed concrete pile bent behind MSE walls

[a] Category 1 or 2 as defined in FDM Section 121.3.1

[b] Abutments and piers will be located 2 feet minimum behind the face of barrier walls to provide shielding for vehicular purposes and provide optimum span arrangement for economy.

Notes:

EB = eastbound

MSE = mechanically stabilized earth

WB = westbound

7.1.2.3 SR 414 Over Little Wekiva Canal

In the Preferred Alternative, the proposed viaduct will span the entire existing bridge at the Little Wekiva Canal. The only proposed modification to the existing bridge is to place concrete barrier walls at 11-foot offset from the centerline. The structure will provide 6-foot-wide inside shoulders, 8-foot-wide outside shoulders and two travel lanes per direction. The existing 5-foot-wide sidewalks would remain on each side. The minimum low member vertical clearance exceeds the minimum 2.0 feet criteria and provides 3.6 feet above the 50-year high water level elevation of 66.8 feet NGVD.

7.1.2.4 SR 414 Over SR 434

The proposed typical section would remove the raised median and provide barrier-separated eastbound and westbound lanes. The eastbound section will consist of an 8-foot-wide outside shoulder, three 12-foot-wide lanes and a 6-foot-wide inside shoulder. The westbound typical section consists of an 8-foot-wide outside shoulder, two 12-foot-wide lanes, one 20- to 24-foot-wide variable lane in the middle and a 6-foot-wide inside shoulder. End bents are founded on 24-inch-square prestressed concrete piles. The minimum vertical clearance is 16 feet 7¾ inches.

7.1.2.5 Geometric Compatibility

Both CFX and FDOT own portions of SR 414 within the project study limits. CFX owns and operates the SR 414 (John Land Apopka Expressway) from SR 429 to just east of US 441, and FDOT owns and operates SR 414 (Maitland Boulevard) from just east of US 441 to U.S. Highway 17/U.S. Highway 92. Therefore, compatibility with the existing bridge conditions varies at the project limits as discussed below.

US 441 Bridge –Compatibility

In the existing condition, the US 441 bridge provides 10-foot-wide minimum outside shoulders and 12-foot-wide inside shoulder which does not meet CFX criteria (12-foot-wide minimum inside and outside shoulders). The Preferred Alternative does not propose any structural changes to the bridge and, therefore, does not improve the bridge shoulder widths. The westbound lanes all tie back to existing east of the bridge with no striping impact. The eastbound lanes propose a horizontal realignment that maximizes use of the existing bridge and requires re-striping. The Preferred Alternative proposes to provide eastbound minimum inside and outside 10-foot-wide shoulders, which meets FDM Limited Access Criteria (Figure 260.1.1).

SR 434 Bridge – Compatibility

The project limits include the existing SR 434 bridge, which is currently classified as an Urban Principal Arterial Other. In the existing condition, the SR 434 bridge provides 10-foot-wide outside shoulders and 12-foot-wide inside shoulder designated as a 12-foot-wide future lane. The existing shoulder widths do not meet CFX criteria (12-foot-wide minimum inside and outside shoulders). The Preferred Alternative proposes structural changes to the bridge involving removing the existing 19-foot-wide median traffic separator and installing a median concrete barrier wall. With no proposed widening of the SR 434 bridge, there are no improvements to the bridge shoulder widths. In the Preferred Alternative, the proposed shoulder widths on the SR 434 bridge are decreased as a trade-off to provide a concept with efficient traffic operations. In both eastbound and westbound directions, the Preferred Alternative provides 8-foot-wide outside shoulders and 6-foot-wide minimum inside shoulders, which meets FDM

Urban criteria (Figure 260.1.4 and Table 260.9.1) and is consistent with the existing SR 414 bridges in the study area at Lake Bosse and Little Wekiva Canal.

7.2 Interchange Refinements

The Preferred Alternative includes interchange improvements as recommended in the *Project Traffic Analysis Report* (CFX 2022j). Interchange exhibits are presented in the Preliminary Concept Plans (refer to Appendix A).

7.2.1 US 441 (SR 500) Interchange

The Preferred Alternative provides all the existing ramp movements to/from US 441 resulting in no impacts to signals associated with the interchange. The significant change to the interchange configuration is the addition of proposed access ramps that connect the expressway to existing SR 414 (Maitland Boulevard). This new access in both directions requires reconstruction of mainline and ramp facilities to provide proper vertical connections. There are no proposed improvements to the ramp west of US 441 (414 EB Exit to US 441) or the loop ramp (414 WB Entrance).

The number of proposed lanes on-ramps and access ramps (one lane vs. two lanes) will be updated as the traffic modeling is further refined.

7.2.2 SR 434 Interchange

The Preferred Alternative provides all the existing ramp movements to/from SR 434 resulting in no impacts to signals associated with the interchange. The significant change to the interchange configuration is the addition of proposed access ramps that connect the expressway to existing SR 414 (Maitland Boulevard). This new access in both directions requires reconstruction of mainline and ramp facilities to provide proper vertical connections. There are no proposed improvements to the ramps east of SR 434 (EB Entrance and WB Exit).

The proposed number of lanes on-ramps and access ramps (one lane vs. two lanes) will be updated as the traffic modeling is further refined. The mainline eastbound lanes propose to drop from three lanes to two lanes to tie to existing SR 414 east of SR 434. The location of this lane drop will be updated as the traffic modeling is further refined.

7.3 Horizontal and Vertical Alignment

7.3.1 Horizontal Alignment

The proposed roadway improvements for the SR 414 Expressway Extension begin at the US 441 interchange and extend through the SR 434 interchange. Tables 7-3 through 7-5 describe the proposed horizontal alignments within the project limits.

Table 7-3. SR 414 Elevated Expressway Horizontal Alignment

Point of Curvature Station	Degree of Curvature	Curve Direction	Radius (feet)	Curve Length (feet)	Super Elevation (feet/foot)	Design Speed (mph)/ e_{max}
1456+39.26	2° 12' 13"	left	2,600.00	319.29	0.055 (Match existing)	55 mph/10%
1459+58.55	2° 29' 59"	left	2,292.00	1479.76	0.049	50 mph/10%
1474+38.31	0° 16' 22"	right	21,000.00	711.11	normal crown	50 mph/10%
1486+15.01	3° 30' 00"	right	1,637.00	1399.76	0.065	50 mph/10%
1501+27.16	0° 06' 40"	right	51,556.20	903.26	normal crown	50 mph/10%
1512+74.96	0° 09' 53"	left	34768.27	860.00	normal crown	50 mph/10%
1532+09.25	0° 41' 14"	left	8,337.00	997.53	normal crown	50 mph/10%
1541+20.01	1° 15' 00"	right	4,584.00	600.27	0.026	50 mph/10%
1553+64.11	0° 43' 15"	left	7,950.00	750.53	reverse crown*	50 mph/10%
1564+56.96	0° 30' 00"	right	11,459.16	1146.19	normal crown	50 mph/10%
1602+31.82	3° 00' 00"	right	1,909.86	1538.33	0.060 (Match exist.)	50 mph/10%

* Reverse crown requires 2 percent super elevation in the curve direction.

Table 7-4. SR 414 (Maitland Boulevard) At-Grade Horizontal Alignment

PC Station	Degree of Curvature	Curve Direction	Radius (feet)	Curve Length (feet)	Super Elevation (feet/foot)	Design Speed (mph)/ e_{max}
405+28.67	2° 12' 13"	left	2600.00	1990.95	0.055 (Match Existing)	55 mph/10%
434+73.95	3° 38' 52"	right	1570.72	1426.13	reverse crown*	45 mph/5%
449+00.08 BK = 500+00.68 AH						
501+27.16	0° 06' 40"	right	51556.20	903.26	normal crown	45 mph/5%
512+74.96	0° 09' 53"	left	34768.27	860.00	normal crown	45 mph/5%
532+09.25	0° 50' 53"	left	6755.80	910.07	normal crown	45 mph/5%
541+20.01	1° 38' 13"	right	3500.00	511.38	normal crown	45 mph/5%
553+78.79	0° 45' 00"	left	7639.44	721.21	normal crown	45 mph/5%
564+56.98	0° 30' 00"	right	11459.16	1146.19	normal crown	45 mph/5%
602+31.84	3° 00' 00"	right	1909.86	1538.33	0.060 (Match Existing)	50 mph/10%

* Reverse crown requires 2 percent super elevation in the curve direction.

Table 7-5. Interchange Ramp and Access Ramp Horizontal Alignments

Curve Name	PC Station	Degree of Curvature	Curve Direction	Radius (feet)	Curve Length (feet)	Super Elevation (feet/foot)	Design Speed (mph)/ e_{max}
RAMPA_ACC_1	2800+00.00	1° 00' 00"	left	5730	545.18	normal crown	45 mph/5%
RAMPA_ACC_2	2805+67.06	0° 41' 14"	right	8337	1628.48	reverse crown*	50 mph/10%
RAMPB_ACC_1	2700+00.00	1° 00' 00"	right	5730	622.65	normal crown	45 mph/5%
RAMPB_ACC_2	2706+22.65	0° 45' 00"	left	7639	712.4	reverse crown*	50 mph/10%
RAMPW_ACC_3	2500+80.30	2° 07' 19"	left	2700	752.23	0.043	50 mph/10%
RAMPX_ACC_1	2600+00.00	2° 59' 59"	left	1910	922.5	0.057	50 mph/10%
RAMPX_ACC_2	2609+22.50	2° 45' 02"	right	2083	725.91	normal crown	45 mph/5%
RAMPX_ACC_3	2616+48.41	2° 59' 59"	left	1910	404.98	reverse crown*	45 mph/5%
RAMPA_3	1206+51.13	1° 00' 00"	right	5730	431.94	normal crown	40 mph/5%
RAMPB_3	1306+66.38	0° 45' 00"	left	7639	476.31	normal crown	45 mph/5%
RAMPW_3	1303+90.27	3° 30' 00"	left	1637	727.13	reverse crown*	45 mph/5%
RAMPX1_3	1704+53.46	3° 16' 27"	right	1750	436.4	reverse crown*	45 mph/5%
RAMPX1_4	1708+89.86	6° 59' 45"	left	819	902.15	0.03	45 mph/5%

* Reverse crown requires 2 percent super elevation in the curve direction.

7.3.2 Vertical Alignment

Tables 7-6 through 7-8 describe the proposed vertical alignments within the project limits.

Table 7-6. SR 414 Elevated Expressway Vertical Alignment

Point of Vertical Intersection Stationing	Crest/Sag/PI	Grade In (%)	Grade Out (%)	Vertical Curve Length (feet)	K Value
1473+25.00	sag	-1.21	3.70	800	163
1485+50.00	crest	3.70	-0.30	1000	250

Table 7-6. SR 414 Elevated Expressway Vertical Alignment

Point of Vertical Intersection Stationing	Crest/Sag/PI	Grade In (%)	Grade Out (%)	Vertical Curve Length (feet)	K Value
1518+60.00	sag	-0.30	-2.40	1000	476
1529+50.00	sag	-2.40	0.30	800	296
1558+00.00	crest	0.30	-0.763	1000	941
1578+50.00	sag	-0.763	1.187	800	410

Table 7-7. SR 414 (Maitland Boulevard) At-Grade Vertical Alignment

Point of Vertical Intersection Stationing	Crest/Sag/PI	Grade In (%)	Grade Out (%)	Vertical Curve Length (feet)	K Value
507+50.00	crest	0.30	-1.39	300	177
518+00.00	sag	-1.24	-0.31	300	324
523+00.00	sag	-0.31	-2.65	300	129
528+40.00	sag	-2.65	-0.41	300	134
532+50.00	sag	-0.41	0.67	200	185
537+00.00	crest	0.67	-0.75	300	212
543+00.00	sag	-0.75	0.69	200	139
551+00.00	crest	0.69	-0.84	200	131
554+20.00	sag	-0.84	0.94	200	113

Table 7-8. Interchange Ramp and Access Ramp Vertical Alignments

Location	PVI Stationing	Crest/Sag/PI	Grade In (%)	Grade Out (%)	Vertical Curve Length (feet)	K Value	Design Speed
Ramp A	1205+97.58	crest	1.65	-4.90	459	70	40 mph
	1209+54.11	sag	-4.90	-1.00	250	64	40 mph
Ramp B	1305+00.00	sag	0.80	2.00	200	167	40 mph
	1312+36.41	crest	2.00	-0.80	380	136	40 mph
	1322+89.66	sag	-0.80	0.30	200	182	40 mph

Table 7-8. Interchange Ramp and Access Ramp Vertical Alignments

Location	PVI Stationing	Crest/Sag/PI	Grade In (%)	Grade Out (%)	Vertical Curve Length (feet)	K Value	Design Speed
Access Ramp A	2802+50.00	PI	0.90	1.20	not applicable	not applicable	50 mph
	2805+00.00	PI	1.20	1.62	not applicable	not applicable	50 mph
	2823+73.42	PI	1.62	1.30	not applicable	not applicable	50 mph
Access Ramp B	2704+00.00	sag	2.00	3.50	200	133.3	50 mph
	2708+20.19	crest	3.50	0.70	381	136	50 mph
Ramp W	1303+36.81	sag	-1.14	3.50	367	79	35 mph*
	1309+89.92	crest	3.50	-1.00	441	98	45 mph
Ramp X1	1707+53.46	crest	1.00	-0.30	300	231	45 mph
	1712+53.46	PI	-0.30	-1.00	not applicable	not applicable	45 mph
	1721+0310	sag	-1.00	1.10	200	95	45 mph
	1725+39.15	PI	1.10	0.50	not applicable	not applicable	45 mph
Access Ramp W	2504+00.00	crest	-1.20	-2.50	200	154	50 mph
	2507+52.80	sag	-2.50	0.80	317	96	50 mph
Access Ramp X	2611+87.48	PI	-1.35		not applicable	not applicable	50 mph

* 35 mph criteria proposed on Ramp W at US 441 intersection where lower speeds are expected because of turning movements.

7.3.3 Design Deviations

Occasionally, it becomes necessary to deviate from the standard criteria used in the design process. If deemed necessary, two specific approval procedures may occur as outlined in CFX Design Guidelines:

1) Design criteria does not meet FDM but meets American Association of State Highway and Transportation Officials criteria.

2) Design criteria does not meet FDM and/or AASHTO criteria; Designer shall evaluate the safety-related ten controlling design elements. The ten controlling design elements for high-speed, design speed greater than or equal to 50 mph, roadways and limited-access ramps are:

   - Design speed
   - Lane width
   - Shoulder width

- Horizontal curve radius
- Superelevation rate
- Stopping sight distance
- Maximum grade
- Cross slope
- Vertical Clearance
- Design loading structural capacity

The two controlling design elements for low speed, design speed less than 50 mph, roadways are:

- Design speed
- Design loading structural capacity

In the Preferred Alternative, AASHTO criteria is met for all controlling design criteria.

The new mainline and ramps are being designed to meet FDM and CFX design criteria. In some cases, design deviations are identified that maintain existing deficiencies. These will be corrected when reasonable and identified in the Final Concept Plans.

Table 7-9 lists potential design deviations associated with FDM and CFX criteria.

Table 7-9. Potential Design Deviations

Facility (Owner)	Design Item	Description of Preferred Alternative	Criteria		Notes
			CFX/FDOT	AASHTO	
At-grade SR 414 (Maitland Boulevard) (FDOT)	Sidewalk Width	Existing to remain; spot locations of 5-foot-wide sidewalk adjacent to curb and gutter.	6 feet wide	N/A	Further analysis is required.
SR 414 bridge over US 441 (CFX)	Bridge Shoulder Widths	Existing outside shoulders to remain 10-foot minimum; existing inside WB shoulder to remain 12 feet; proposed inside EB shoulder reduced to 10 feet minimum.	12-foot-wide inside and outside on expressway	Freeway Match roadway approach (FDM Table 122.5.4)	Further analysis is required. All shoulders meet interstate criteria; only inside WB shoulder meets CFX criteria.
SR 414 bridge over SR 434 (FDOT)	Bridge Shoulder Widths	Proposed 6 feet inside and 8 feet outside.	10-foot-wide inside and outside on limited access; 6 feet wide inside/8 feet wide outside on Urban Arterial	Freeway Match roadway approach (FDM Table 122.5.4)	Further analysis is required. Proposed shoulders meet Arterial criteria, do not meet Limited Access criteria as described in FDM Section 7.1.2.

Table 7-9. Potential Design Deviations

Facility (Owner)	Design Item	Description of Preferred Alternative	Criteria		Notes
			CFX/FDOT	AASHTO	
SR 414 east of SR 434 (FDOT)	Vertical alignment: K value	Existing to remain; proposed reconstruction ties to west bridge limit. Existing alignment over SR 434 and continuing west includes Crest k-value = 130, and Sag k-value = 90.	50 mph K value crest = 136; sag = 96 45 mph K-value crest = 98, sag = 79	50 mph K value crest = 84; sag = 96 (FDM Table 122.5.8)	Further analysis is required. Existing vertical alignment east of SR 434 does not meet FDM 50-mph criteria. Meets 45-mph FDOT and AASHTO criteria.

7.4 Access Management

The Preferred Alternative is developed to maintain the existing access locations within the study area. Table 7-10 provides a list of the Preferred Alternative access management existing and proposed median classifications. One signal control modification is proposed to improve the existing directional median opening at Gateway Drive.

Table 7-10. Access Management Recommendations

Mile Post	Street	Existing Median Classification		Preferred Alternative
		Full	Directional	
0.336	US 441/ SR 500	Signalized	N/A	Maintain
36.655	Rose Avenue/ Bear Lake Road	Signalized	N/A	Maintain
37.144	Eden Park Road	Signalized	N/A	Maintain
37.642	Magnolia Homes Road/ Lake Lotus Park Drive	Signalized	N/A	Maintain
37.887	Gateway Drive	N/A	Directional (Eastbound)	Upgrade to Signalized as Continuous Green T-Intersection
38.359	SR 434 (Forest City Road)	Signalized	N/A	Maintain

7.5 Drainage

The drainage patterns in the proposed conditions will remain the same as existing conditions, with basins outfalling into the Little Wekiva River, Lake Bosse and adjacent wetlands. The existing drainage system for the SR 414 mainline conveys stormwater via curb-and-gutter inlets into ditch bottom inlets existing and proposed stormwater retention facilities for water quality treatment and attenuation before outfalling into the Little Wekiva River and Lake Bosse. The proposed drainage system for the new four-lane SR 414 Expressway Extension will consist of barrier wall inlets in a closed system similarly discharging into existing and proposed stormwater retention facilities for water quality treatment and

attenuation before outfalling into tributaries and waterways of the Little Wekiva River and Lake Bosse. Because a project goal is to not acquire additional ROW, existing permitted ponds within the study limits were evaluated first and then opportunities within the existing CFX and FDOT ROW were identified as potential new pond sites.

Stormwater treatment and attenuation associated with the Preferred Alternative is proposed through the use of existing and proposed ponds and swales. The proposed drainage system includes maintaining the existing drainage basins, modifying existing Ponds 4A, 4B, 4C, C, D and E, and adding two new ponds (Ponds B1 and B2) and two new swales (Swales F and G). Because a project goal is to not acquire additional ROW, existing permitted ponds within the study limits were evaluated first and then opportunities within the existing CFX and FDOT ROW were identified as potential new pond sites. In addition to the initial permitting requirements for the construction SR 414 Maitland Boulevard, modification of the existing stormwater management system provides sufficient capacity for the proposed improvements.

Impacts to the 100-year floodplain are anticipated from the proposed 16-foot by 10-foot piers (four proposed) at the SR 414 Lake Bosse Bridge, resulting in approximately 2,470 cubic feet of impacts. To compensate for this impact, existing Pond E is proposed to be regraded to provide 2,482 cubic feet compensation. Minimal floodplain involvement is anticipated with federally defined floodplains. No adverse impacts are anticipated to the floodplain, as required by the SJRWMD permitting process. As a result, there will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, floodplain encroachment resulting from the proposed roadway extension and added bridge piers is not significant.

Preliminary pond sizing was based on the required stormwater treatment and attenuation volumes criteria set forth by SJRWMD, CFX and FDOT. Table 7-11 provides the recommended pond locations. Detailed drainage analysis is documented in the *Pond Siting Report* (CFX 2022i) and the *Location Hydraulics Report* (CFX 2021k). Refer to the Concept Plans in Appendix A for locations of the recommended ponds and swales.

Table 7-11. Preliminary Pond Recommendations

Basin ID	Recommended Pond Alternative
A	Existing Pond A
6	Modified Existing Ponds 4A, 4B and 4C
B	Pond B1 and Pond B2
C	Modified Existing Pond C
D	Modified Existing Pond D
E	Modified Existing Pond E
F	Existing Pond F and Swale F
G	Swale G

7.5.1 Bridge Hydraulic Evaluation

The proposed project requires a portion of the existing SR 414 bridge superstructure (three beams and deck) over Lake Bosse to be removed to accommodate the new elevated bridge. The proposed bridge places four new sets of 20-inch-diameter piles with four bridge columns, where the longest horizontal clearance increases from 210 feet to approximately 300 feet. Because there is a potential for the four new bridge columns to take up part of the channel and impact the flow underneath and upstream of the bridge, vertical clearances and upstream water surface impacts required a hydraulic model evaluation.

Modeling results indicate that the 50-year design high water elevation is 62.84 feet, resulting in 3.15 feet of vertical clearance. FDOT requires a 2-foot vertical clearance and no rise in the water surface elevation upstream of the project at the ROW (1-foot maximum) and 500 feet upstream (0.1 foot maximum). Because the proposed bridge is anticipated to have 3.15 feet of vertical clearance, the FDOT criterion is met. Further, the model results indicate that no more than 0.01-foot rise for the 50-year design flood at the ROW upstream of bridge, which extends 500 feet upstream of the bridge, but reduces to 0.00 feet within the following 100 feet. Results of the analysis indicate that the proposed bridge meets all navigational clearance, and no discernable change in water surface elevation resulted from the proposed bridge columns. The hydrologic analysis details are documented in the *Location Hydraulics Report* (CFX 2021k).

7.6 Lighting

A lighting justification analysis was performed for the project to determine if lighting for the proposed elevated expressway and associated underdeck, as well as for the existing SR 414 (Maitland Boulevard) is warranted. As noted earlier, there is limited lighting along the existing project corridor (lighting at signalized intersections and grade-separated interchanges). Based on FDOT's *Manual on Uniform Traffic Studies* (FDOT 2021a), the AASHTO *Roadway Lighting Design Guide Warranting System* (AASHTO 2018b) is used to determine lighting warranting for freeways, bridges and interchanges. The MUTS further notes that the FDOT Lighting Geometric and Operational Factors (Form No. 750-020-20) should be used to determine lighting warranting for collectors, major arterials, and local streets.

The AASHTO Roadway Lighting Design Guide was used for the SR 414 Elevated Expressway lighting warranting analysis as the proposed facility falls under the freeway category described in MUTS. AASHTO's four warranting conditions for continuous freeway lighting were reviewed in conjunction with the data from PTAR. Lighting along the elevated expressway is warranted under two of the four warranting conditions.

FDOT Form 750-020-20 was used to determine the lighting warranting condition for the existing SR 414 (Maitland Boulevard). The initial lighting justification analysis was based upon geometric factors. Then operational, environmental and crash factors were reviewed and scored. If the total point score of FDOT Form 750-020-20 is equal to or greater than 60, then roadway lighting is justified. Because the total point score was determined to be 40 for at-grade SR 414 (Maitland Boulevard), lighting is not justified along the facility.

Based on the data and the analysis performed, lighting is warranted for the proposed elevated expressway, but is not warranted for the at-grade SR 414 (Maitland Boulevard). Additionally, due to the shape of the proposed elevated expressway and its coverage of the at-grade SR 414 (Maitland Boulevard), under deck lighting is recommended to be coordinated during the design phase.

7.7 Signing

A conceptual signing plan will be provided by CFX for the project during the design phase. This will involve coordination with Seminole State College on advance signing considerations. Additionally, the pavement marking design will be developed during the design phase and involve coordination with FDOT and local agencies on the proposed markings for the bicycle lanes.

7.8 Intelligent Transportation Systems

The Preferred Alternative may result in impacts to some of the existing ITS System along SR 414 (Maitland Boulevard) and at each of the signalized intersections and will require replacement. The proposed ITS infrastructure will be used to monitor traffic and provide incident management and travel information to travelers within project corridor and includes closed-circuit television cameras, microwave vehicle detectors, dynamic message signs, automatic vehicle identification readers, traffic monitoring stations, data collection sensors and fiber optic cable for network communication.

The existing ITS System along SR 414 (Maitland Boulevard) and at each of the signalized intersections will likely require replacing as a result of the Preferred Alternative. High definition CCTV color cameras are proposed on the SR 414 Elevated Expressway for incident management, and will be operated and maintained by CFX. Similar CCTV cameras are proposed at the signalized intersections along SR 414 (Maitland Boulevard) with operation and maintenance by FDOT, Orange and Seminole counties. Travel advisory DMS are proposed before major exit points along the SR 414 Elevated Expressway and SR 414 (Maitland Boulevard), to provide traffic management information and travel time to motorists. Traveler information DMS is proposed for incident management and traveler information. TMS are proposed at all ingress and egress points of the SR 414 Elevated Expressway to provide vehicular traffic data consisting of volume, speed and occupancy between all interchanges and at all on- and off-ramps to general tolled lanes. The TMS system shall be independent as to not interfere with the toll collection systems and/or the ITS device network operated by CFX or any other agency. DCS are proposed on structures associated with Preferred Alternative and/or in DMS enclosures. The DCS field equipment is proposed to detect vehicles using Bluetooth/Wi-Fi readers to provide real-time vehicle information to CFX Headquarters. AVI readers are proposed at the signalized intersection of Bear Lake Road along SR 414 (Maitland Boulevard) with operation and maintenance by FDOT, Orange and Seminole counties. With the rapidly approaching connected and autonomous vehicles implementation, it is recommended that the ITS infrastructure along the SR 414 Elevated Expressway and SR 414 (Maitland Boulevard) be planned to support any future CAV implementation.

FDOT District 5 Regional Transportation Management Centers control, monitor, operate and manage traffic along regional interstates and major arterial roadways 24 hours a day, 7 days a week including SR 414 (Maitland Boulevard) and CFX roadways. The proposed SR 414 Elevated Expressway will be included to be monitored by the RTMC to respond to changing traffic conditions. A new or updated memorandum of understanding is recommended between FDOT, CFX, Orange and Seminole counties for the operation and maintenance of the proposed ITS infrastructure along SR 414 (Maitland Boulevard) and the SR 414 Elevated Expressway. The MOU should define limits of maintenance for each agency and jurisdiction and access to ROW for maintenance and operations and funding for any shared responsibilities.

7.9 Maintenance of Traffic

Preliminary MOT and viable sequence of construction concepts have been developed to ensure viability of the Preferred Alternative with an emphasis on minimizing traffic delays, providing safe construction

zones for all road users including pedestrians, bicyclists and transit, and maintaining existing access for businesses and residences at the side streets.

Construction of the proposed viaduct superstructure and overhead pier will require using nighttime detours of both lanes in one direction at a time to allow construction of pier cap overhangs and bridge superstructure as detailed in the *Bridge Analysis Technical Memorandum* (CFX 2022b; refer to Figure 7-1). Some critical constraints to efficiently maintain traffic during median viaduct construction include:

- Vertical clearance during all phases of construction
- Detour routes for both eastbound and westbound travel
- Access to/from side streets during SR 414 lane closures
- Early implementation of proposed 45-mph design speed on SR 414 (Maitland Boulevard)
- Temporary routes for pedestrians and bicyclists
- Ingress/egress construction access
- Sequencing of proposed bridge modifications to the existing bridges over Lake Bosse and the Little Wekiva Canal
- Temporary signalization
- Temporary drainage

The Preferred Alternative proposed significant vertical changes to the interchange ramps on the east side of US 441 and to the interchange ramps on the west side of SR 434. The proposed lengths of reconstruction are developed to maximize use of existing ROW and in many locations propose a new vertical elevation at the same horizontal alignment. Major construction activities that are anticipated to efficiently maintain traffic at each of the interchanges include temporary pavement, temporary sheet pile/walls, temporary drainage, detour routes for all ramps and temporary routes for pedestrians and bicyclists where existing facilities are located.

The SR 414 corridor is already a heavily traveled, congested facility, so the development of an effective Transportation Management Plan will contribute to the success of this construction project. A combination of MOT criteria from FDOT and CFX Design Guidelines should be documented for this project during final design to customize the traffic control criteria for the varied maintaining agencies and facility owners. Because of the anticipated sustained work zone impacts associated with the viaduct construction and proximity to the I-4 interstate system, the following TMP components should be expanded on and refined during final design:

- Temporary Traffic Control Plan: The TTC Plan will be developed during the final design phase of this project in accordance with current criteria and guidelines outlined in applicable FDOT standards and manuals, the Federal Highway Administration's *Manual on Uniform Traffic Control Devices for Streets and Highways* and CFX's Design Guidelines. The TTC Plan will detail how all modes of traffic will be adequately maintained throughout all construction phases.
- Transportation Operations Plan: The Transportation Operations component will provide strategies, such as safety management and work zone traffic management, to mitigate impacts of the work zone on SR 414 and side street operations
- Public Information Plan: The Public Information Plan describes how project information will be communicated to affected parties, traveling public and project stakeholders prior to and during construction.

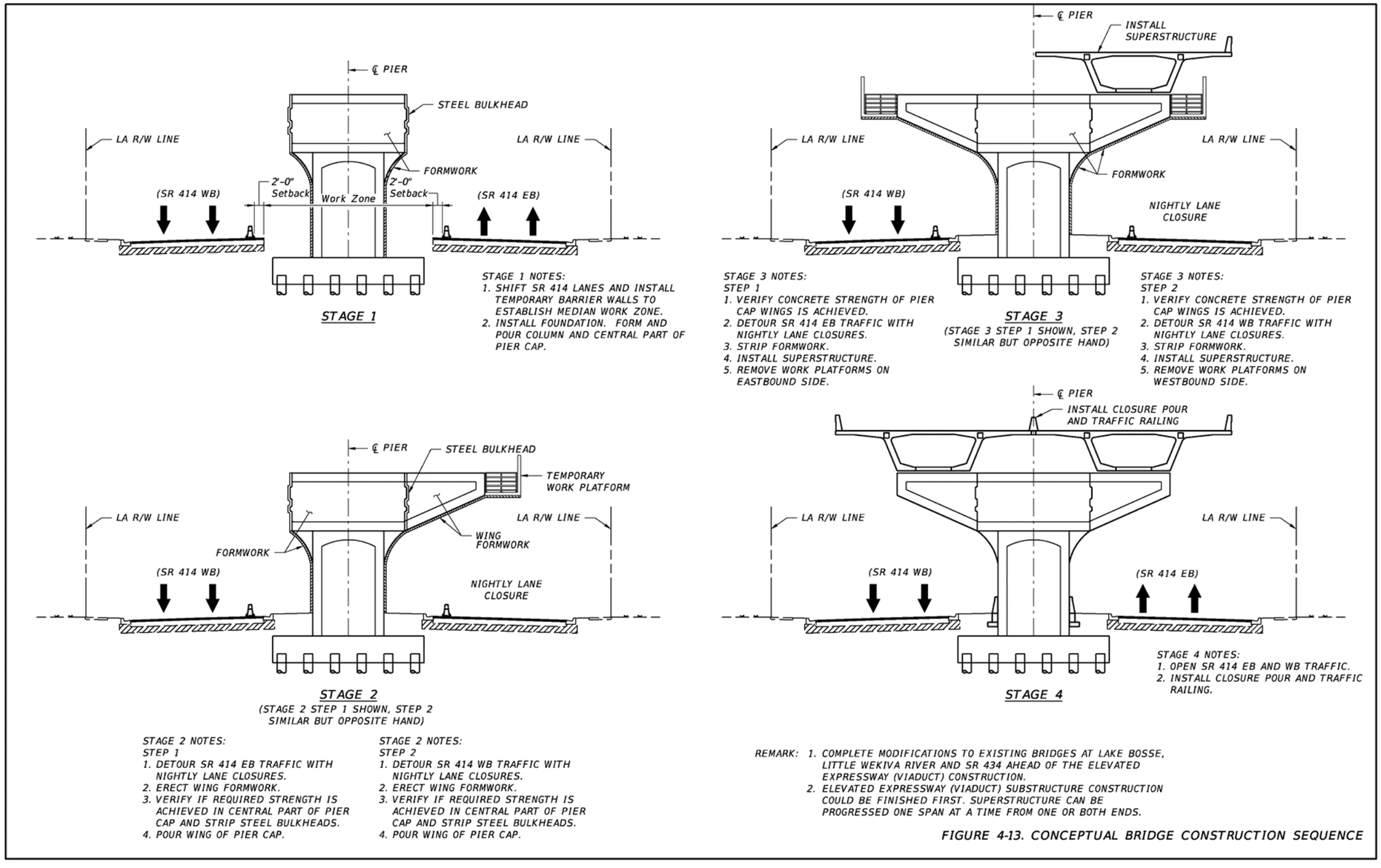

Figure 7-1. Conceptual Bridge Construction Sequence

7.10 Preliminary Construction Costs

Preliminary construction costs were estimated for the proposed improvements based on the design in the Preliminary Concept Plans (refer to Appendix A). The cost estimate includes roadway, drainage, bridges, walls, embankment, utility relocations, toll equipment and wetland mitigation. Additionally, several items are estimated as a percentage of the sum of the top three line items (roadway, bridges, and walls) including signing, pavement marking, signalization, lighting, erosion control and aesthetics. Mobilization costs are estimated at 10 percent and MOT costs are estimated at 15 percent.

Construction costs do not include costs associated with environmental permits, cost escalation, removal and disposal of contaminated soils or materials or adverse geotechnical conditions. Because of the conceptual nature of the design, a 10 percent contingency is added for Bridges and for all other items a 20 percent project contingency is added, which is capped by Florida Statute. Total project costs include engineering, administration and legal fees (estimated as a percentage of the total construction costs), ROW acquisition (none anticipated), wetland mitigation (calculated as credits per acre) and toll equipment (per lane). The total project cost for the Preferred Alternative is estimated to be approximately $364.4 million (in 2022 dollars).

Table 7-12 summarizes the construction and project cost estimate for the Preferred Alternative. Refer to Appendix C for calculations and cost backup data.

Table 7-12. Construction and Project Costs (2022 dollars) for the Preferred Alternative

Item	Percentage	Estimated Costs (millions)
Roadway and Drainage	N/A	$13.44
Bridges (estimated in BATM, without Mob, Cont.)	N/A	$150.58
Additional Items (including Retaining Walls, Embankment, At-grade Median Barrier, Noise Walls)	N/A	$12.69
Subtotal 1		**$176.72**
Signing, Pavement Marking, Signalization and Lighting	10%	$17.67
Subtotal 2		**$194.39**
Erosion Control/ Temporary Drainage	2%	$3.89
Maintenance of Traffic	15%	$29.16
Mobilization	10%	$19.44
Subtotal Roadway (all costs except Bridges)		**$96.29**
Roadway Contingency	20%	$19.26
Subtotal Bridge		**$150.58**
Bridge Contingency	10%	$15.06
Subtotal 3		**$281.19**
Aesthetic Allowance (includes Landscaping)	3%	$8.44

Table 7-12. Construction and Project Costs (2022 dollars) for the Preferred Alternative

Item	Percentage	Estimated Costs (millions)
Utilities (estimated in UAM)	N/A	$2.30
Allowance for Disputes Review Board	N/A	$0.05
Work Order Allowance	N/A	$0.50
Total Construction Cost		**$292.48**
Engineering/Administration/Legal (% Total of Construction Cost)	24%	$70.20
Right-of-Way	N/A	$0.00
Wetland Mitigation	N/A	$0.10
Toll Equipment	N/A	$1.65
Grand Total Project Cost		**$364.4**

7.11 Toll Conditions

Proposed project will include AET gantries. Tolling feasibility for this project will be coordinated by CFX.

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Appendix A
Concept Plans

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

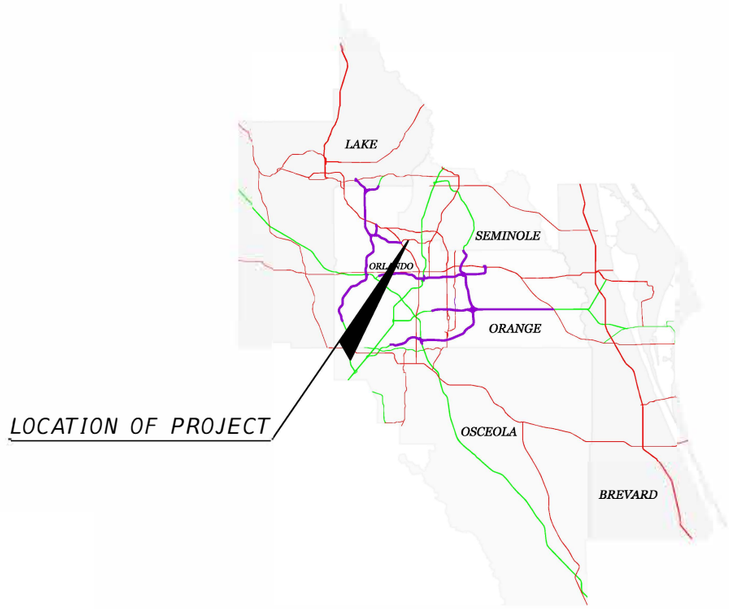
PREFERRED ALTERNATIVE CONCEPT PLANS

SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION US 441 TO SR 434

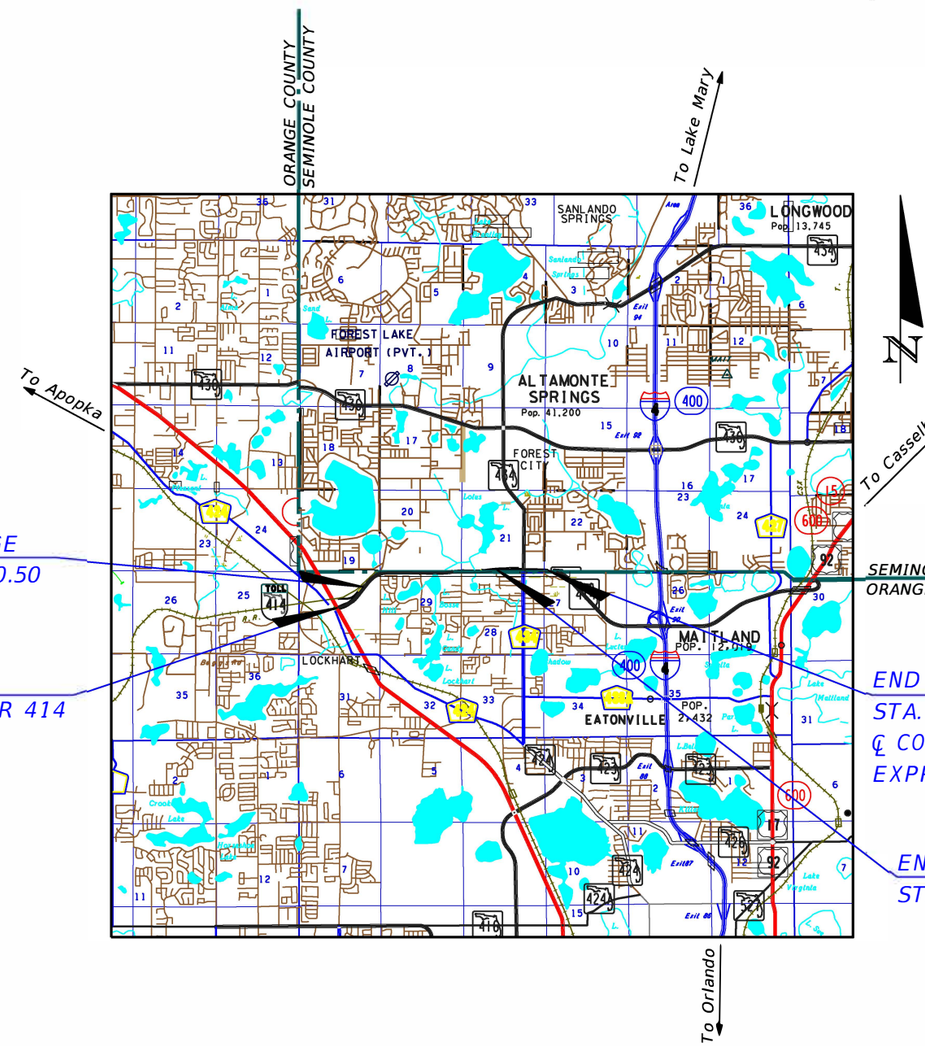
STATE ROAD NO. 414

CFX PROJECT NUMBER: 414-227

INDEX OF ROADWAY PLANS



DRAFT CONCEPT
NOT FOR CONSTRUCTION
APRIL 2022

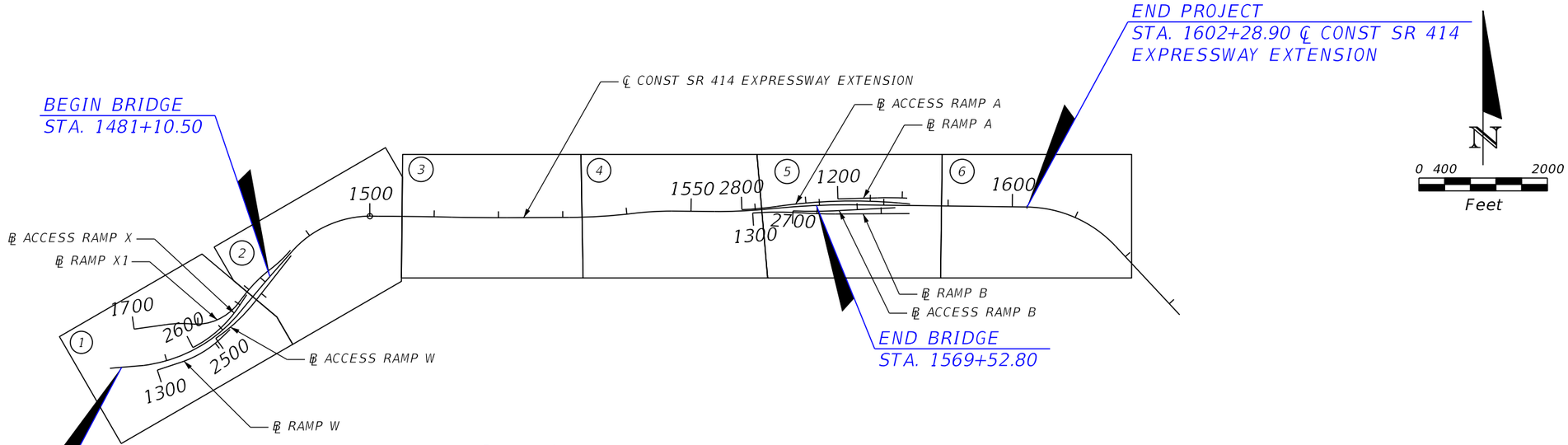


CENTRAL FLORIDA EXPRESSWAY AUTHORITY
GOVERNING BOARD

SEAN PARKS	CHAIRMAN, LAKE COUNTY REPRESENTATIVE
JERRY DEMINGS	VICE CHAIRMAN, ORANGE COUNTY MAYOR
LEE CONSTANTINE	TREASURER, SEMINOLE COUNTY REPRESENTATIVE
BRANDON ARRINGTON	OSCEOLA COUNTY REPRESENTATIVE
BUDDY DYER	MAYOR OF ORLANDO
JAY MADARA	GOVENOR'S APPOINTEE
CHRISTOPHER MAIER	GOVENOR'S APPOINTEE
RAFAEL E. MARTINEZ	GOVENOR'S APPOINTEE
VICTORIA SIPLIN	ORANGE COUNTY REPRESENTATIVE
CURT SMITH	BREVARD COUNTY REPRESENTATIVE

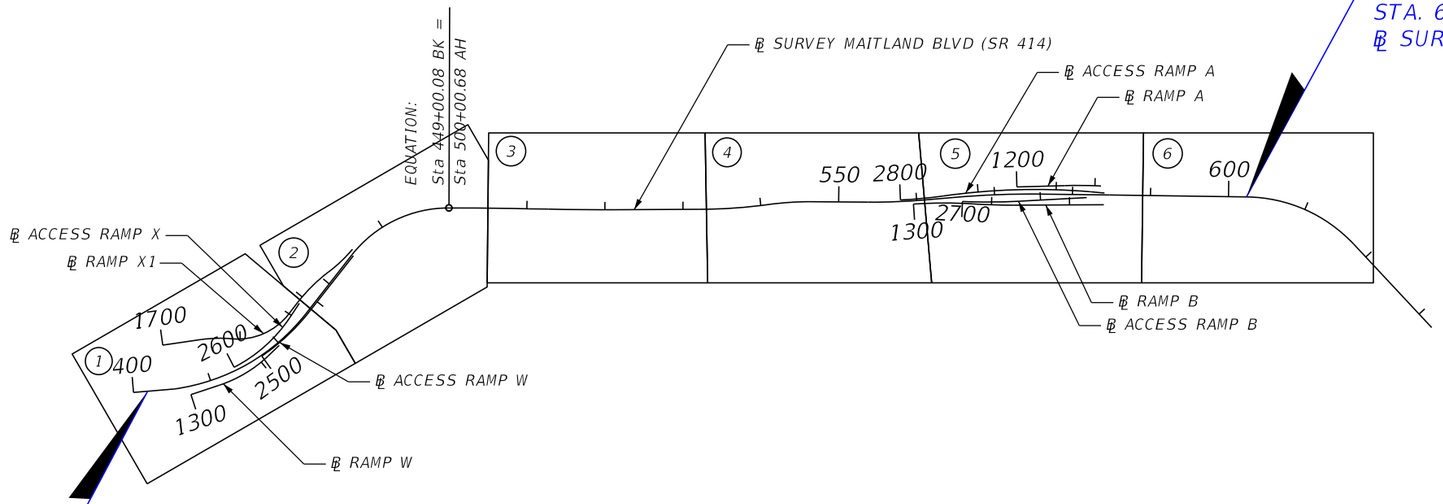
CFX PROJECT MANAGER:
WILL HAWTHORNE, P.E.

SHEET NO.
001



SR 414 ELEVATED

BEGIN PROJECT
STA. 1452+90.59 ℄ CONST SR 414
EXPRESSWAY EXTENSION



SR 414 AT-GRADE

BEGIN PROJECT
STA. 1452+90.59 ℄ CONST SR 414
EXPRESSWAY EXTENSION =
STA. 401+80.00 ℄ SURVEY MAITLAND BLVD
EXPRESSWAY EXTENSION

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

PROJECT LAYOUT

SHEET NO. 002

CURVE AND COORDINATE DATA

CHAIN	CURVE NO.	PC STA.	PT STA.	D	L	R	Direction	Design Speed	e_{max}	Superelev.	DESIGN NOTES
					LF	LF	LT/RT	mph	5%/10%	(ft./ft.)	
BL_SR414_PROP	BL_SR414_PROP_3	1456+39.26	1459+58.55	2° 12' 13"	319.29	2600.00	LT	55 mph	10%-Rural	0.055	MATCH EXISTING 'e' ON BRIDGE
EXPRESSWAY		COMPOUND CURVE									
	BL_SR414_PROP_4	1459+58.55	1473+95.17	2° 29' 59"	1436.61	2292.00	LT	50 mph	10%-Rural	0.049	
		REVERSE CURVE									
	BL_SR414_PROP_5	1473+95.17	1481+66.28	0° 16' 22"	771.11	21000.00	RT	50 mph	10%-Rural	NC	
	BL_SR414_PROP_8	1486+15.76	1500+15.52	3° 30' 00"	1399.76	1637.00	RT	50 mph	10%-Rural	0.065	AT BEAR LAKE RD/ROSE AVE
	BL_SR414_PROP_11	1501+27.07	1510+30.33	0° 06' 40"	903.26	51556.20	RT	50 mph	10%-Rural	NC	
	BL_SR414_PROP_14	1512+74.87	1521+34.87	0° 09' 53"	860.00	34768.27	LT	50 mph	10%-Rural	NC	
	BL_SR414_PROP_17	1530+98.79	1540+96.33	0° 41' 14"	997.53	8337.00	LT	50 mph	10%-Rural	NC	
		REVERSE CURVE									
	BL_SR414_PROP_18	1540+96.33	1546+96.60	1° 15' 00"	600.27	4584.00	RT	50 mph	10%-Rural	0.026	CURVE LENGTH CONSTRAINED BY PROPOSED PIER PLACEMENT WITHIN EXISTING BRIDGE MEDIAN
	BL_SR414_PROP_21	1553+63.52	1561+14.05	0° 43' 15"	750.53	7950.00	LT	50 mph	10%-Rural	RC	
	BL_SR414_PROP_24	1564+56.36	1576+02.56	0° 30' 00"	1146.19	11459.16	RT	50 mph	10%-Rural	NC	
	BL_SR414_PROP_27	1602+31.22	1617+69.55	3° 00' 00"	1538.33	1909.86	RT	50 mph	10%-Rural	0.06	MATCH EXISTING ROADWAY

NOTE: SHADING OF ADJACENT CURVES INDICATES COMPOUND CURVES OR REVERSE CURVES.

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

CURVE & COORDINATE DATA

SHEET NO. 003

CURVE AND COORDINATE DATA

CHAIN	CURVE NO.	PC STA.	PT STA.	D	L	R	Direction	Design Speed	e_{max}	Superelev.	DESIGN NOTES
					LF	LF	LT/RT	mph	5%/10%	(ft./ft.)	
BL_SR414	BL_SR414_3	405+28.67	425+19.62	2° 12' 13"	1990.95	2600.00	LT	55 mph	10% - Rural	0.055	OVER US 441
EXISTING											
MAITLAND BLVD.	BL_SR414_6	434+73.95	449+00.08	3° 38' 52"	1426.13	1570.72	RT	45 mph	5% - Urban	RC	AT BEAR LAKE RD/ROSE AVE
STA EQN 449+00.08 BK = 500+00.68 AH											
	BL_SR414_9	501+27.16	510+30.43	0° 06' 40"	903.26	51556.20	RT	45 mph	5% - Urban	NC	
	BL_SR414_12	512+74.96	521+34.96	0° 09' 53"	860.00	34768.27	LT	45 mph	5% - Urban	NC	
	BL_SR414_15	532+09.25	541+20.01	0° 50' 53"	910.07	6755.80	LT	45 mph	5% - Urban	NC	
		REVERSE CURVE									
	BL_SR414_16	541+20.01	546+31.40	1° 38' 13"	511.38	3500.00	RT	45 mph	5% - Urban	NC	
	BL_SR414_19	553+78.79	561+00.00	0° 45' 00"	721.21	7639.44	LT	45 mph	5% - Urban	NC	
	BL_SR414_22	564+56.98	576+03.17	0° 30' 00"	1146.19	11459.16	RT	45 mph	5% - Urban	NC	
	BL_SR414_27	602+31.84	617+70.17	3° 00' 00"	1538.33	1909.86	RT	50 mph	10% - Rural	0.060	MATCH EXISTING ROADWAY

NOTE: SHADING OF ADJACENT CURVES INDICATES COMPOUND CURVES OR REVERSE CURVES.

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

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200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
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SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

CURVE & COORDINATE DATA

SHEET NO. 004

CURVE AND COORDINATE DATA

CHAIN	CURVE NO.	PC STA.	PT STA.	D	L	R	Direction	Design Speed	e_{max}	Superelev.	DESIGN NOTES
					LF	LF	LT/RT	mph	5%/10%	(ft./ft.)	
RAMP A_ACC	RAMPA_ACC_1	2800+00.00	2805+45.18	1° 00' 00"	545.18	5730.00	LT	45 mph	5%-Urban	NC	CONNECTS TO AT-GRADE 45 MPH
		REVERSE CURVE									
	RAMPA_ACC_2	2805+45.18	2824+36.14	0° 41' 14"	1890.96	8337.00	RT	50 mph	10%-Rural	NC	
RAMP B_ACC	RAMPB_ACC_1	2700+00.00	2707+17.87	0° 45' 00"	717.87	7639.00	LT	50 mph	10%-Rural	RC	
RAMP W_ACC	RAMPW_ACC_1	2500+80.30	2508+32.53	2° 07' 19"	752.23	2700.00	LT	50 mph	10%-Rural	0.043	
RAMP X_ACC	RAMPX_ACC_1	2600+00.00	2609+65.89	2° 59' 59"	965.89	1910.00	LT	50 mph	10%-Rural	0.057	
RAMP A	RAMPA_3	1206+14.56	1210+46.50	1° 00' 00"	431.93	5730.00	RT	40 mph	5%-Urban	NC	
RAMP B	RAMPB_1	1300+00.00	1307+58.33	1° 00' 00"	758.33	5730.00	RT	40 mph	5%-Urban	NC	
		REVERSE CURVE									
	RAMPB_2	1307+58.33	1312+82.19	0° 45' 00"	523.87	7639.00	LT	40 mph	5%-Urban	NC	
RAMP W	RAMPW_3	1303+90.27	1311+17.40	3° 30' 00"	727.13	1637.00	LT	45 mph	5%-Urban	RC	
RAMP X1	RAMPX1_3	1704+99.54	1708+99.96	3° 16' 27"	400.41	1750.00	RT	45 mph	5%-Urban	RC	
		REVERSE CURVE									
	RAMPX1_4	1708+99.96	1717+17.94	6° 59' 45"	817.99	819.00	LT	45 mph	5%-Urban	0.030	
	RAMPX1_7	1719+14.15	1724+64.15	2° 45' 02"	550.00	2083.00	RT	45 mph	5%-Urban	NC	
		REVERSE CURVE									
	RAMPX1_8	1724+64.15	1728+89.15	2° 59' 59"	425.00	1910.00	LT	45 mph	5%-Urban	RC	

NOTE: SHADING OF ADJACENT CURVES INDICATES COMPOUND CURVES OR REVERSE CURVES.

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

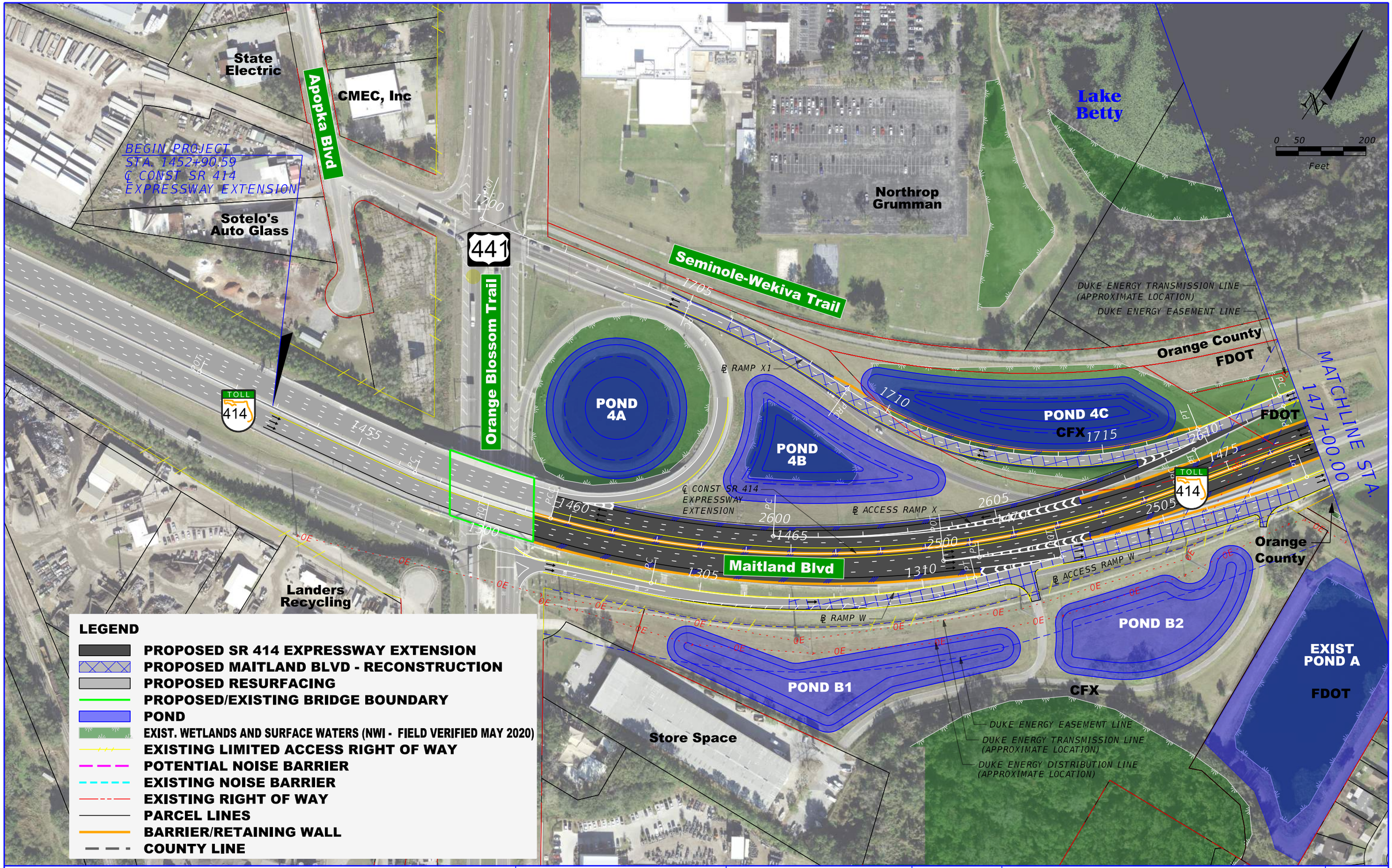
SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

CURVE & COORDINATE DATA

SHEET NO. 005



LEGEND

- PROPOSED SR 414 EXPRESSWAY EXTENSION
- PROPOSED MAITLAND BLVD - RECONSTRUCTION
- PROPOSED RESURFACING
- PROPOSED/EXISTING BRIDGE BOUNDARY
- POND
- EXIST. WETLANDS AND SURFACE WATERS (NWI - FIELD VERIFIED MAY 2020)
- EXISTING LIMITED ACCESS RIGHT OF WAY
- POTENTIAL NOISE BARRIER
- EXISTING NOISE BARRIER
- EXISTING RIGHT OF WAY
- PARCEL LINES
- BARRIER/RETAINING WALL
- COUNTY LINE

PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001

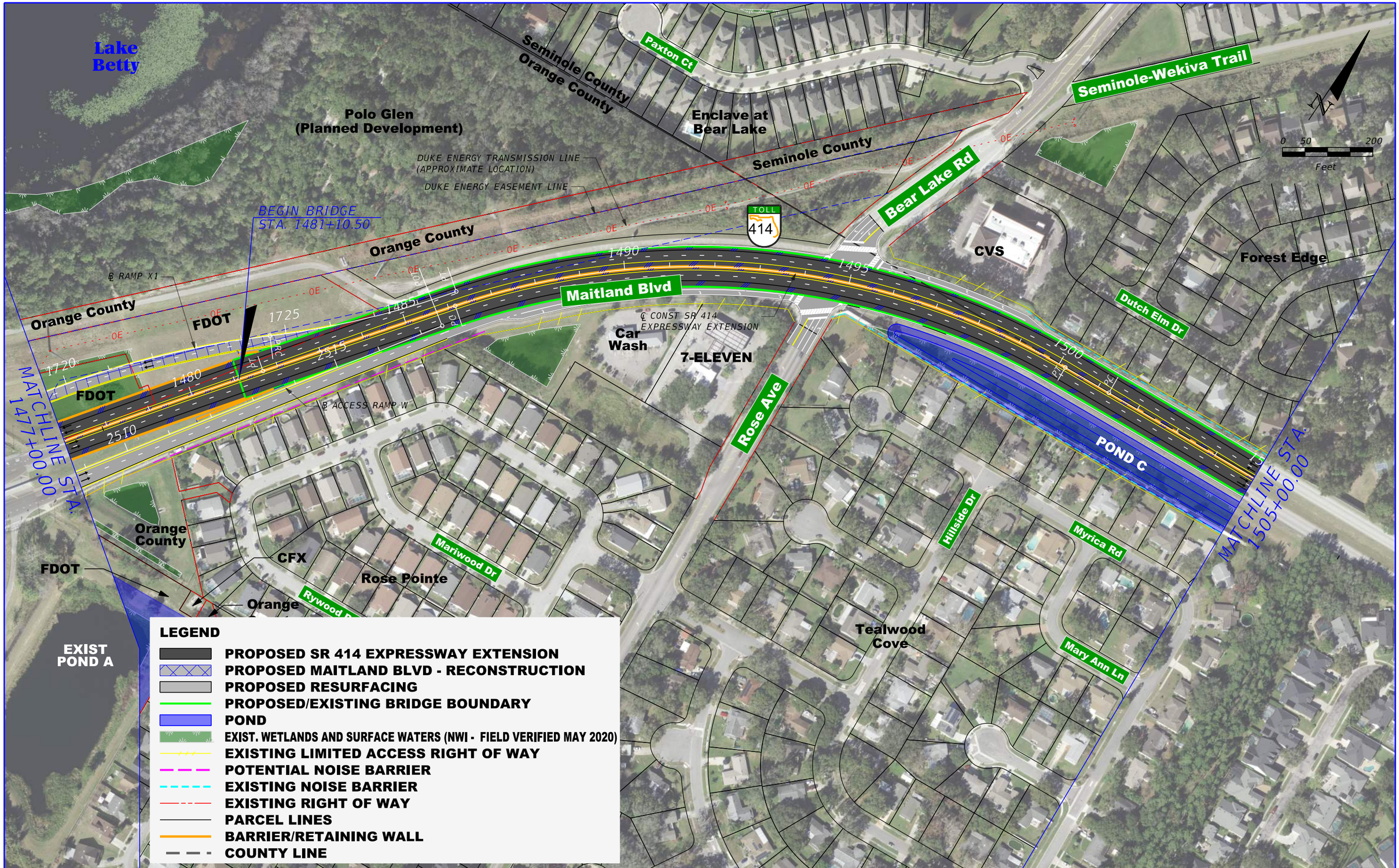
SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 ELEVATED PLAN SHEET (1)

SHEET NO. 006



LEGEND

- PROPOSED SR 414 EXPRESSWAY EXTENSION
- PROPOSED MAITLAND BLVD - RECONSTRUCTION
- PROPOSED RESURFACING
- PROPOSED/EXISTING BRIDGE BOUNDARY
- POND
- EXIST. WETLANDS AND SURFACE WATERS (NWI - FIELD VERIFIED MAY 2020)
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- EXISTING RIGHT OF WAY
- PARCEL LINES
- BARRIER/RETAINING WALL
- COUNTY LINE

PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001

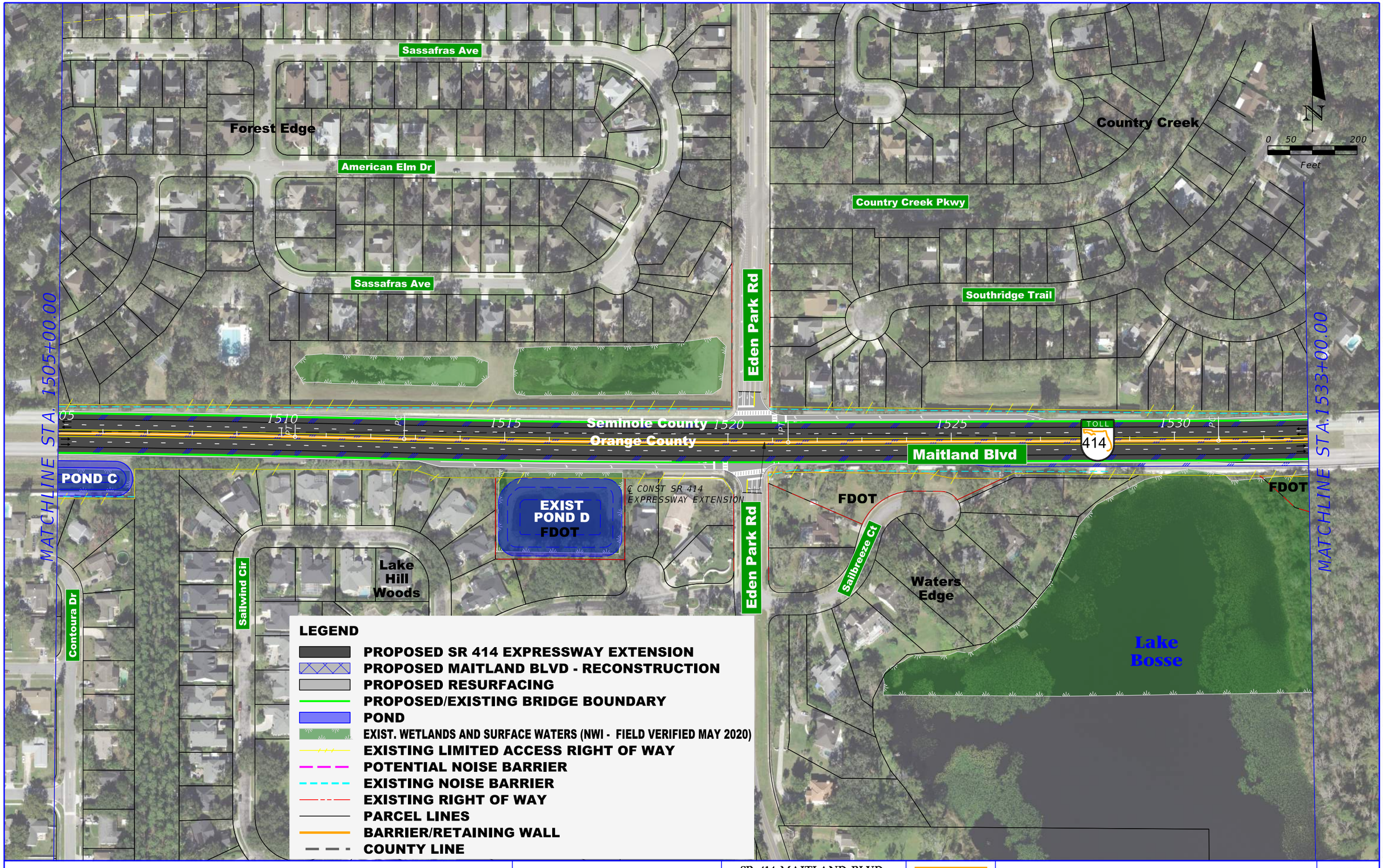
SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 ELEVATED PLAN SHEET (2)

SHEET NO. 007



PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001

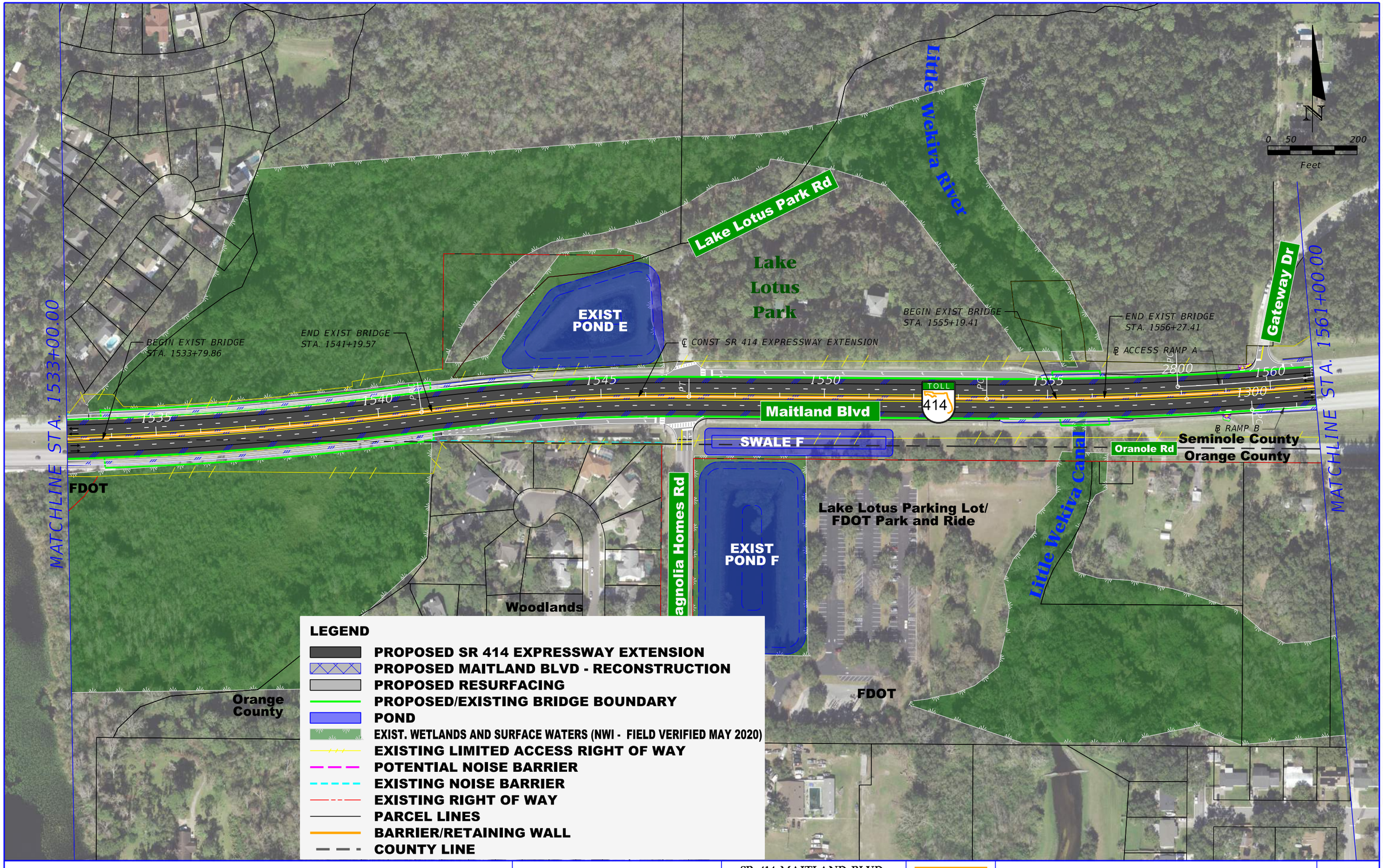
SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 ELEVATED PLAN SHEET (3)

SHEET NO. 008



LEGEND

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- PROPOSED MAITLAND BLVD - RECONSTRUCTION
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- COUNTY LINE

PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001

SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 ELEVATED
PLAN SHEET (4)

SHEET NO.
009

Lotus Vista Condominiums

Crescent Place Condominiums

Seminole State College

Adventist Gateway

0 50 200 Feet

N

Gateway Dr

Grand Regency Pointe

℄ CONST SR 414 EXPRESSWAY EXTENSION

℄ ACCESS RAMP A

℄ RAMP A

SWALE G

℄ ACCESS RAMP B

℄ RAMP B

Maitland Blvd

414

Oranole Rd

Seminole County
Orange County

MATCHLINE STA. 1561+00.00

MATCHLINE STA. 1589+00.00

END BRIDGE
STA. 1569+52.80

Orange County

Ava Lake Dr

Winfield St

Forest City Rd

434

Joyann St

EXIST POND G

LEGEND

- PROPOSED SR 414 EXPRESSWAY EXTENSION
- PROPOSED MAITLAND BLVD - RECONSTRUCTION
- PROPOSED RESURFACING
- PROPOSED/EXISTING BRIDGE BOUNDARY
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- COUNTY LINE

PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001

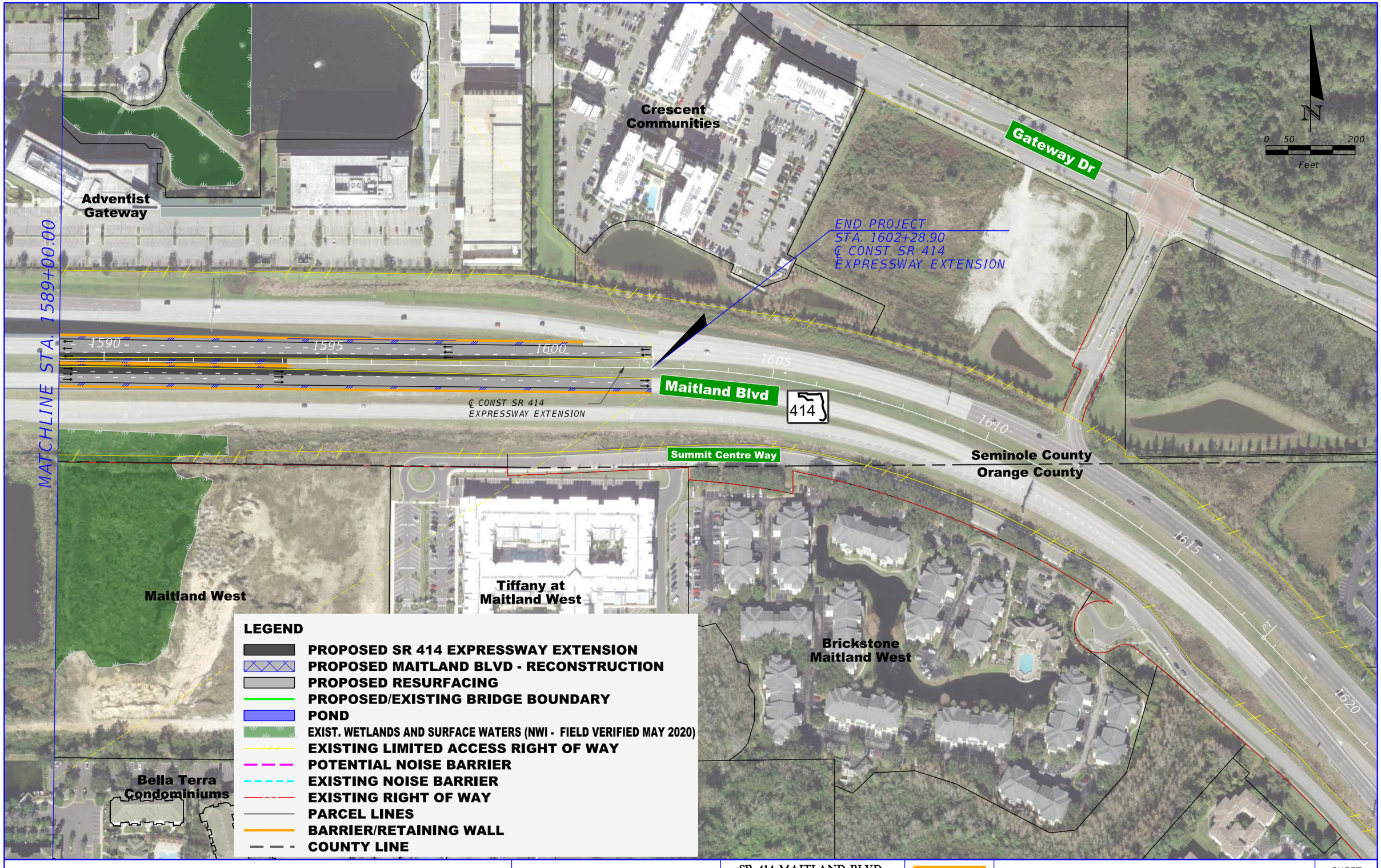
SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 ELEVATED PLAN SHEET (5)

SHEET NO. 010



PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001

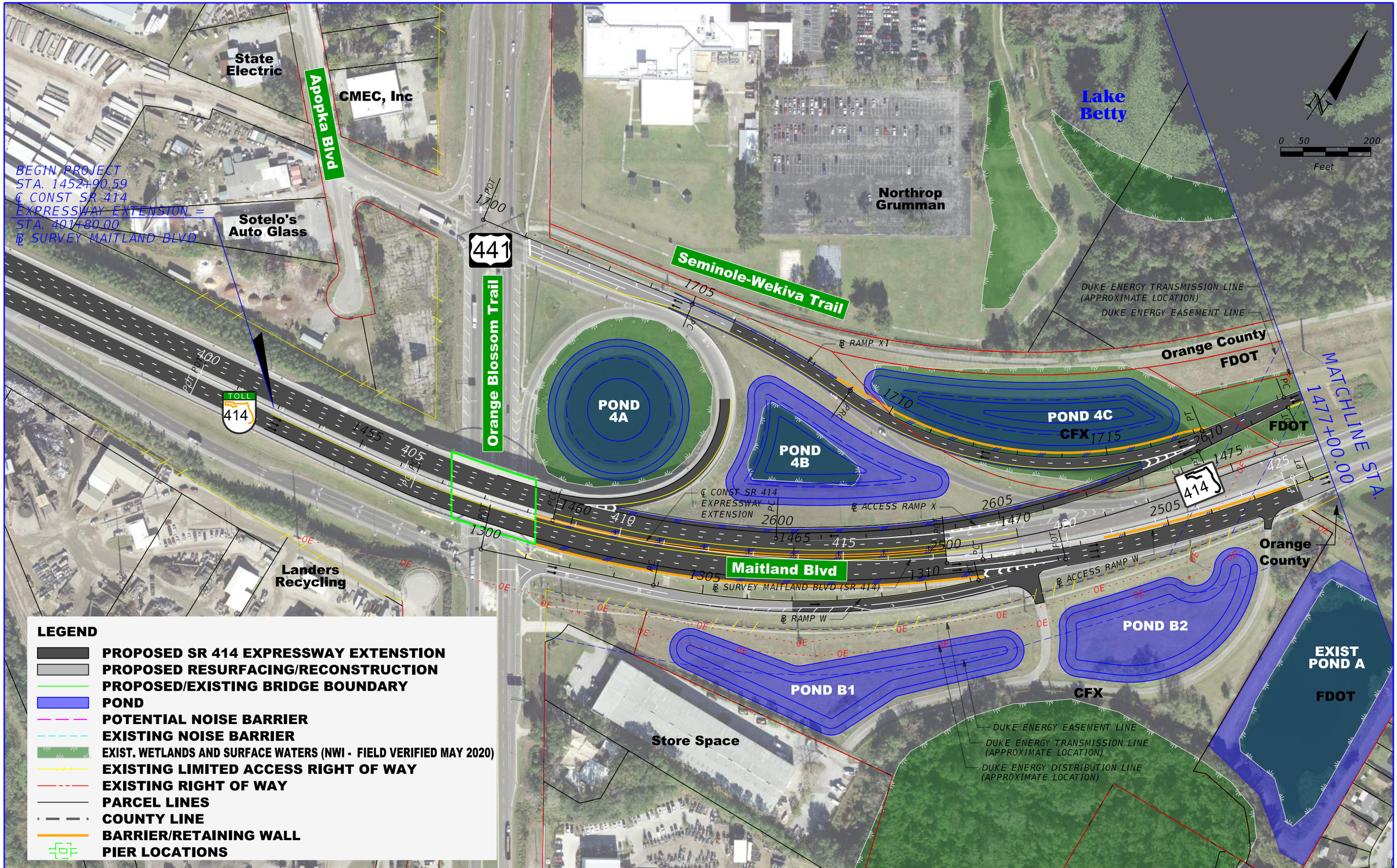
SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 ELEVATED PLAN SHEET (6)

SHEET NO. 011



LEGEND

- PROPOSED SR 414 EXPRESSWAY EXTENSTION
- PROPOSED RESURFACING/RECONSTRUCTION
- PROPOSED/EXISTING BRIDGE BOUNDARY
- POND
- POTENTIAL NOISE BARRIER
- EXISTING NOISE BARRIER
- EXIST. WETLANDS AND SURFACE WATERS (NWI - FIELD VERIFIED MAY 2020)
- EXISTING LIMITED ACCESS RIGHT OF WAY
- EXISTING RIGHT OF WAY
- PARCEL LINES
- COUNTY LINE
- BARRIER/RETAINING WALL
- PIER LOCATIONS

PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001

SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 AT-GRADE
PLAN SHEET (1)

SHEET NO.
012

PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001

SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 AT-GRADE PLAN SHEET (2)

SHEET NO. 013

LEGEND

- PROPOSED SR 414 EXPRESSWAY EXTENSTION
- PROPOSED RESURFACING/RECONSTRUCTION
- PROPOSED/EXISTING BRIDGE BOUNDARY
- POND
- POTENTIAL NOISE BARRIER
- EXISTING NOISE BARRIER
- EXIST. WETLANDS AND SURFACE WATERS (NWI - FIELD VERIFIED MAY 2020)
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- PARCEL LINES
- COUNTY LINE
- BARRIER/RETAINING WALL
- PIER LOCATIONS

Sassafras Ave
Forest Edge
American Elm Dr
Country Creek
Country Creek Pkwy
Southridge Trail
Sassafras Ave
Eden Park Rd
℄ CONST SR 414 EXPRESSWAY EXTENSION
MATCHLINE STA. 1505+00.00
505
510
1510
515
1515
520
1520
525
1525
530
1530
PT
PC
Seminole County
Orange County
Maitland Blvd
414
MATCHLINE STA.1533+00.00
POND C
EXIST POND D FDOT
℄ SURVEY MAITLAND BLVD (SR 414)
FDOT
FDOT
Eden Park Rd
Sailbreeze Ct
Waters Edge
Sailwind Cir
Lake Hill Woods
Lake Bosse
Lake Hill
0 50 200
Feet

PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
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200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001

SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 AT-GRADE PLAN SHEET (3)

SHEET NO. 014

LEGEND

- PROPOSED SR 414 EXPRESSWAY EXTENSTION
- PROPOSED RESURFACING/RECONSTRUCTION
- PROPOSED/EXISTING BRIDGE BOUNDARY
- POND
- POTENTIAL NOISE BARRIER
- EXISTING NOISE BARRIER
- EXIST. WETLANDS AND SURFACE WATERS (NWI - FIELD VERIFIED MAY 2020)
- EXISTING LIMITED ACCESS RIGHT OF WAY
- EXISTING RIGHT OF WAY
- PARCEL LINES
- COUNTY LINE
- BARRIER/RETAINING WALL
- PIER LOCATIONS

N

0 50 200
Feet

Little Wekiva River

Lake Lotus Park Rd

Lake Lotus Park

END EXISTING BRIDGE
STA. 556+28.06

BEGIN EXISTING BRIDGE
STA. 555+20.04

Gateway Dr

END EXISTING BRIDGE
STA. 541+21.40

BEGIN EXISTING BRIDGE
STA. 533+78.58

EXIST POND E

℄ SURVEY
MAITLAND BLVD
(SR 414)

℄ ACCESS RAMP A

2800

1300

℄ RAMP B

Maitland Blvd

414

SWALE F

Oranole Rd

Seminole County
Orange County

℄ CONST SR 414
EXPRESSWAY
EXTENSION

Magnolia Homes Rd

EXIST POND F

Lake Lotus Parking Lot/
FDOT Park and Ride

Little Wekiva Canal

MATCHLINE STA. 1533+00.00

MATCHLINE STA. 1561+00.00

FDOT

END EXISTING BRIDGE
STA. 541+18.59

BEGIN EXISTING BRIDGE
STA. 533+81.41

Woodlands
by the Lake

Orange
County

FDOT

PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001

SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 AT-GRADE
PLAN SHEET (4)

SHEET NO.
015

Lotus Vista Condominiums

Crescent Place Condominiums

Seminole State College

Adventist Gateway

Gateway Dr

Grand Regency Pointe

℄ CONST SR 414 EXPRESSWAY EXTENSION

℄ SURVEY MAITLAND BLVD (SR 414)

℄ ACCESS RAMP A

℄ RAMP A

SWALE G

Maitland Blvd

414

℄ ACCESS RAMP B

℄ RAMP B

MATCHLINE STA. 1561+00.00

MATCHLINE STA. 1589+00.00

Oranole Rd

Seminole County
Orange County

Winfield St

Ava Lake Dr

Joyann St

Forest City Rd

434

EXIST POND G

Orange County

0 50 200
Feet

N

LEGEND

- PROPOSED SR 414 EXPRESSWAY EXTENSTION
- PROPOSED RESURFACING/RECONSTRUCTION
- PROPOSED/EXISTING BRIDGE BOUNDARY
- POND
- POTENTIAL NOISE BARRIER
- EXISTING NOISE BARRIER
- EXIST. WETLANDS AND SURFACE WATERS (NWI - FIELD VERIFIED MAY 2020)
- EXISTING LIMITED ACCESS RIGHT OF WAY
- EXISTING RIGHT OF WAY
- PARCEL LINES
- COUNTY LINE
- BARRIER/RETAINING WALL
- PIER LOCATIONS

PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
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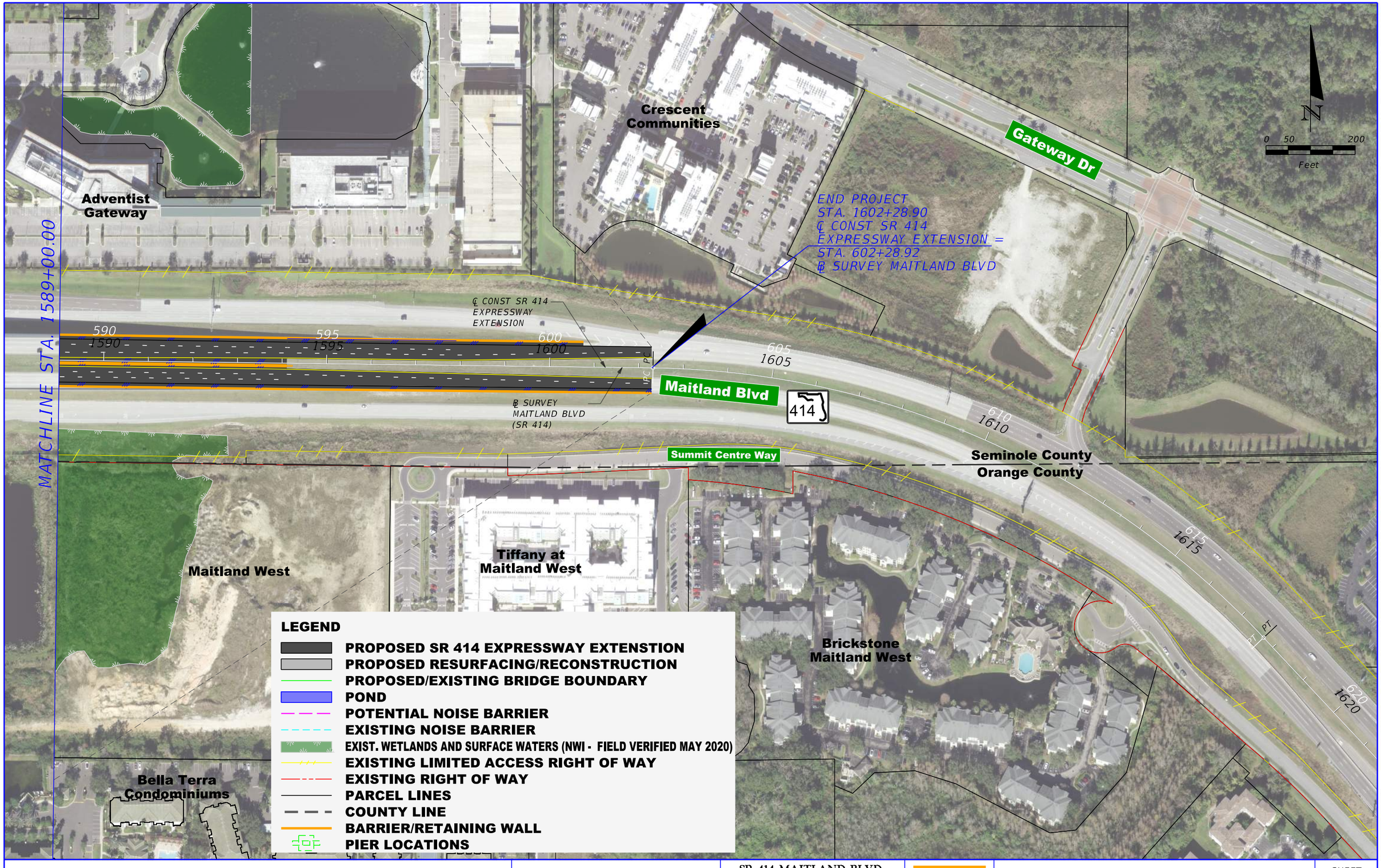
SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 AT-GRADE PLAN SHEET (5)

SHEET NO. 016



PRELIMINARY - SUBJECT TO CHANGE
FINAL 4/6/2022

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
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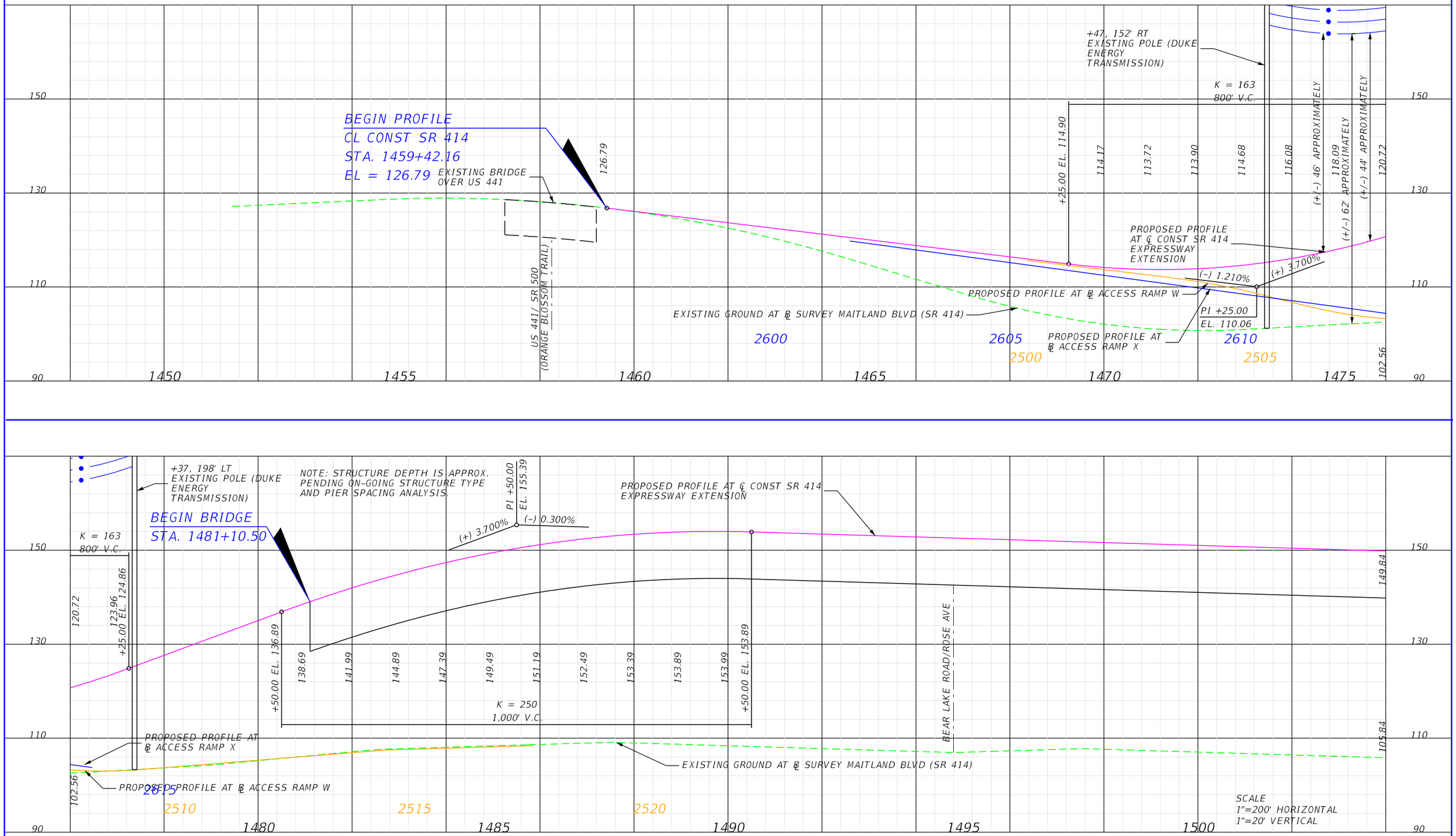
SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 AT-GRADE
PLAN SHEET (6)

SHEET NO.
017



PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

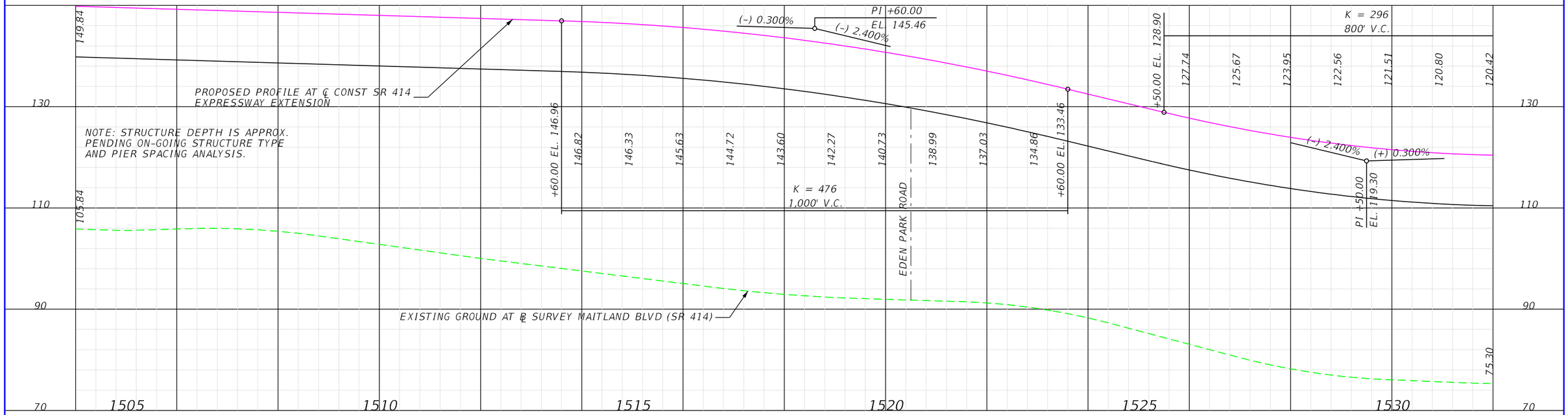
SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

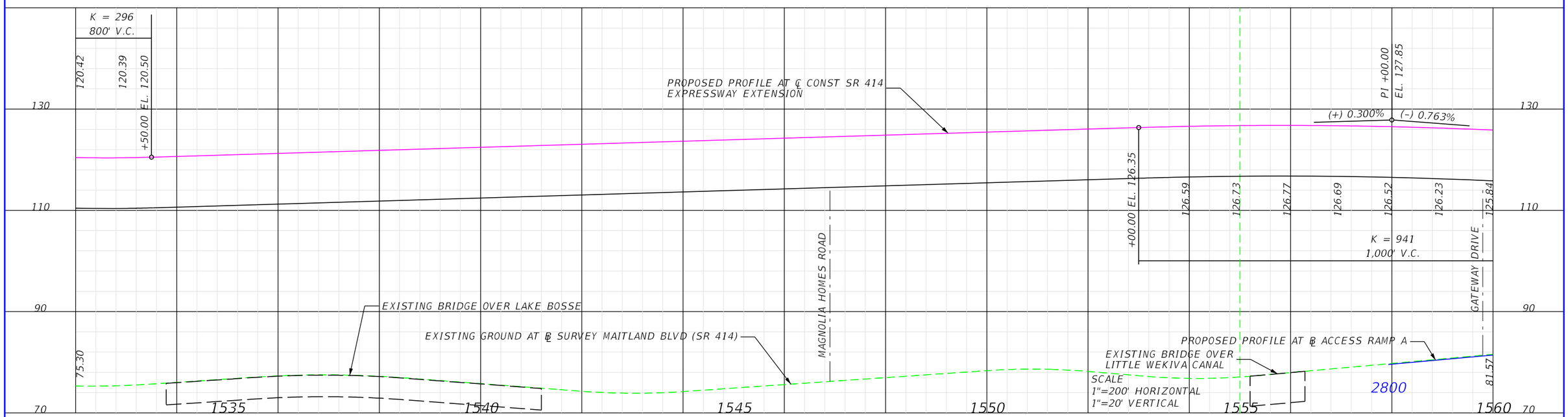
ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 EXPRESSWAY EXTENSION PROFILE SHEET (1)

SHEET NO. 018





PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
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CERTIFICATE OF AUTHORIZATION No. 000072

SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 EXPRESSWAY EXTENSION PROFILE SHEET (2)

SHEET NO. 019

NOTE: STRUCTURE DEPTH IS APPROX.
PENDING ON-GOING STRUCTURE TYPE
AND PIER SPACING ANALYSIS.

PROPOSED PROFILE AT ℄ CONST SR 414
EXPRESSWAY EXTENSION

END BRIDGE
STA. 1569+52.80

K = 941
1,000' V.C.

+00.00 EL. 124.03

125.84
125.34
124.71

81.57

K = 410
800' V.C.

+50.00 EL. 115.26

114.91
114.39
114.11
114.08
114.29
114.75
115.45
116.39

+50.00 EL. 116.96

(-) 0.763%
(+) 1.187%

PI +50.00
EL. 112.21

EXISTING BRIDGE
OVER SR 434

119.15

118.34

SR 434
(FOREST CITY ROAD)

PROPOSED PROFILE AT ℄ ACCESS RAMP A
PROPOSED PROFILE AT ℄ ACCESS RAMP B

EXISTING GROUND AT ℄ SURVEY MAITLAND BLVD (SR 414)

END PROFILE
CL CONST SR 414
STA. 1584+15.22
EL = 118.90

130
110
90
70

1560 1565 1570 1575 1580 1585

2805 2700 2810 2705 2815 2710 2820 2715 2825

118.34

EXISTING GROUND AT ℄ SURVEY MAITLAND BLVD (SR 414)

1590 1595 1600 1605 1610 1615

SCALE
1"=200' HORIZONTAL
1"=20' VERTICAL

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

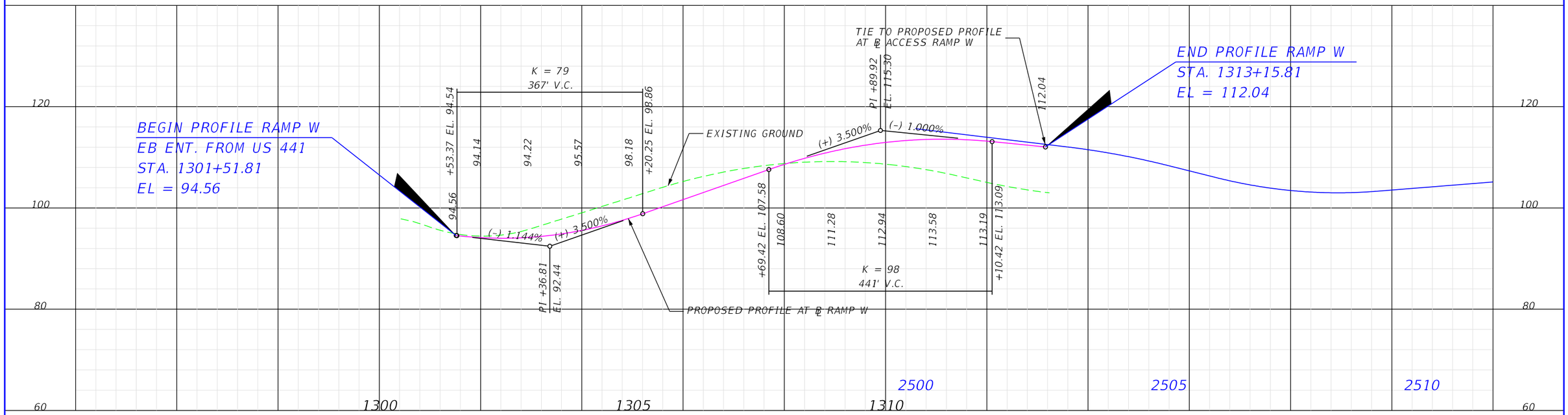
SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

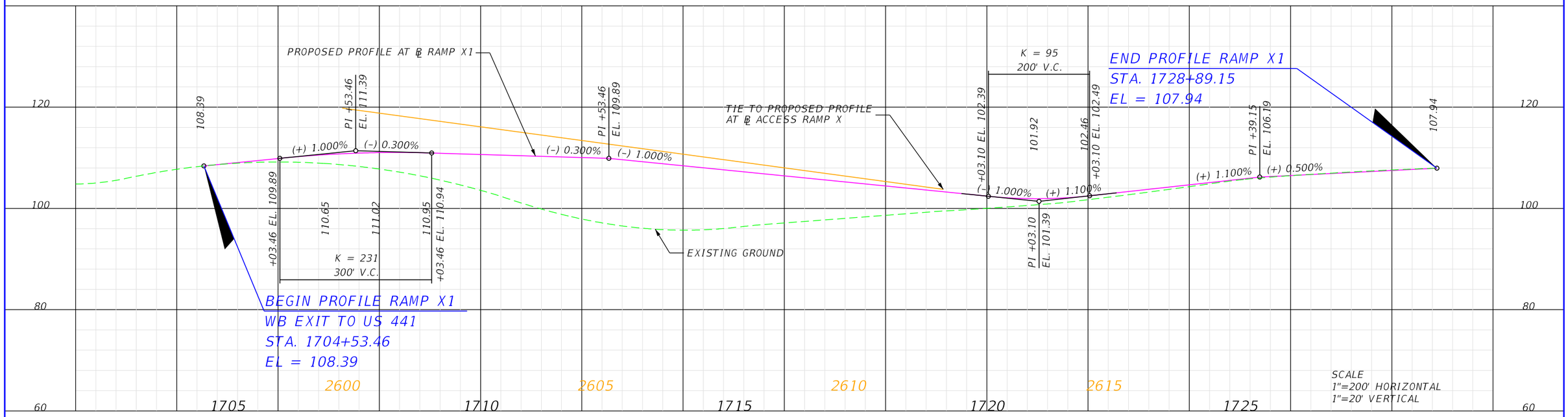
ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

SR 414 EXPRESSWAY EXTENSION PROFILE SHEET (3)

SHEET NO. 020





PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
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SR 414 MAITLAND BLVD.
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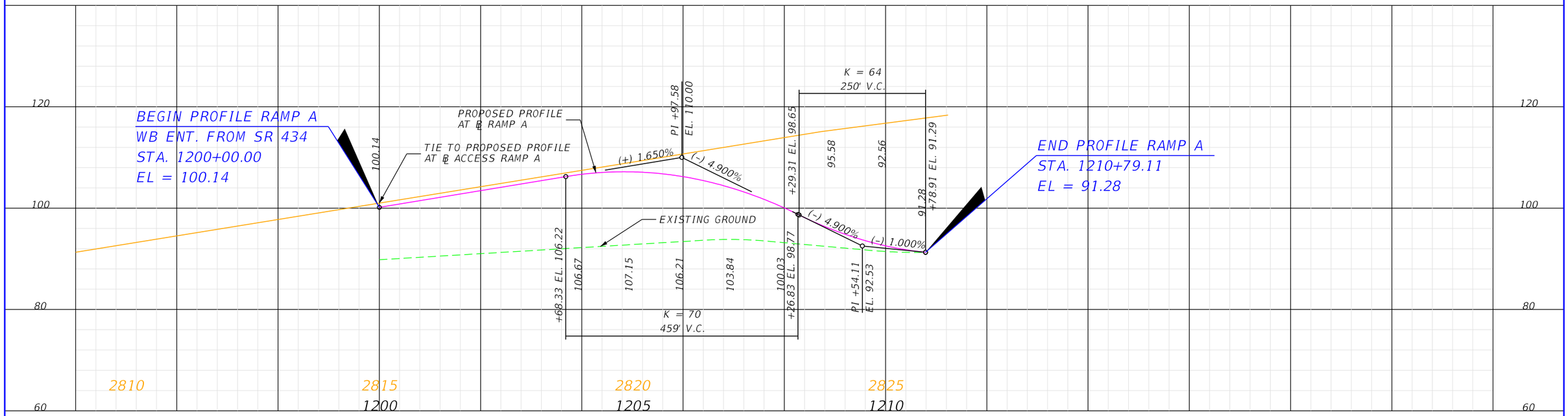
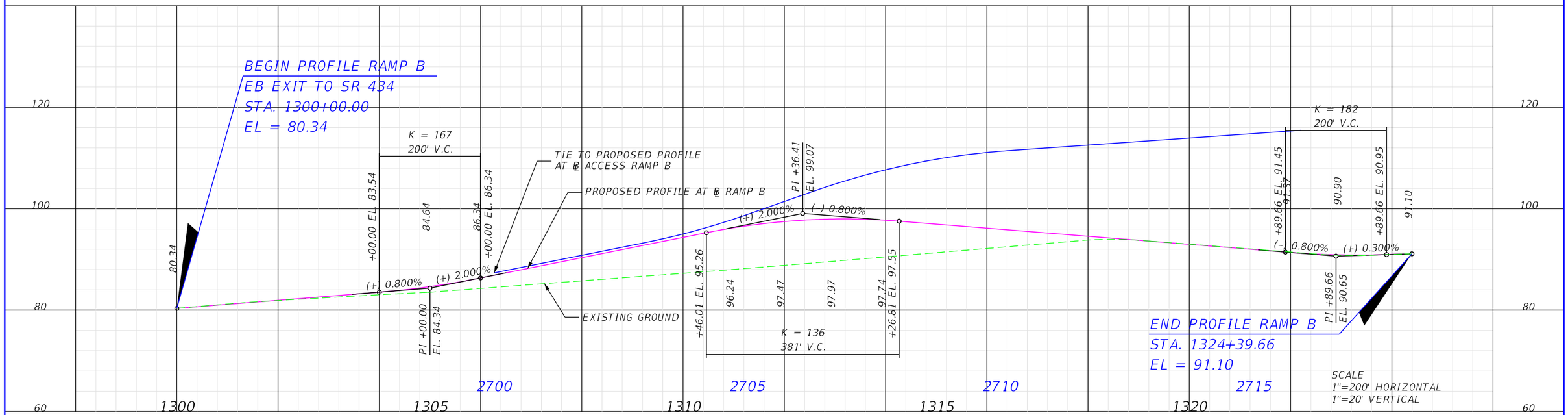
ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

RAMPS W AND X1 PROFILE SHEET (4)

SHEET NO. 021





PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
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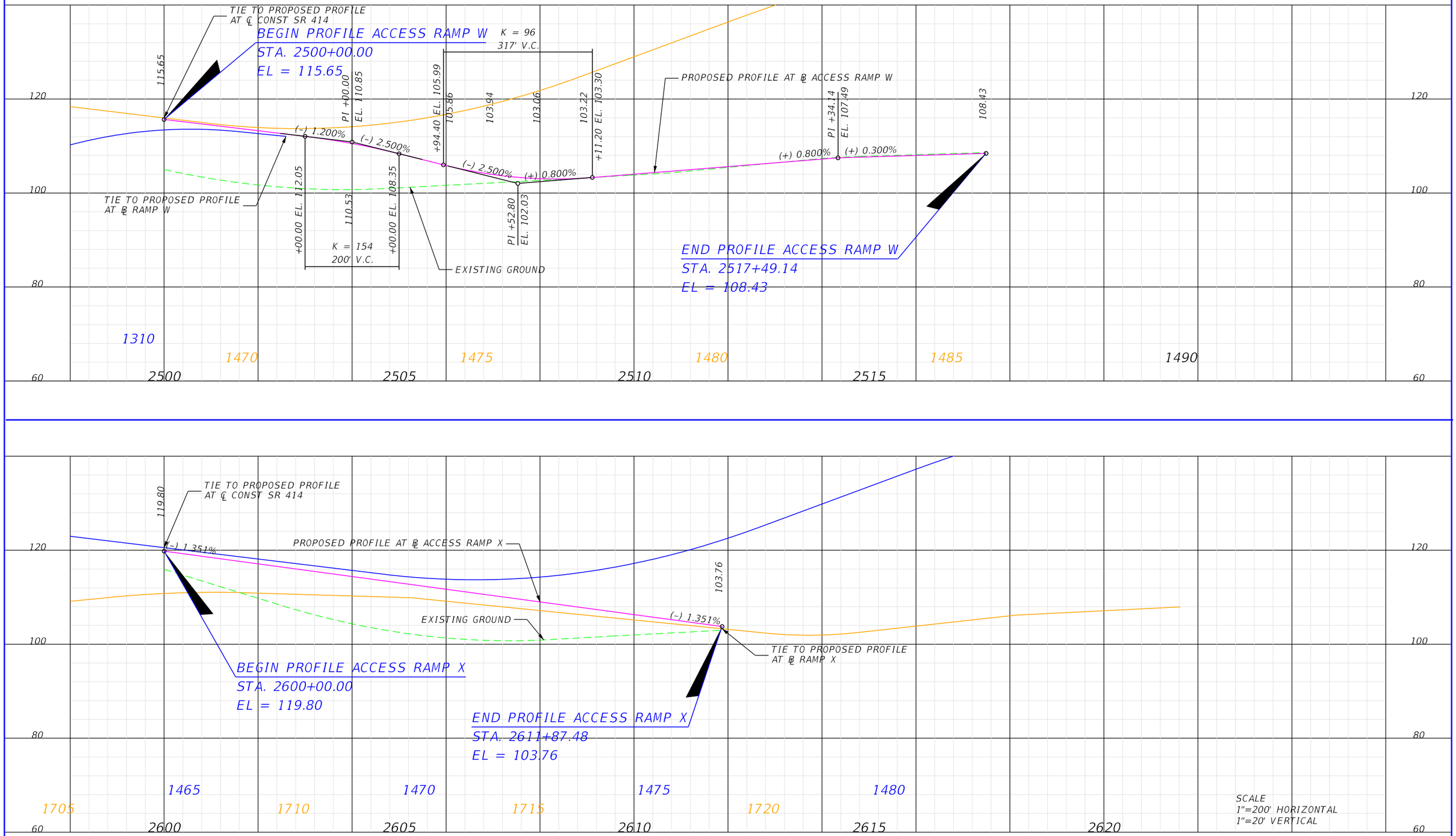
SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

RAMPS A AND B PROFILE SHEET (5)

SHEET NO. 022



PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
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SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

ACCESS RAMPS X AND W PROFILE SHEET (6)

SHEET NO. 023

BEGIN PROFILE ACCESS RAMP A
WB ENT. FROM SR 434
STA. 2800+00.00
EL = 79.56

79.56

(+) 0.900%

(+) 1.200%

(+) 1.200%

(+) 1.617%

P.I. +50.00
EL. 81.81

P.I. +00.00
EL. 84.81

PROPOSED PROFILE AT ℄ ACCESS RAMP A

TIE TO PROPOSED PROFILE AT ℄ RAMP A

EXISTING GROUND

TIE TO PROPOSED PROFILE
AT ℄ CONST SR 414

118.36

P.I. +73.42
EL. 115.11

(+) 1.617%

(+) 1.300%

END PROFILE ACCESS RAMP A
STA. 2826+23.42
EL = 118.36

BEGIN PROFILE ACCESS RAMP B
STA. 2700+00.00
EL = 87.36

END PROFILE ACCESS RAMP B
STA. 2715+93.48
EL = 115.48

115.48

TIE TO PROPOSED PROFILE
AT ℄ CONST SR 414

87.36

K = 133
200' V.C.

+00.00 EL. 93.36

95.73

+00.00 EL. 98.86

(+) 2.000%

(+) 3.500%

(+) 3.500%

P.I. +00.00
EL. 95.36

P.I. +20.19
EL. 110.07

(+) 0.700%

+29.79 EL. 103.40

105.68

108.29

110.17

111.32

+10.59 EL. 111.40

K = 136
381' V.C.

PROPOSED PROFILE AT
℄ ACCESS RAMP B

EXISTING GROUND

TIE TO PROPOSED PROFILE AT
℄ RAMP B

SCALE
1"=200' HORIZONTAL
1"=20' VERTICAL

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
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CERTIFICATE OF AUTHORIZATION No. 000072

SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

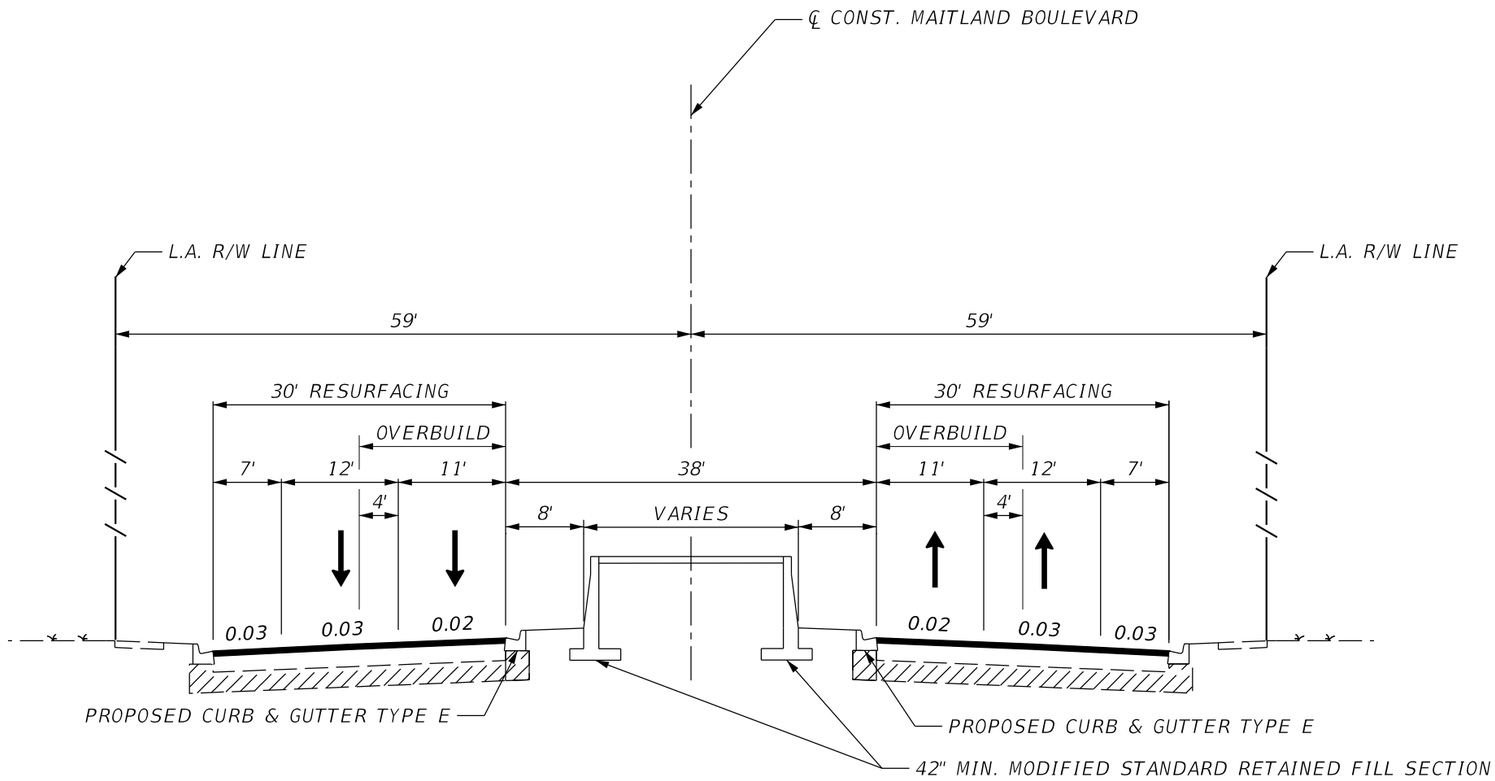
ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

ACCESS RAMPS A AND B PROFILE SHEET (7)

SHEET NO. 024

Appendix B
Typical Section Package



TYPICAL SECTION 1
MAITLAND BOULEVARD OVERBUILD AND RESTRIPE BETWEEN PIER LOCATIONS

DESIGN SPEED = 45 MPH

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

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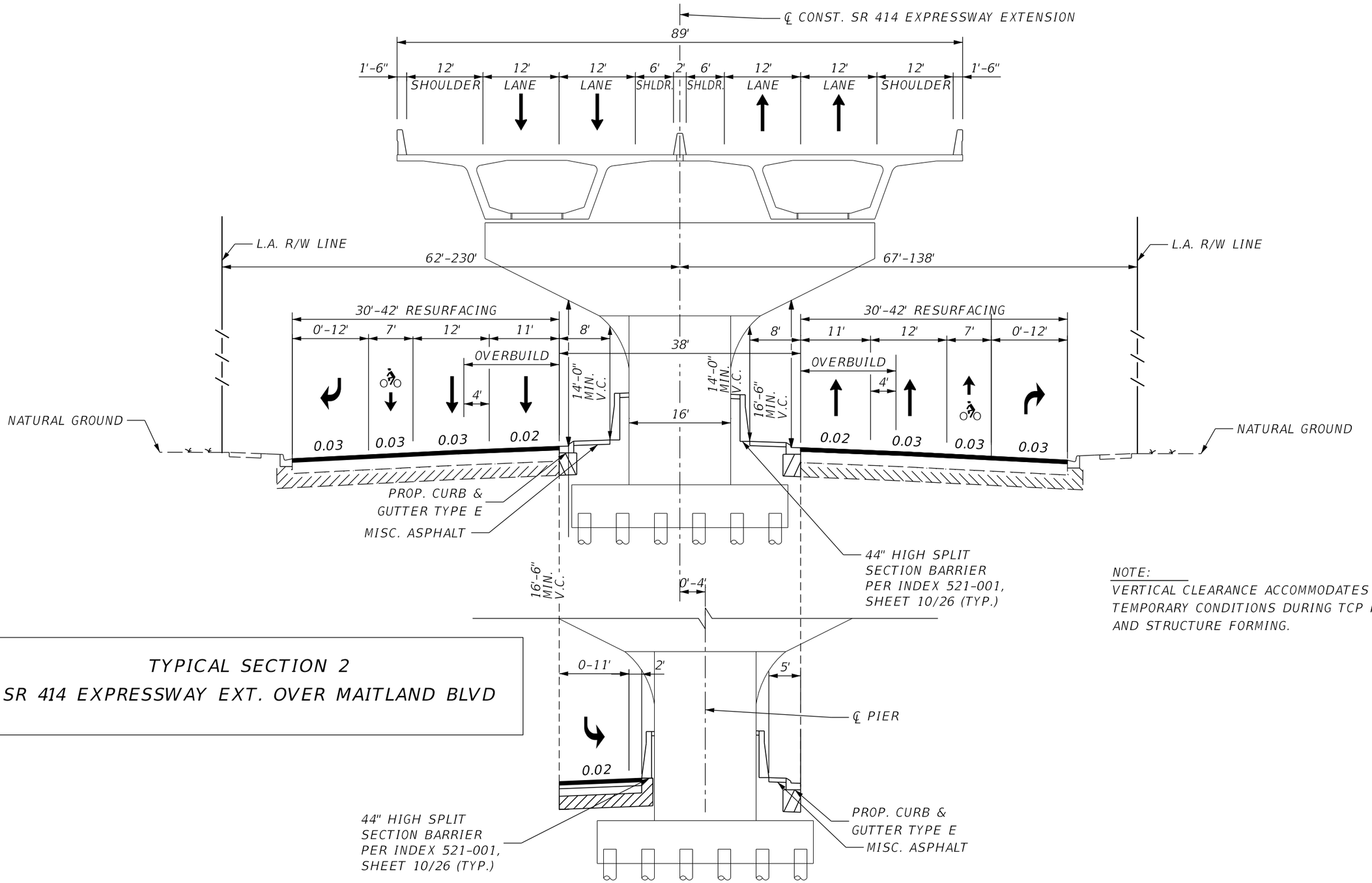
SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

SHEET NO. 001



TYPICAL SECTION 2
SR 414 EXPRESSWAY EXT. OVER MAITLAND BLVD

LEFT TURN LANE ON MAITLAND BOULEVARD
(WESTBOUND SHOWN, MIRROR FOR EASTBOUND)

NOTE:
VERTICAL CLEARANCE ACCOMMODATES TEMPORARY CONDITIONS DURING TCP PHASING AND STRUCTURE FORMING.

DESIGN SPEED:
EXPRESSWAY = 50 MPH
MAITLAND BLVD = 45 MPH

PRELIMINARY - SUBJECT TO CHANGE

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P.E. LICENSE NO. 60883

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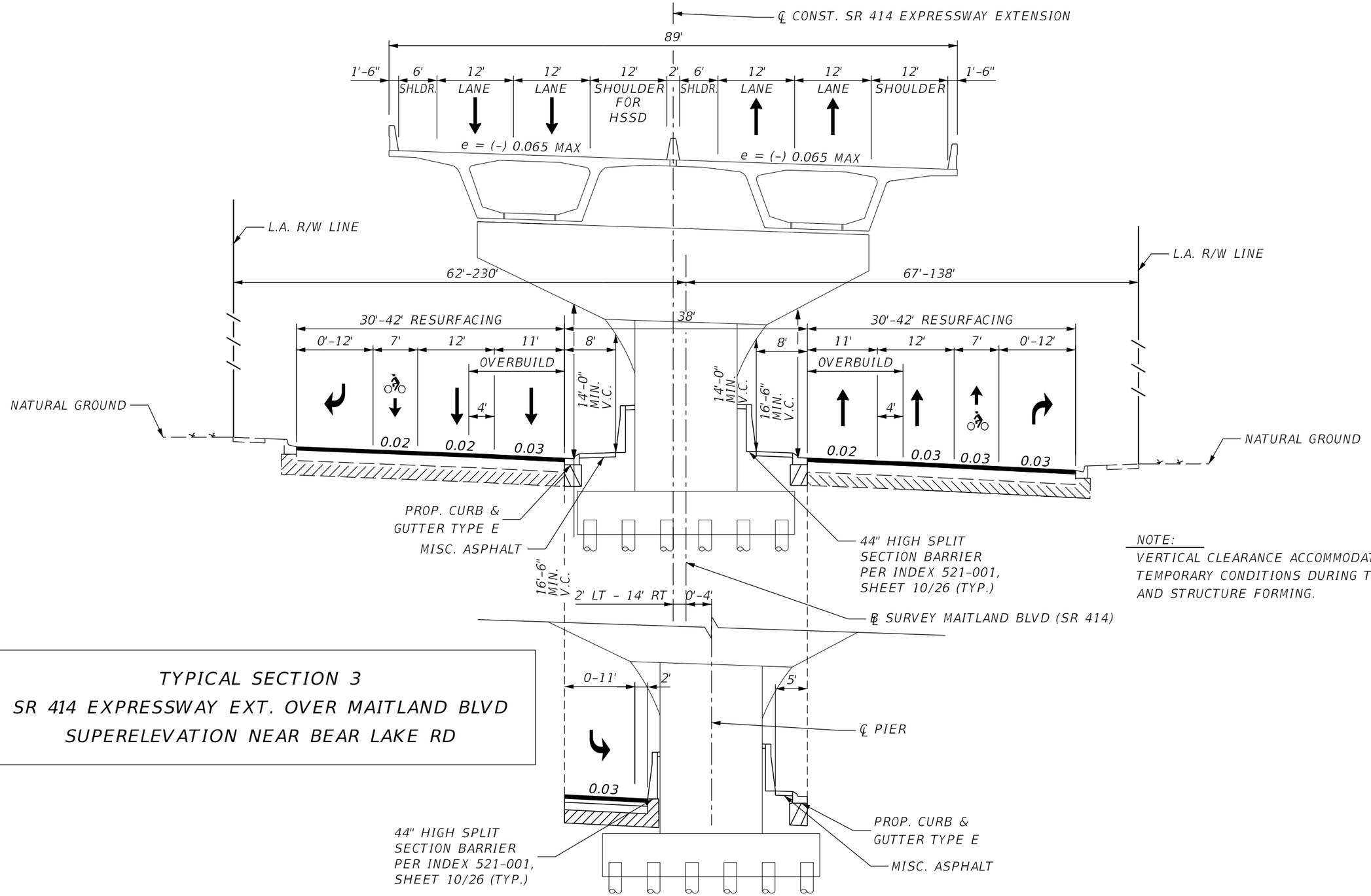
SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

SHEET NO. 002



NOTE:
VERTICAL CLEARANCE ACCOMMODATES TEMPORARY CONDITIONS DURING TCP PHASING AND STRUCTURE FORMING.

TYPICAL SECTION 3
SR 414 EXPRESSWAY EXT. OVER MAITLAND BLVD
SUPERELEVATION NEAR BEAR LAKE RD

LEFT TURN LANE ON MAITLAND BOULEVARD
(WESTBOUND SHOWN, MIRROR FOR EASTBOUND)

DESIGN SPEED:
EXPRESSWAY = 50 MPH
MAITLAND BLVD = 45 MPH

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

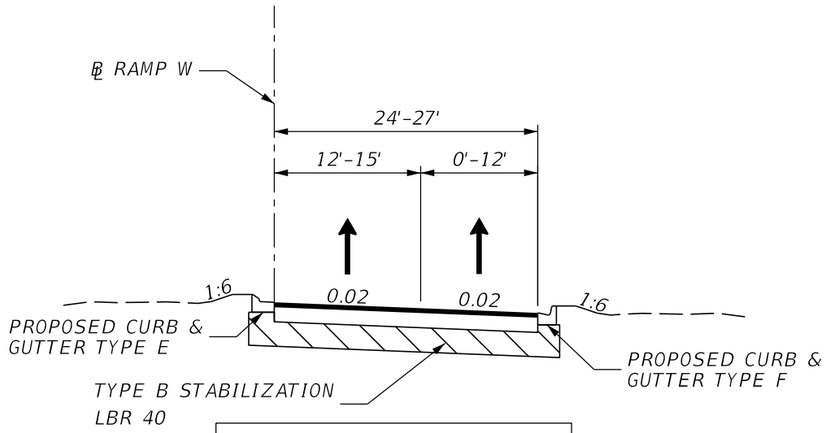
JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION US 441 TO SR 434	
ROAD NO.	PROJECT NO.
SR 414	414-227

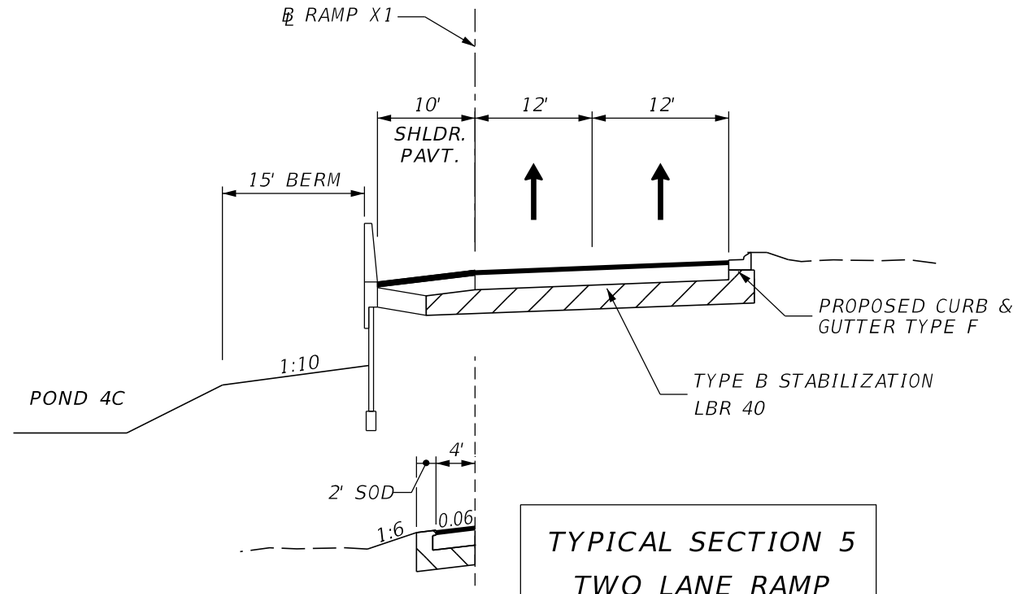
CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

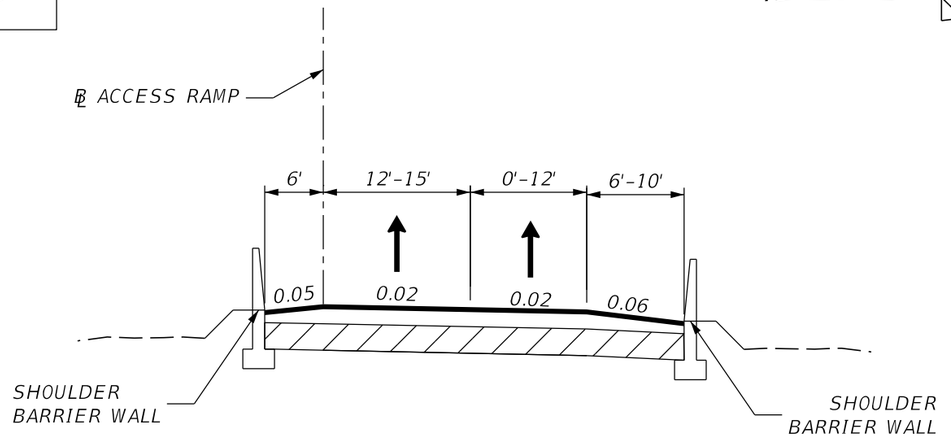
SHEET NO. 003



TYPICAL SECTION 4
TWO LANE RAMP



TYPICAL SECTION 5
TWO LANE RAMP



TYPICAL SECTION 6
ONE/TWO LANE RAMP
(EASTBOUND SHOWN, MIRROR FOR WESTBOUND)

DESIGN SPEED:
ACCESS RAMP A, B = 50 MPH
ACCESS RAMP W = 50 MPH
ACCESS RAMP X = VARIES 45-50 MPH
RAMP A, B = 40 MPH
RAMP W, X1 = 45 MPH

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

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SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

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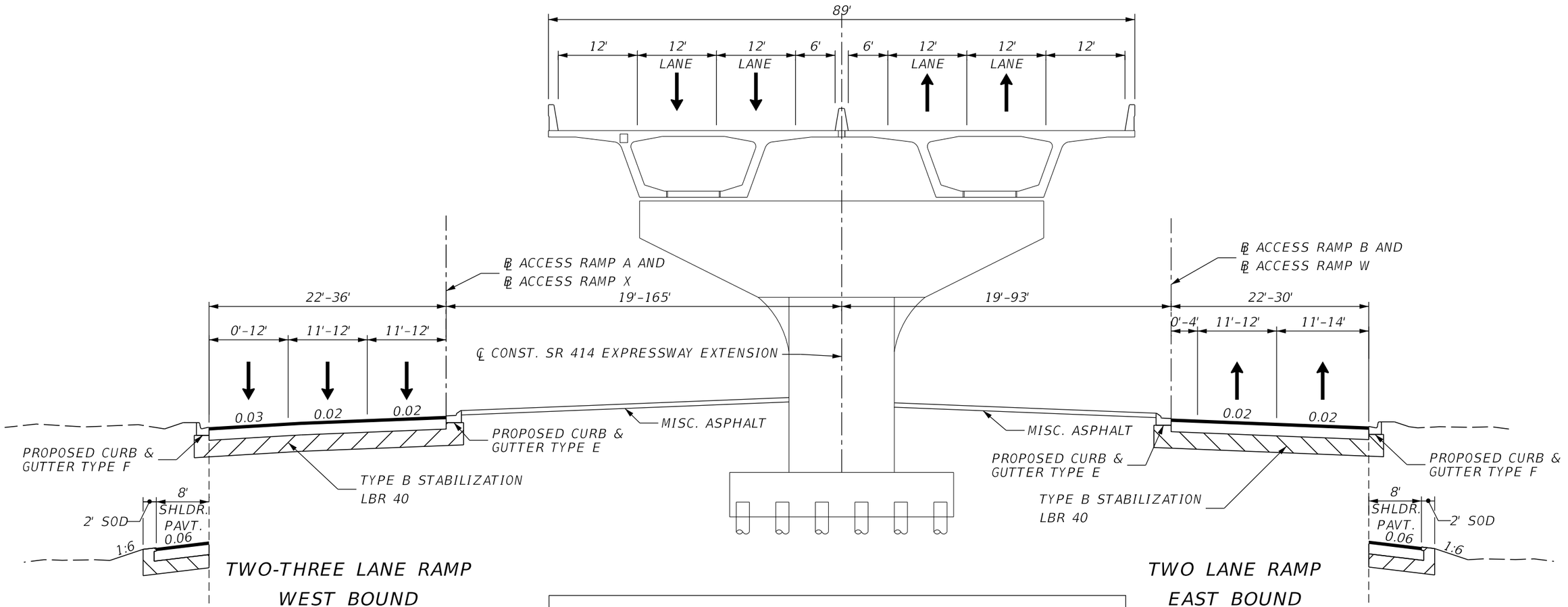
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

SHEET NO. 004



TYPICAL SECTION 7
EXPRESSWAY ACCESS AT PROJECT TERMINALS

DESIGN SPEED:
ACCESS RAMP A, B = 50 MPH
ACCESS RAMP W = 50 MPH
ACCESS RAMP X = VARIES 45-50 MPH
RAMP A, B = 40 MPH
RAMP W, X1 = 45 MPH

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
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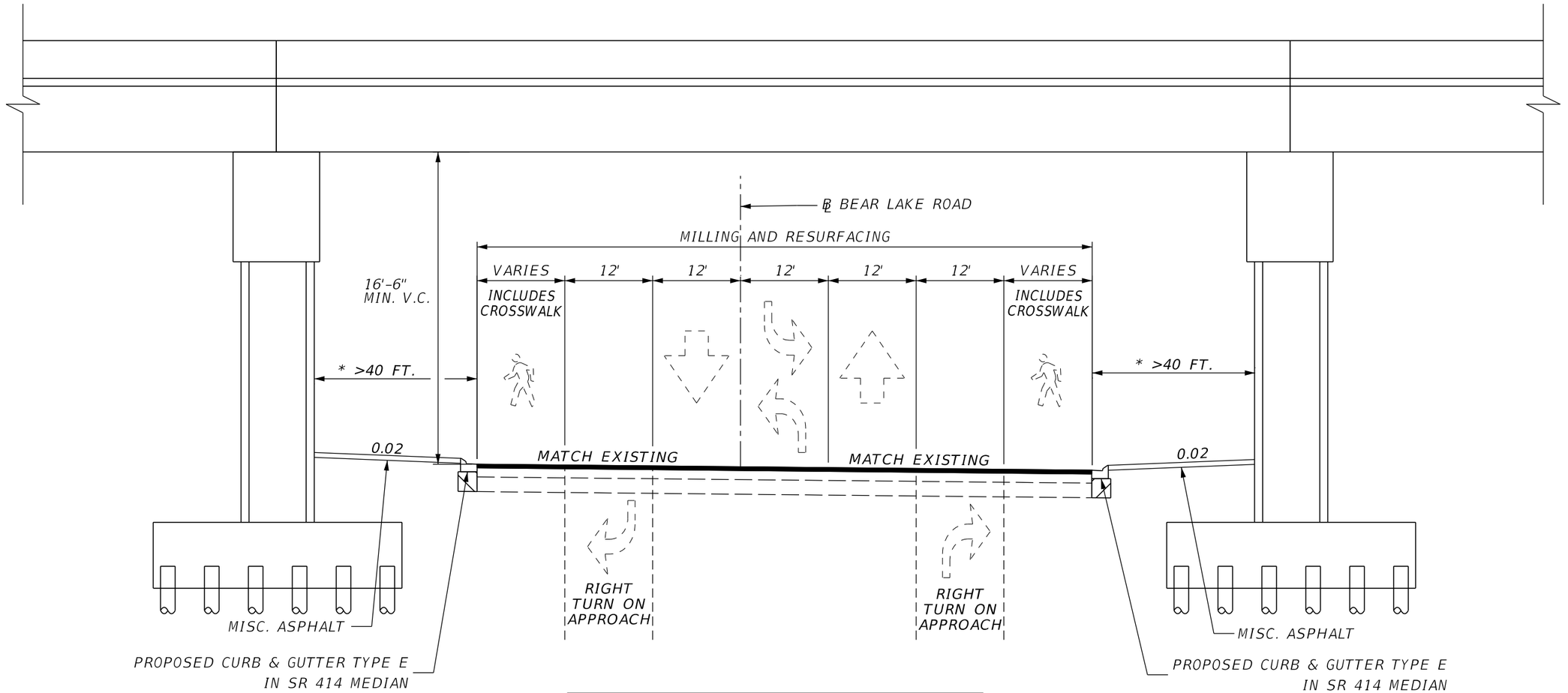
SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

SHEET NO. 005



TYPICAL SECTION 8
BEAR LAKE ROAD / ROSE AVE
(LOOKING NORTH)

* EXCEEDS REQUIREMENTS FOR CLEARZONE AND LATERAL OFFSET.

POSTED SPEED:
BEAR LAKE RD = 35 MPH
ROSE AVE = 40 MPH

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

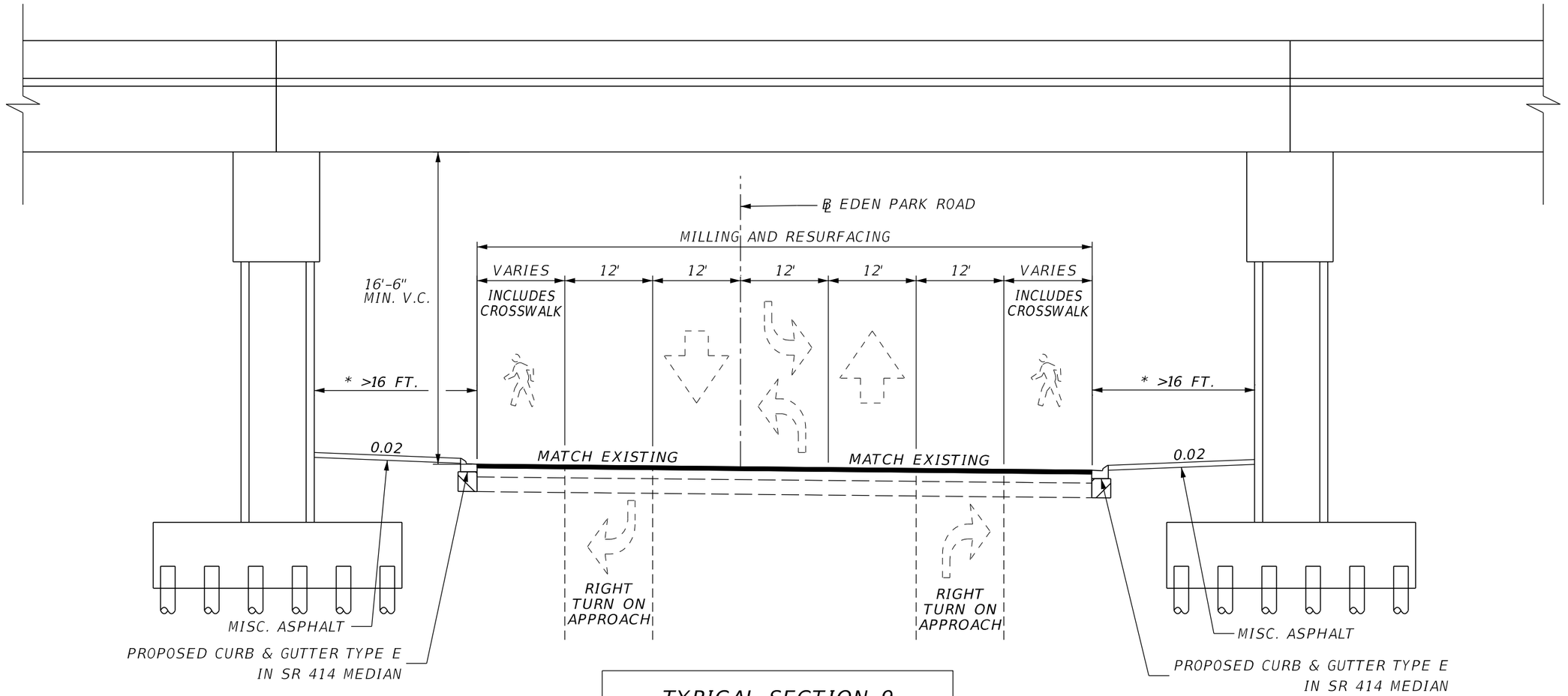
SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

SHEET NO. 006



TYPICAL SECTION 9
EDEN PARK ROAD

* EXCEEDS REQUIREMENTS FOR CLEARZONE AND LATERAL OFFSET.

POSTED SPEED
EDEN PARK RD (SOUTH OF SR 414) = 35 MPH
EDEN PARK RD (NORTH OF SR 414) = 40 MPH

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

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ORLANDO, FL 32801; PHONE (407) 903-5001
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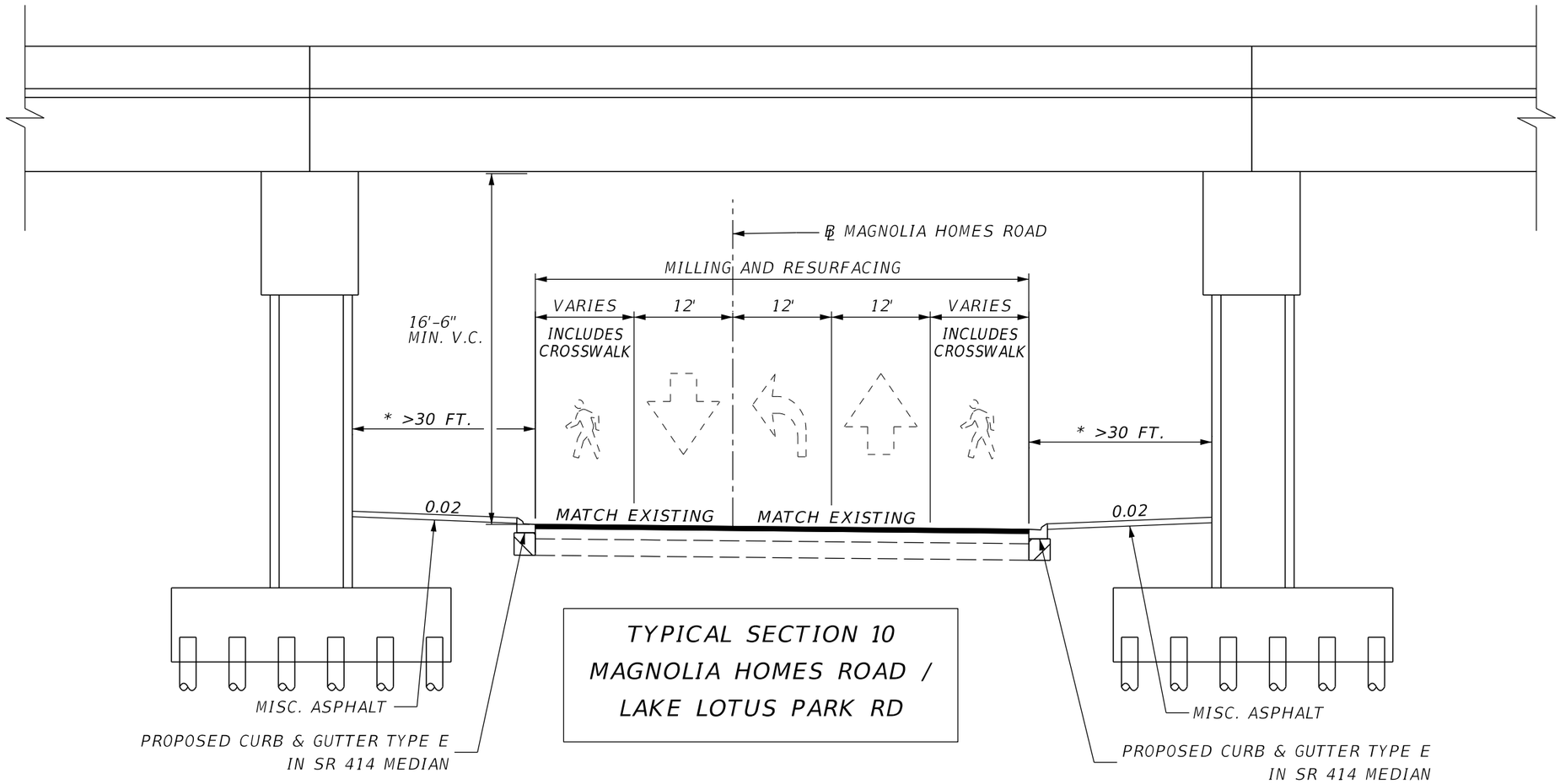
SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

SHEET NO. 007



TYPICAL SECTION 10
MAGNOLIA HOMES ROAD / LAKE LOTUS PARK RD

* EXCEEDS REQUIREMENTS FOR CLEARZONE AND LATERAL OFFSET.

POSTED SPEED:
MAGNOLIA HOMES RD = 40 MPH

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

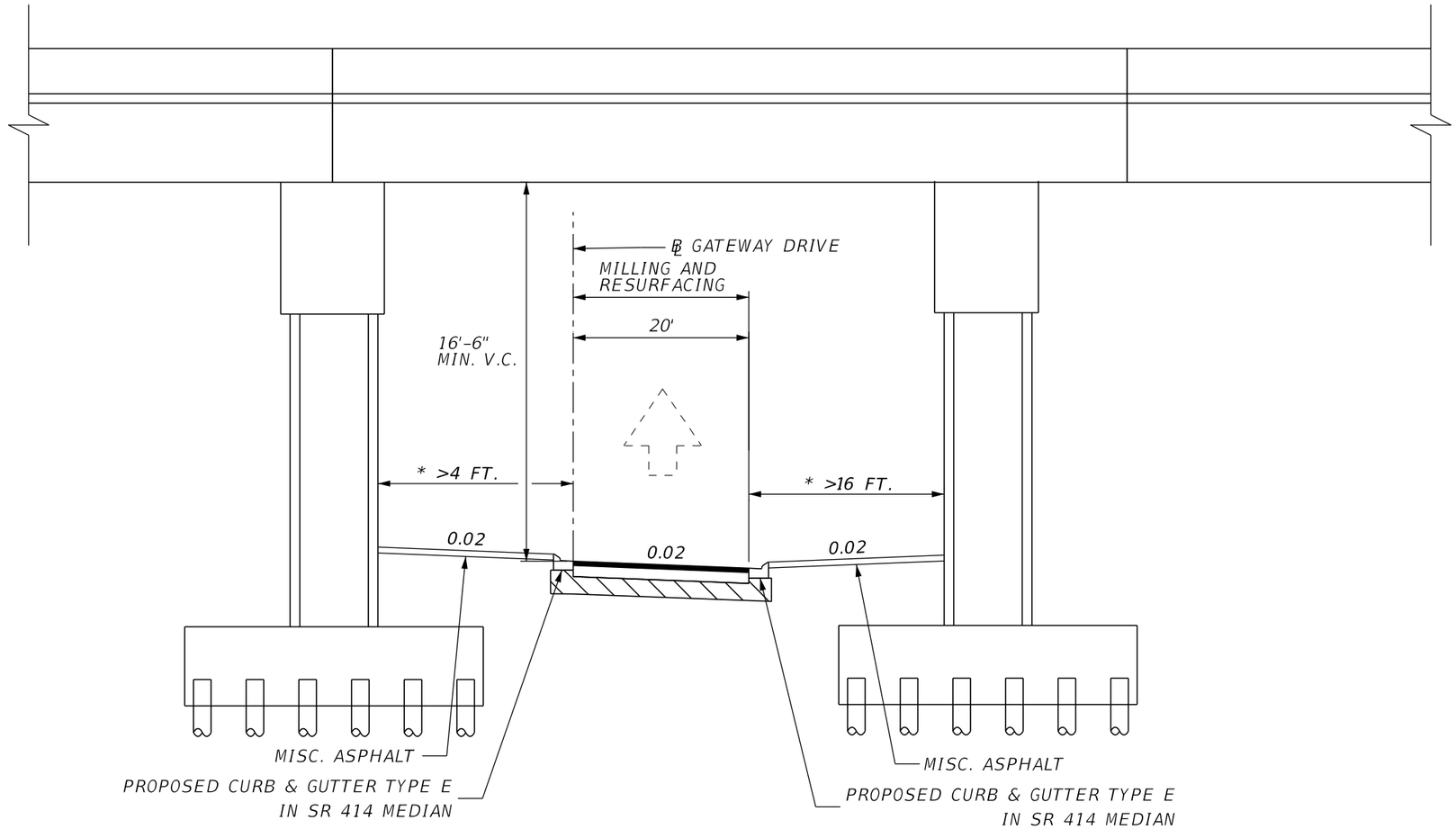
SR 414 MAITLAND BLVD. EXPRESSWAY EXTENSION US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

SHEET NO. 008



TYPICAL SECTION 11
GATEWAY DRIVE

* EXCEEDS REQUIREMENTS FOR CLEARZONE AND LATERAL OFFSET.

POSTED SPEED:
GATEWAY DR = 30 MPH

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

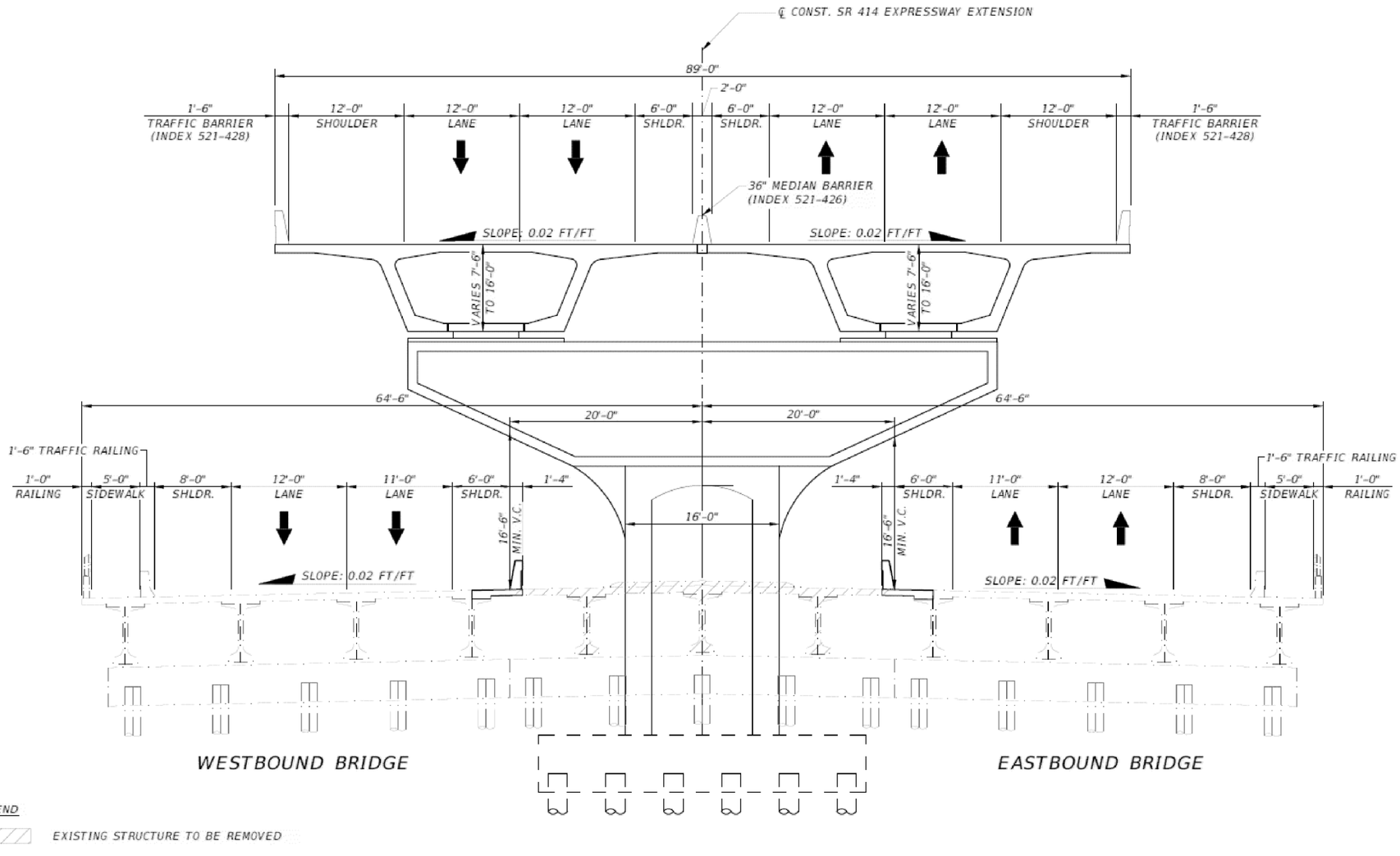
SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

SHEET NO. 009



EXISTING BRIDGE TYPICAL SECTION 1
MAITLAND BLVD. OVER LAKE BOSSE
WITH PROPOSED SR 414 VIADUCT

DESIGN SPEED:
EXPRESSWAY = 50 MPH
MAITLAND BLVD = 45 MPH

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

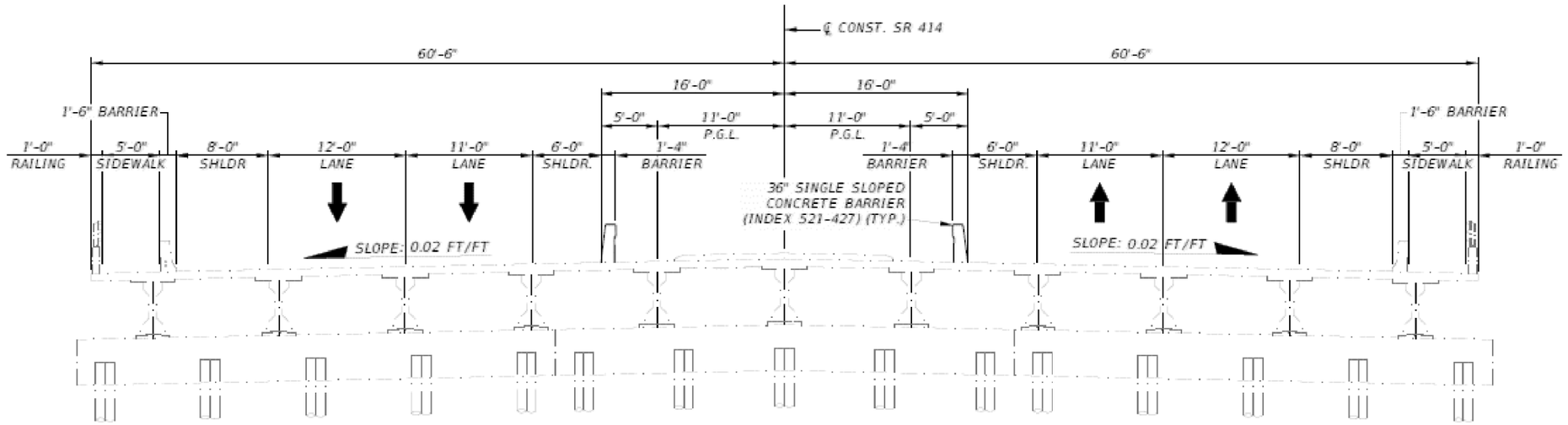
SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

SHEET NO. 010



EXISTING BRIDGE TYPICAL SECTION 2
MAITLAND BLVD. OVER LITTLE WEKIVA CANAL
(EXPRESSWAY SPANS BRIDGE)

DESIGN SPEED:
MAITLAND BLVD = 45 MPH

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

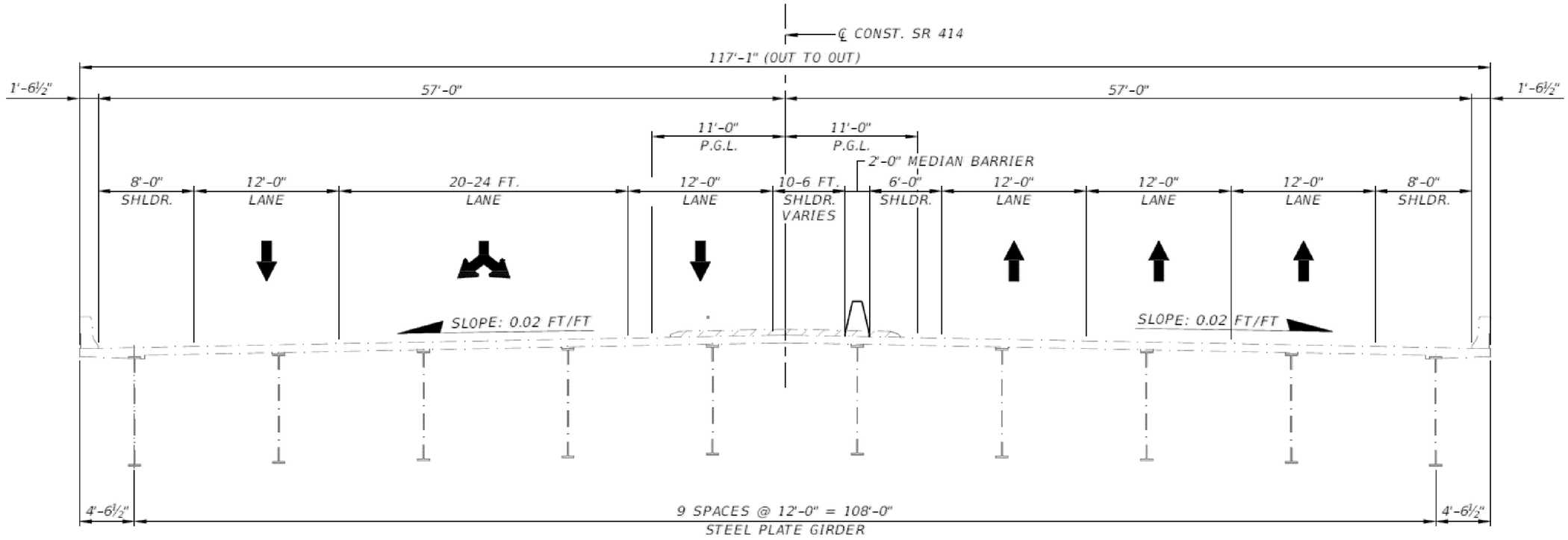
SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

SHEET NO. 011



LEGEND

EXISTING STRUCTURE TO BE REMOVED

PROPOSED TYPICAL SECTION

EXISTING BRIDGE TYPICAL SECTION 3
SR 414 (MAITLAND BLVD.) OVER SR 434

DESIGN SPEED:
MAITLAND BLVD = 45 MPH

PRELIMINARY - SUBJECT TO CHANGE

ENGINEER OF RECORD: KRYSTAL H. BURNS, P.E.
P.E. LICENSE NO. 60883

JACOBS ENGINEERING GROUP INC.
200 S. ORANGE AVENUE, STE 900
ORLANDO, FL 32801; PHONE (407) 903-5001
CERTIFICATE OF AUTHORIZATION No. 000072

SR 414 MAITLAND BLVD.
EXPRESSWAY EXTENSION
US 441 TO SR 434

ROAD NO.	PROJECT NO.
SR 414	414-227

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTIONS

SHEET NO. 012

$USER$ $DATE$ $TIME$ $MODELNAME$ $FILE$

Appendix C
Estimated Probable Project Cost

SUMMARY

ESTIMATED PROBABLE PROJECT COST

SR 414 Elevated Extension

PREPARED BY *JACOBS*
LAST UPDATED (02/17/2022)

PROJECT CENTERLINE MILES:	2.829
NUMBER OF BRIDGES:	4

Mainline Project Costs	$292,477,412

TOTAL (2022 CONSTRUCTION COST)				**$292,477,412**
ENGINEERING / ADMINISTRATION / LEGAL (24%)				$70,194,579
RIGHT - OF - WAY	0.0	ACRES		$0
MITIGATION (WETLAND IMPACT ACERAGE x 0.7 = CREDITS)	0.7	CREDITS @	$ 145,000	$101,500
TOLL COLLECTION EQUIPMENT	6	LANES @	$ 275,000	$1,650,000
GRAND TOTAL PROJECT COST				**$364,423,490**

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ESTIMATED PROBABLE CONSTRUCTION COST

Mainline Project Costs

PREPARED BY *JACOBS*

ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL
**** ROADWAYS ****				
URBAN M&R 4-LANE + BIKE	1.236	MI	$876,721	$1,083,541
AND C&G TO MEDIAN (see Additional Items for modified barrier)	1.101	MI	$2,567,919	$2,827,931
RURAL M&R 2-LANE RAMP	0.106	MI	$359,233	$38,081
RURAL M&R 3-LANE RAMP	0.267	MI	$501,668	$133,832
RURAL M&R 4-LANE RAMP	0.123	MI	$775,889	$95,317
URBAN M&R 2-LANE RAMP	0.160	MI	$415,468	$66,431
URBAN M&R 3-LANE RAMP	0.180	MI	$545,157	$97,998
RURAL NEW 1-LANE RAMP	0.527	MI	$1,635,578	$861,454
RURAL NEW 2-LANE RAMP	0.746	MI	$1,924,209	$1,435,843
URBAN NEW 2-LANE RAMP	0.522	MI	$3,213,872	$1,678,414
URBAN NEW 3-LANE RAMP	0.102	MI	$3,629,176	$370,348
RURAL M&R 3-LANE INTERSTATE	0.232	MI	$501,668	$116,221
RURAL WIDEN FROM 4 TO 6 LANES	0.284	MI	$3,521,767	$1,000,182
RURAL NEW 6-LANE INTERSTATE	0.329	MI	$5,647,469	$1,858,295
RURAL NEW 4-LANE INTERSTATE	0.368	MI	$4,825,168	$1,777,179
**** BRIDGES ****				
BRIDGE 1 SR 414 EXPRESS VIADUCT OVER SR 414	786,938	SF	$187	$147,157,406
BRIDGE 2 - Lake Bosse Westbound MAINLINE ROADWAY BRIDGE OVER LAKE (INCLUDES MINOR DEMOLITION AND RECONSTRUCTION)	32,081	SF	$48	$1,536,713
BRIDGE 3 - Lake Bosse Eastbound MAINLINE ROADWAY BRIDGE OVER LAKE (INCLUDES MINOR DEMOLITION AND RECONSTRUCTION)	32,081	SF	$48	$1,536,713
BRIDGE 4 - Little Wekiva River MAINLINE ROADWAY BRIDGE OVER RIVER	8,332	SF	$8	$68,750
BRIDGE 5 - SR 414 over SR 434 MAINLINE ROADWAY BRIDGE (INCLUDES COST FOR THE MEDIAN REMOVAL MODIFICATION)	1	LS	$285,000	$285,000
**** ADDITIONAL ITEMS ****				
RETAINING WALLS	98,941	SF	$35.00	$3,462,935
EMBANKMENT	147,970	CY	$7.00	$1,035,790
MEDIAN UNDER VIADUCT - CONCRETE BARRIER WALL + MODIFIED RETAINED FILL	5,815	LF	$400.00	$2,325,848
FIBER OPTIC NETWORK (FON) (CONDUIT, 72 WIRE, PULL BOXES, SPLICE, ETC.)	5.658	MI	$350,000	$1,980,458
MAINLINE TOLL GANTRY (2 LANE, 2 TRUSSES AND EQUIP. BLDG)	2	EA	$1,750,000	$3,500,000
NOISE WALLS (AVERAGE 16 FT HEIGHT, ADJ. TO ROSE POINTE SUBDIVISION)	12,912	SF	$30.00	$387,360

SUB-TOTAL 1 (Roadway + Bridges + Additional Items)		**$176,718,039**
SIGNING, PAVEMENT MARKING, SIGNALIZATION AND LIGHTING	10%	$17,671,804
SUB-TOTAL 2		**$194,389,842**
EROSION CONTROL	2%	$3,887,797
MOT	15%	$29,158,476
MOBILIZATION	10%	$19,438,984
SUB-TOTAL Roadway (All except Bridges)		**$96,290,518**
ROADWAY CONTINGENCY	20%	$19,258,104
SUB-TOTAL Bridge		**$150,584,582**
BRIDGE CONTINGENCY	10%	$15,058,458
SUB-TOTAL 3		**$281,191,662**
AESTHETIC ALLOWANCE (INCLUDES LANDSCAPING) (3%)	3%	$8,435,750
UTILITIES (ESTIMATED IN UAM)		$2,300,000
ALLOWANCE FOR DISPUTES REVIEW BOARD		$50,000
WORK ORDER ALLOWANCE		$500,000
TOTAL (2022 CONSTRUCTION COST)		**$292,477,412**

Bridge Cost Backup

Bridge Unit Cost (Foundation to barriers) - I-Girder Alternative

		Assumed premimums			Total
	(85% Concrete & 15% Steel Girders)	Phase (20%)	PT caps (5%)	Specialty Equipment Factor (2%)	
Girder Option	$141	$28.2	$7.05	$2.82	$179.07

Approx. amount of money estimated for specialized overhead gantry equipment = $2,219,165.16 (Beam Shifter = $2M)

Bridge Unit Cost (Foundation to barriers) - Segmental Alternative

		Assumed premimums			Total	
	(85% Span-by-Span & 15% Balanced Cantilever)	Phase (15%)*	PT Piercaps (5%	Specialty Equipment Factor (7%)		
Segmental	$147	$22.09	$7.36	$10.31	$187.01	Approx. 5% more than Girder Alternative

Use for cost est.

*MOT will be easier for segmental option since eliminates deck pours and segment delivery can occur from above.

Approx. amount of money estimated for specialized overhead gantry equipment & cast $8,111,363.44 (Overhead Gantry = $4M, 8 Cast beds @0.5M each = 4M)

Cost comparison

Lake Bosse Bridge

	Length (FT)	Width (FT)	Thickness (IN)	Area (SF)	Volume (CY)	COST ($/SF)	COST ($/CY)	COST ($/LF)	COST	
Superstructure Demolition	700	23.00	N/A	16100	N/A	$50.00	N/A	N/A	$805,000.00	
New Construction										
Deck	700	5.33	8	N/A	92.1	N/A	$3,000.00	N/A	$276,370.37	
Traffic Railing	740	N/A	N/A	N/A	N/A	N/A	N/A	200	$148,000.00	
								Subtotal =	$1,229,370.37	
								Misc. Allowance for Bridge Modification (25%) =	$307,342.59	
								Total Cost =	$1,536,712.96	
								Cost per SF	$47.90	**Use for cost est.**

Little Wekiva

New Construction										
Traffic Railing (x2)	220	N/A	N/A	N/A	N/A	N/A	N/A	250	$55,000.00	
								Misc. Allowance for Bridge Modification (25%) =	$13,750.00	
								Total Cost =	$68,750.00	
								Cost per SF	$8.25	**Use for cost est.**

SR 434

Traffic Railing Separator Demolition	285	22	N/A	N/A	N/A	$25.00	N/A	N/A	$156,750.00	
New Construction										
Traffic Railing	285	N/A	N/A	N/A	N/A	N/A	N/A	250	$71,250.00	
								Subtotal =	$228,000.00	
								Misc. Allowance for Bridge Modification (25%) =	$57,000.00	
								Total Cost =	$285,000.00	**Use for cost est.**

Calculation of Roadway Lengths

Facility	Typical Applied	Alignment	Side (LT/RT)	Begin STA	End STA	Length (ft)
Maitland Blvd.	Urban M&R 4-lane + bike	BL SR 414 MAITLAND BLVD	CL	434+74.00	533+78.58	4803.98
Maitland Blvd.	Urban M&R 4-lane + bike	BL SR 414 MAITLAND BLVD	CL	541+21.40	555+20.04	1398.64
Maitland Blvd.	Urban M&R 4-lane + bike	BL SR 414 MAITLAND BLVD	CL	556+28.06	559+51.00	322.94
						6,526
Maitland Blvd.	Add C&G to median	BL SR 414 MAITLAND BLVD	CL	434+74.00	443+04.00	830
Maitland Blvd.	Add C&G to median	BL SR 414 MAITLAND BLVD	CL	444+30.00	519+73.00	2,442
Maitland Blvd.	Add C&G to median	BL SR 414 MAITLAND BLVD	CL	521+23.00	533+78.58	1,256
Maitland Blvd.	Add C&G to median	BL SR 414 MAITLAND BLVD	CL	541+21.40	546+32.00	511
Maitland Blvd.	Add C&G to median	BL SR 414 MAITLAND BLVD	CL	547+44.00	555+20.04	776
Maitland Blvd.	Add C&G to median	BL SR 414 MAITLAND BLVD	CL	556+28.06	559+51.00	323
						5,815
RAMP X1	Rural M&R 3-lane ramp	BL RAMP X1	RT	1701+00.00	1704+53.48	353
RAMP X1	Urban M&R 2-lane ramp	BL RAMP X1	RT	1704+53.48	1706+00.00	147
RAMP X1	Urban New 2-lane ramp	BL RAMP X1	RT	1706+00.00	1727+41.43	2,141
RAMP X1	Urban M&R 2-lane ramp	BL RAMP X1	RT	1727+41.43	1728+89.15	148
RAMP W	Urban M&R 2-lane ramp	BL RAMP W	RT	1301+50.00	1307+00.00	550
RAMP W	Urban New 2-lane ramp	BL RAMP W	RT	1307+00.00	1313+16.00	616
RAMP A	Rural New 2-lane ramp	BL RAMP A	CL	1200+00.00	1210+00.00	1,000
RAMP A	Rural M&R 2-lane ramp	BL RAMP A	CL	1210+00.00	1210+79.11	79
RAMP B	Rural M&R 2-lane ramp	BL RAMP B	LT	1300+00.00	1304+80.61	481
RAMP B	Rural New 2-lane ramp	BL RAMP B	LT	1304+80.61	1317+91.02	1,310
RAMP B	Rural M&R 4-lane ramp	BL RAMP B	LT	1317+91.02	1324+39.66	649
ACCESS RAMP X	Rural New 1-lane ramp	BL ACCESS RAMP X	LT	2600+00.00	2611+87.48	1,187
ACCESS RAMP W	Rural New 2-lane ramp	BL ACCESS RAMP W	RT	2500+00.00	2502+61.19	261
ACCESS RAMP W	Urban New 3-lane ramp	BL ACCESS RAMP W	RT	2502+61.19	2508+00.00	539
ACCESS RAMP W	Urban M&R 3-lane ramp	BL ACCESS RAMP W	RT	2508+00.00	2517+49.14	949
ACCESS RAMP A	Rural M&R 3-lane ramp	BL ACCESS RAMP A	LT	2802+00.00	2812+55.09	1055
ACCESS RAMP A	Rural New 2-lane ramp	BL ACCESS RAMP A	LT	2812+55.09	2826+23.42	1,368
ACCESS RAMP B	Rural New 1-lane ramp	BL ACCESS RAMP B	RT	2700+00.00	2715+93.48	1,593
						2,781 **3,940** **2,757** **560** **649** **539** **949** **1,409** **844**
Expressway	Rural M&R 3-lane Interstate	CL CONST SR 414 EXPRESSWAY EXT.	RT	1445+00.00	1457+23.21	1,223
Expressway	Rural New 6-lane Interstate	CL CONST SR 414 EXPRESSWAY EXT.	CL	1459+20.00	1471+63.00	1,243
Expressway	Rural New 4-lane Interstate	CL CONST SR 414 EXPRESSWAY EXT.	CL	1471+63.00	1481+10.50	948
Expressway	Rural New 4-lane Interstate	CL CONST SR 414 EXPRESSWAY EXT.	CL	1569+52.80	1579+50.00	997
Expressway	Rural New 6-lane Interstate	CL CONST SR 414 EXPRESSWAY EXT.	CL	1579+50.00	1584+44.38	494
Expressway	Widen 4 Lane Interstate to 6 Lanes (In Median)	CL CONST SR 414 EXPRESSWAY EXT.	CL	1587+29.38	1602+28.90	1,500
						1,223 **1,945** **1,737** **1,500**

						Length LF	Wall Area SF (0 - 26 ft.)	Width of Fill LF	Calculated CY
Expressway	retaining walls	CL CONST SR 414 EXPRESSWAY EXT.	RT	1459+36.00	1469+00.00	964	12,532	60	27,849
Pond 4C	retaining walls	CL CONST RAMP X1	LT	1708+59.85	1717+28.67	869	11,295	60	25,099
Expressway	retaining walls	CL CONST SR 414 EXPRESSWAY EXT.	RT	1473+30.00	1481+10.00	780	10,140	42	15,773
Expressway	retaining walls	CL CONST SR 414 EXPRESSWAY EXT.	LT	1472+70.00	1481+10.00	840	10,920	42	16,987
Expressway	retaining walls	CL CONST SR 414 EXPRESSWAY EXT.	RT	1569+53.00	1579+00.00	947	12,311	42	19,150
Expressway	retaining walls	CL CONST SR 414 EXPRESSWAY EXT.	LT	1569+53.00	1579+00.00	947	12,311	42	19,150
Expressway	retaining walls	CL CONST SR 414 EXPRESSWAY EXT.	RT	1571+98.00	1584+44.00	1,246	16,198	24	14,398
Expressway	retaining walls	CL CONST SR 414 EXPRESSWAY EXT.	LT	1577+82.00	1584+44.00	662	8,606	30	9,562
Expressway	MSE Walls under begin/end viaduct	CL CONST SR 414 EXPRESSWAY EXT.	MED	at begin and end viaduct		178	4,628	-	-
						7,433	**98,941**		**147,969**