

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

# **ENVIRONMENTAL ASSESSMENT**

# **SR 408 CAPACITY IMPROVEMENTS** FROM KIRKMAN ROAD TO CHURCH STREET **PROJECT DEVELOPMENT & ENVIRONMENT STUDY**



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# **1.0 - Project Information**

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

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#### SR 408 CAPACITY IMPROVEMENTS SR 435 (KIRKMAN RD) TO CHURCH ST PROJECT DEVELOPMENT AND ENVIRONMENT STUDY

Figure 1: Project Location Map



### **Project Background & Description**

### Background

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

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

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

### **Study Description**

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

### **Purpose and Need**

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

### **Purpose**

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

### Need

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

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

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

# 2.0 – Environmental Analysis & Report Introduction

# **General Existing Conditions of Project Area**

The project area is on existing SR 408 from Kirkman Road to Church Street. For consistency in studying the existing and anticipated conditions of the area surrounding the proposed widening, a half-mile radius of the general existing conditions surrounding the project area is used.

The land use within this segment of SR 408 is primarily commercial along the north side of the project corridor. The south side of SR 408 includes commercial and residential. Downtown Orlando is located approximately two miles east of Church Street. This is depicted below on **Figure 2**.

Figure 2: Kirkman Road to Church Street



2.a – Social & Economic Environment Analysis

# 2.a – Social & Economic Environment Analysis Social

### **Demographics**

The study area was reviewed to identify minority and/or low-income populations as well as underrepresented population groups protected under *Title VI of the Civil Rights Act of 1964* and related nondiscrimination statutes and regulations. **Table 1** provides study area demographics based on the US Census Tracts in which the project is located. See **Figure 3** for the location of the tracts.

Census Tract	Total Population	Percent Minority Population	Percent Population Below Poverty Level	Percent Population Aged 65 and Over
117.01	4,229	94.51%	30.27%	19.60%
117.02	4,365	95.83%	27.05%	20.10%
146.01	8,419	94.60%	30.05%	7.70%
147.01	5,613	78.23%	39.50%	13.90%
183	3,149	78.28%	36.76%	16.40%
Orange County	1,340,469	56.0%	19.06%	12.0%

### Table 1: Study Area Demographics by Census Tract (I-4 to Bumby Ave)

Source: 2020 U.S. Census (Total Population, Minority Population); 2021 ACS 5-Year Estimates (Poverty, 65 and Over)

### Figure 3: Study Area Census Tracts



### **Community Features**

A desktop review of the study area indicates that there are several community features within the study area: Dobbs Cremation & Funeral Services, Iglesia Cristiana Obreros de Paz, Orlando Faith Ministries, New Hope Primitive Baptist Church, Zion Church of Jesus Christ, Mt. Olive AME Church, Carter Tabernacle CME Church, and International Harvest Church of God. Several other features are located within close proximity to the study area, including Church of God Prophecy, Ivey Lane Park, Ivey Lane Elementary School, Victory Christian Academy, Roosevelt Martin Park, Orange County Sheriff Facilities, and Guardian Care Nursing & Rehabilitation Center. The location of these features relative to the study area are included in **Table 2**. **Figure 4** presents the community facility locations.

Additionally, the area within and surrounding the project is mostly developed, with much of the land dedicated to residential and industrial uses.

Name	Type of Facility	Relative Location		
Church of God Prophecy	Place of Worship	±45 feet southwest of study area		
Dobbs Cremation & Funeral Services	Funeral Home	Partially within study area		
Iglesia Cristiana Obreros de Paz	Place of Worship	Partially within study area		
Orlando Faith Ministries	Place of Worship	Partially within study area		
Ivey Lane Park	Recreation/Park	±375 feet south of study area		
Ivey Lane Elementary School	School	±670 feet south of study area		
Victory Christian Academy	School	±515 feet south of study area		
New Hope Primitive Baptist Church	Place of Worship	Partially within study area		
Zion Church of Jesus Christ	Place of Worship	Partially within study area		
Roosevelt Martin Park	Cemetery	±320 feet south of study area		
Orange County Sheriff Facility	Institutional	±630 feet south of study area		
Guardian Care	Medical	±290 feet south of study area		
Mt. Olive AME Church	Place of Worship	Partially within study area		
Carter Tabernacle CME Church	Place of Worship	Partially within study area		
International Harvest Church of God	Place of Worship	Partially within study area		

### Table 2: Community Features

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#### Figure 4: Community Features



### Economic

The proposed improvements will provide improved safety, enhanced capacity, and reduced congestion and travel time. As this stretch of SR 408 includes several connections to surface roads in developed areas located just west of downtown Orlando, it is a critical connection to one of Central Florida's major economic centers of downtown Orlando and surrounding neighborhoods.

### Land Use Changes

Adjacent land includes parcels within Orlando City Limits and within unincorporated Orange County. Future Land Use (FLU) designations are summarized in **Table 3** and shown on **Figure 5**. Land adjacent to the study area generally consists of developed properties, the majority of which are residential. There are park features and commercial areas within 250 feet of the project.

Jurisdiction	Future Land Use (FLU) Designation	FLU Code
	Conservation	CONSERV
	Industrial	INDUST
	Mixed Use Corridor Medium Intensity	MUC-MED
City of Orlanda	Office Low Intensity	OFFICE-LOW
City of Orlando	Public/Recreational & Institutional	PUB-REC-INST
	Residential Low Intensity	RES-LOW
	Residential Low Intensity/Resource Protection Overlay	RES-LOW/RES-PRO
	Urban Reserve	UR-AC
Orange County	Commercial	С
	Low-Density Residential	LD
	Low/Medium-Density Residential	LM
	Office	0
	Water Body	WB

Table 3: Future Land Uses Within Project Area

In addition to the Orange County and City of Orlando Future Land Use classifications, the Florida Department of Environmental Protection (FDEP) Florida Land Use Cover Classification System (FLUCCS) was used to classify various land uses and land covers within the study area. **Table 4** summarizes the land uses and the locations are depicted on **Figure 6**.

FLUCCS Code	Description
1110	Fixed Single Family Units (Low Density)
1180	Rural Residential
1200	Medium Density Residential
1210	Fixed Single Family Units (Medium Density)
1300	Residential High Density
1320	Mobile Home Units
1330	Multiple Dwelling Units, Low Rise
1400	Commercial and Services
1411	Shopping Centers
1700	Institutional
1710	Educational Facilities
1900	Open Land
3100	Herbaceous (Dry Prairie)
4200	Upland Hardwood Forests
4340	Upland Mixed Coniferous/Hardwood
5200	Lakes
5300	Reservoirs
6170	Mixed Wetland Hardwoods
6172	Mixed Shrubs
6410	Freshwater Marshes
8140	Roads and Highways
8320	Electrical Power Transmission Lines
8370	Surface Water Collection Features

### Table 4: FLUCCS Codes Within Project Area

Figure 5: Project Area Future Land Use Designations



Figure 6: FLUCCS Within Project Area



### **Mobility**

There are no existing transit routes that travel on SR 408 within the project area. Lynx Link 48, Link 49, and Link 105 each travel parallel to SR 408 on SR 50 (W Colonia Drive). Link 54 travels parallel to the study corridor on Old Winter Garden Road. Several other routes cross the SR 408 route on Kirkman Road (Link 301), Ivy Lane/Mercy Drive (Link 20, Link 302), John Young Parkway (Link 303), Dollins Avenue (Link 21), and Church Street (Link 20).

There is sidewalk present along Old Winter Garden Road and W Colonial Drive parallel to the study area. There is also sidewalk present on the streets that interchange with or pass under SR 408 (Kirkman Road, Pine Hills Road, Old Winter Garden Road, Ortman Drive, Ferguson Drive, John Young Parkway, and Church Street). There are marked bike lanes present on Kirkman Road.

This project's proposed improvements will provide more efficient connections via SR 408, potentially taking additional automobiles off surface roads to minimize potential conflicts with transit, pedestrians, and bicyclists.

### **Aesthetic Effects**

There are existing noise walls present along parts of the corridor. There are no areas of landscaping within the median, but there is landscaping located between the guardrail and noise wall in some areas. The interchanges and bridge overpasses generally consist of terraced landscaping. Existing areas of landscaping may need to be reduced but will not be eliminated. Opportunities for preserving as much as possible of the existing landscaping will be finalized during the design phase.

2.b – Cultural Environment Analysis

# **2.b – Cultural Environment Analysis**

### **Historic Sites/Districts & Archaeological Sites**

On January 4, 2023, SEARCH reviewed concept plans for the widening of SR 408 from Kirkman Road to Church Street. The purpose of this review was to identify any previously recorded cultural resources within the project area. The study area was defined as the parcels where the proposed widening will occur (the potential construction area) in addition to a 152-meter (500-foot) buffer to address any potential viewshed effects to historic resources (see **Figure 7**: Previously Recorded Historic Resources in Study Area). This review is for information purposes only and does not satisfy any requirements under the National Environmental Policy Act or Section 106 of the National Historic Preservation Act.

Review of the Florida Master Site File (FMSF) database indicates that eight historic buildings are within the study area (**Table 5**; see **Figure 7**). These resources were recommended ineligible for the National Register of Historic Places (NRHP) by the original surveyor, but they have not yet been evaluated for the NRHP by the State Historic Preservation Officer.

FMSF No.	Address	Year Built	Surveyor Recommendation	NRHP Eligibility Status
80R07224	4415 W Old Winter Garden Rd	ca. 1920	Ineligible for NRHP	Not evaluated
80R07225	4160 W Old Winter Garden Rd	ca. 1925	Ineligible for NRHP	Not evaluated
80R07227	3604 W Old Winter Garden Rd	ca. 1935	Ineligible for NRHP	Not evaluated
80R07228	3530 W Robinson St	ca. 1931	Ineligible for NRHP	Not evaluated
80R07229	3712 W Robinson St	ca. 1935	Ineligible for NRHP	Not evaluated
80R07230	3730 W Robinson St	ca. 1927	Ineligible for NRHP	Not evaluated
80R07249	235 N Cottage Hill Rd	ca. 1923	Ineligible for NRHP	Not evaluated
80R07250	231 N Cottage Hill Rd	ca. 1923	Ineligible for NRHP	Not evaluated

#### Table 5: Previously Recorded Historic Resources in the Study Area

Review of the FMSF database indicates that the current study area has been partially surveyed by prior studies that meet the current Module Three standards for cultural resource surveys (**Table 6**). Typically, portions of the study area that have been subjected previously to Module Three-compliant survey will not need additional archaeological survey, but they may need an updated architectural history survey. Given the lack of significant cultural resource survey within the study area and the presence of unevaluated resources, a Phase I Cultural Resource Assessment Survey (CRAS) will be considered as part of the design phase for this project.

Table 6: Cultural Resource Surv	eys Conducted in the Study Area
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FMSF No.	Address	Year	Consultant
17	Historical, Architectural, and Archaeological Survey of Orlando, Florida	1978	Carr, Robert S., and Phillip A. Werndli
1986	Proposed Multi-Laning of SR 423/John Young Parkway from Church Street to Technology Drive in Orange County, Florida	1989	Wiedenfeld, Melissa G.
4238	A Cultural Resource Assessment Survey of S.R. 435 from Conroy-Windemere Road to S.R. 50, Orange County, Florida	1995	Ashley, Keith H.

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Figure 7: Previously Recorded Historic Resources in Study Area

### **Recreational Areas and Protected Lands**

There are no recreational areas or protected lands located within the project area. There are other recreational and public areas located nearby the project area, including Ivey Lane Park and Roosevelt Martin Park (**Figure 8**).

No direct impacts are anticipated to any recreational areas or protected lands.

#### SR 408 CAPACITY IMPROVEMENTS SR 435 (KIRKMAN RD) TO CHURCH ST PROJECT DEVELOPMENT AND ENVIRONMENT STUDY

Figure 8: Recreational Areas and Parks Within Project Area



**2.c – Natural Environment Analysis** 

## 2.c – Natural Environment Analysis

A review was conducted of existing conditions related to natural resources for the project. Below is a summary of findings.

### Wetlands and Other Surface Waters

An assessment of wetlands and surface waters was conducted within the project study area utilizing the 2016 South Florida Water Management District (SFWMD) Florida Land Use, Cover and Forms Classification System (FLUCFCS) and the National Wetland Inventory (NWI) GIS datasets. Based on these databases, the project study area contains three (3) potential wetlands and 12 surface waters. Due to the hydrologic connection of the wetlands and surface waters, they will likely fall under the jurisdiction of the SFWMD and FDEP.

Using the 2016 SFWMD Land Use Land Cover data, the wetlands within the proposed limits of disturbance were used to calculate proposed impacts to wetlands. As of the current design, there are no proposed direct wetland or surface waters impacts (**Figure 9**).

Figure 9: Wetlands and Surface Waters Impacts Map



### Water Resources

There are no Aquatic Preserves or Outstanding Florida Waters (OFWs) within the project study area. A review of EPA Sole Source Aquifer Protection Program maps of sole source aquifers in the southeastern United States indicated that the project study area is located within the Biscayne Sole Source Aquifer and Recharge Zone. The project will meet all applicable SFWMD criteria related to water quality. The project is currently a non-federal action receiving no federal monies; therefore, concurrence from the EPA is not required according to the Safe Drinking Water Act. Best Management Practices (BMPs) to control erosion, sediment release, and storm water runoff to minimize adverse impacts on surface water resources will be implemented during design, permitting and construction.

### **Floodplains**

Approximately 12.8 of the ±521.2-acre study area (2%) is classified as being within the Federal Emergency Management Agency (FEMA) Flood Zone A, within the Special Flood Hazard Areas, where an established Base Flood Elevation (BFE) has been determined. Approximately 59.6 acres of the ±521.2-acre study area (11%) is classified as being within the Federal Emergency Management Agency (FEMA) Flood Zone AE, within the Special Flood Hazard Areas, where an established Base Flood Elevation (BFE) has been determined. The remaining approximately 448.8 acres of the study area is classified as being within FEMA Flood Zone X, areas of minimal flood hazard. There is no FEMA Regulatory Floodway within the project study area. The FEMA Flood maps are depicted on **Figure 10**.

### Figure 10: FEMA Flood Map



### **Protected Species and Habitat**

A database review of potential species occurring within the project study area and immediate vicinity was conducted. Results of the database review is summarized below.

Based on a review of the U.S. Fish and Wildlife Service (USFWS) Critical Habitat Mapper, there is no USFWS designated Critical Habitat within the project study area. Areas identified by FWC as Strategic Habitat Conservation Areas (SHCA) are located within the project study area. SHCAs are undeveloped natural areas identified by FWC as areas that could provide potential habitat to native plant and wildlife species and, therefore, may be considered for acquisition as conservation lands. However, these areas have no regulatory implications and have not been and may never be acquired for conservation.

Based on Florida Natural Areas Inventory (FNAI) and USFWS IPaC data, no listed plant or wildlife species have been documented near the project site; however, the wood stork (*Mycteria americana*) is listed as likely to occur within one (1) mile of the study area. The study area lies within the Core Foraging Area (CFA) of three (3) active wood stork colonies. The study area also lies within the USFWS Consultation Area for the Everglade snail kite (*Rostrhamus sociabilis plumbeus*), Florida scrub-jay (*Aphelocoma coerulescens*), and Lake Wales Ridge plants. Additional federally listed species with the potential to occur include the Audubon's crested caracara (*Caracara cheriway*), bluetail mole skink (*Eumeces egregius lividus*), sand skink (*Neoseps reynoldsi*), eastern black rail (*Laterallus jamaicensis ssp. jamaicensis*), eastern indigo snake (*Drymarchon couperi*), and red-cockaded woodpecker (*Dryobates borealis*). State listed species with the potential to occur include the Florida burrowing owl (*Athene cunicularia floridana*), Florida sandhill crane (*Antigone canadensis pratensis*), Florida black bear (*Ursus americanus floridanus*), and gopher tortoise (*Gopherus polyphemus*). There are no known wading bird rookeries within the project study area or within one (1) mile of the study area.

A list of the state and federally listed species potentially occurring within the immediate vicinity of the project site has been compiled in **Table 7**. The table below lists species that may occur and their effect determinations.

Common Name	Scientific Name	Status	Documented (<1 mile)	Habitat Present	Effect Determination
Avian	_		_		
Audubon's crested caracara	Caracara cheriway	FT	No	No	No effect
Eastern black rail	Laterallus jamaicensis jamaicensis	FT	No	No	No effect
Everglade snail kite	Rostrhamus sociabilis plumbeus	FE	No	No	No effect
Florida scrub-jay	Aphelocoma coerulescens	FT	No	No	No effect
Red-cockaded woodpecker	Picoides borealis	FE	No	No	No effect
Wood stork	Mycteria americana	FT	No	No	No effect
Florida burrowing owl	Athene cunicularia	ST	No	No	No adverse effect anticipated
Florida sandhill crane	Grus canadensis pratensis	ST	No	No	No adverse effect anticipated
Reptilian	•				
Eastern indigo snake	Drymarchon corais couperi	FT	No	Yes	Not likely to adversely affect
Sand skink	Neoseps reynoldsi	FT	No	No	No effect
Bluetail mole skink	Eumeces egregius lividus	FT	No	No	No effect
Gopher tortoise	Gopherus polyphemus	ST	No	Yes	No adverse effect anticipated
Short-tailed snake	Lampropeltis extenuate	ST	No	No	No adverse effect anticipated
Legend: FE - Federally Endangered: FT - Federally Threatened: FT(S/A) – Threatened due to Similarity of Appearance: C - Candidate for Listing					

#### Table 7: Listed Species Potentially Within Project Area

FE - Federally Endangered; FT - Federally Threatened; FT(S/A) – Threatened due to Similarity of Appearance; C - Candidate for Listing SE - State Endangered; ST - State Threatened Note: Coordination is not required with FWC for federally listed species

### Federal Listed Fauna

#### Birds

#### Audubon's Crested Caracara

Audubon's crested caracara (caracara) is listed as threatened by USFWS and FWC. This species has not been documented within one (1) mile of the project limits and suitable habitat is not located within the project limits. Therefore, it has been determined that the project will have "no effect" on the caracara.

#### Eastern Black Rail

The eastern black rail is listed as threatened by the USFWS. This species has not been documented within one (1) mile of the project limits and suitable habitat is not located within the

project limits. Therefore, it has been determined that the project will have "no effect" on the eastern black rail.

#### Everglade Snail Kite

The Everglade snail kite is listed as endangered by USFWS and FWC. The project limits are located within the USFWS consultation area for the snail kite; however, the species has not been documented within one (1) mile of the project limits and suitable habitat is not located within the project limits. Therefore, it has been determined that the project will have "no effect" on the Everglade snail kite.

#### Florida Scrub-Jay

The Florida scrub-jay (scrub-jay) is listed as threatened by USFWS and FWC. The project limits are located within the USFWS consultation area for the scrub jay; however, the species has not been documented within one (1) mile of the project limits and suitable habitat is not located within the project limits. Therefore, it has been determined that the project will have "no effect" on the Florida scrub-jay.

#### Red-Cockaded Woodpecker

The red-cockaded woodpecker (RCW) is listed as endangered by USFWS and FWC. This species has not been documented within one (1) mile of the project limits and suitable habitat is not located within the project limits. Therefore, it has been determined that the project will have "no effect" on the RCW.

#### Wood Stork

The wood stork is listed as threatened by USFWS and FWC. No wood storks have been documented within one (1) mile of the project limits and suitable habitat is not located within the project limits. Therefore, it has been determined that the project will have "no effect" on the wood stork. The path to this determination followed the USFWS Effect Determination Key for the Wood Stork in South Florida (Step A).

#### Reptiles

#### Eastern Indigo Snake

The eastern indigo snake is listed as threatened by USFWS and FWC. No indigo snakes have been documented within one (1) mile of the project limits; however, the project limits offer marginal habitat for indigo snakes. It has been determined that the project is "not likely to adversely affect" the eastern indigo snake. The path to this determination followed the Eastern Indigo Snake Programmatic Effect Determination Key (South Florida Ecological Service Office), steps  $A \rightarrow B \rightarrow C \rightarrow D \rightarrow NLAA$ .

#### Sand Skink and Bluetail Mole Skink

The sand skink and bluetail mole skink are listed as threatened by USFWS and FWC. The project limits are located within the USFWS Consultation Area for sand skinks and contains suitable soils; however, no sand skinks have been documented within one (1) mile of the project site. Therefore, it has been determined that the project will have "no effect" on the sand skink and bluetail mole skink.

### **State Listed Fauna**

#### Birds

#### Florida Burrowing Owl

The Florida burrowing owl is listed as threatened by the FWC. Suitable habitat for this species was not observed within the project limits and no individuals were observed during a field review. Additionally, no individuals have been documented within one (1) mile of the project limits. Based on this information, it has been determined that the project will have "no adverse effect anticipated" on the Florida burrowing owl.

#### Florida Sandhill Crane

The Florida sandhill crane is listed as threatened by the FWC. Suitable habitat for this species was not observed within the project limits and no individuals were observed during a field review. Additionally, no individuals have been documented within one (1) mile of the project limits. Based on this information, it has been determined that the project will have "no adverse effect anticipated" on the Florida sandhill crane.

#### Reptiles

#### **Gopher Tortoise**

The gopher tortoise is listed as threatened by the FWC and is a candidate species for listing under the ESA by USFWS. Potential suitable habitat is present within the project; however, no gopher tortoises have been documented within one (1) mile of the project limits. At the time of the site reviews, no gopher tortoise burrows were observed within or adjacent to the project limits. If gopher tortoises or burrows are found within the project limits, CFX will coordinate with the FWC to secure all permits needed to relocate the tortoises and associated commensal species prior to construction. With the implementation of these measures, it has been determined that this project will have "no adverse effect anticipated" on the gopher tortoise.

### **Non-Listed Species**

#### Bald Eagle

The bald eagle is a large raptor with a distinctive white head and yellow bill. This species has been federally de-listed by the USFWS. However, it remains federally protected under the Bald and Golden Eagle Protection Act (BGEPA) in accordance with the 16 United States Code 668 and the Migratory Bird Treaty Act of 1918. In addition, the FWC has implemented a bald eagle management plan (FWC 2008). During design and permitting, CFX will survey the project area for eagle nests. If a nest is observed within 660 feet of the project limits, CFX will coordinate with the USFWS to secure all necessary permits.

#### Florida Black Bear

The Florida black bear was removed from the FWC list of state-threatened species in August 2012; however, the Florida black bear remains protected under other rules and regulations, primarily through the Florida Black Bear Conservation Rule 68A-4.009 (F.A.C.) and the FWC Florida Black Bear Management Plan. Based on these regulations, pursuing, hunting, molesting, capturing, killing, or attempting those actions, whether or not such actions result in possession of the bear is unlawful. In addition, Rule 68A-4.009, F.A.C., generally prohibits anyone from possessing, injuring, shooting, wounding, trapping, collecting, or selling bears or their parts or attempting to engage in such actions without prior authorization from FWC. Black Bear Management Units (BMU) have also been established based on the seven geographically distinct bear subpopulations in Florida. The project is located within the Central BMU.

2.d – Physical Environment Analysis

# **2.d – Physical Environment Analysis** Air Quality

As part of this study, an air quality evaluation has been performed consistent with the FDOT PD&E Manual, Part 2, Chapter 19. Based on this initial evaluation, a detailed Air Quality analysis is not needed because the project does not meet the two qualifying criteria per Section 19.2.2.1, Part 2, Chapter 19 of the PD&E Manual. It does not require an Environmental Impact Statement, and it is not expected to have community controversy regarding air quality.

This project is not expected to create adverse impacts on air quality because the project area is in attainment for all National Ambient Air Quality Standards (NAAQS) and because the project is expected to improve the Level of Service (LOS) and not change delay and congestion on all facilities within the study area.

Construction activities may cause short-term air quality impacts in the form of dust from earthwork and unpaved roads. These impacts will be minimized by adherence to applicable state regulations and to applicable FDOT Standard Specifications for Road and Bridge Construction.

Additional information is provided in **Appendix A – Air Quality Technical Memorandum**.

### Water Quality

There are no aquatic preserves or Outstanding Florida Waters (OFWs) within the project study area. A review of EPA Sole Source Aquifer Protection Program maps of sole source aquifers in the southeastern United States indicated that the project study area is located within the Biscayne Sole Source Aquifer and Recharge Zone. The project will meet all applicable SFWMD criteria related to water quality. The project is currently a non-federal action receiving no federal monies; therefore, concurrence from the EPA is not required according to the Safe Drinking Water Act. Best Management Practices (BMPs) to control erosion, sediment release, and storm water runoff to minimize adverse impacts on surface water resources will be implemented during design, permitting and construction. Determination has been made that there are no USACE retained waters.

A Water Quality Impact Evaluation Checklist is provided in **Appendix B – Water Quality Impact Evaluation Checklist**.

### **Contamination Screening**

A Contamination Screening Evaluation (**Appendix C – Contamination Screening Evaluation Technical Memorandum**) was prepared per the project scope as a part of the Evaluation of Physical Resources. The memo includes a site figure indicating the location of potential contamination sites, brief summaries of the most recent assessment information available through Map Direct, and recommendations on necessity for additional evaluation.

### **Highway Traffic Noise**

A traffic noise analysis was performed in accordance with the FDOT PD&E Manual. A Traffic Noise Model was used to evaluate existing conditions, the No-Build Alternative and the Build Alternative for the Noise Sensitive Areas (NSAs) potentially impacted by traffic noise within 400 feet of the project corridor.

Per these analyses, 191 residential sites were analyzed for project-related impacts. Currently 18 sites are affected by traffic noise. The noise levels associated with the 2045 No-Build Alternative

are predicted to meet or exceed the 66.0 dB(a) FDOT NAC at 19 sites.

The analysis concluded that once the project is built, which requires the removal of a majority of the existing walls, the overall traffic noise levels will increase by an average of 4.0 dB(A), with the average project-related noise level predicted to be 66.9 dB(A). The 2045 Build Alternative's noise levels are predicted to meet or exceed the applicable NAC at 95 sites. The greatest noise level increase is predicted to be 10.3 dB(A) in NSA 1. None of the increases are considered substantial (i.e., 15 dB(A) or more over existing levels).

As required, noise abatement consideration was given to all impacted sites. Five noise barrier systems were evaluated to abate the project-related impacts. Barrier systems WB-A1 and EB-A1 are not deemed feasible and reasonable for impacted receptors 8-5, 10-6, 10-8 through 10-12, and 9-1 through 9-3. Receptor 4-18 is considered isolated; therefore, a barrier at this location cannot achieve the minimum noise reduction requirement. Consequently, a barrier was not analyzed for this location.

As described in **Table 8** and detailed in **Appendix D – Highway Traffic Noise and Noise Study Report**, noise barriers EB1, WB1, and EB2 are the CFX preferred options recommended for further consideration during the final design process. For areas where barriers are not feasible and reasonable, but barriers currently exist, CFX will evaluate other options for providing visual buffers between the residences and the expressway during the final design process.

Noise Study Area	Barrier ID	Barrier Height (ft) <sup>*2</sup>	Barrier Length (ft)	Barrier Location	Estimated Barrier Cost <sup>*1</sup>	Recommended for further evaluation?
1 and 3	EB1	8 & 14	456 [8'] 2,993 [14']	m/l shoulder; on bridge; ramp shoulder	\$1,366,500	Yes
4	WB1	8 & 14	178 [8'] 1,017 [14']	m/l shoulder; on bridge	\$469,860	Yes
5 and 7	EB2	8, 14, & 16	3,351 [8'] 1,287 [14'] 603 [16']	m/l shoulder; ramp shoulder ROW post/panel	\$1,634,220	Yes
8 and 10	WB-A1	8 & 14	1,431 [8'] 2,809 [14']	m/l shoulder; ramp shoulder	\$1,523,220	No
10	EB-A1	8 & 14	626 [8'] 657 [14']	m/l shoulder; ramp shoulder	\$426,180	No

Table 8: Noise Barrier Recommendations

<sup>\*1</sup> Based on FDOT Statewide average of \$30 per square foot.

<sup>\*2</sup> 8-ft max on MSE/Bridge; 14-ft max on shoulder; 22-ft max at ROW or offset from shoulder.

### Construction

Construction activities may cause short-term air quality impacts in the form of dust from earthwork and unpaved roads. These impacts will be minimized by adherence to applicable state regulations and to applicable FDOT Standard Specifications for Road and Bridge Construction.

Based on the existing land use within the limits of this project, construction of the proposed roadway improvements will not have any noise or vibration impact. If noise-sensitive land uses develop adjacent to the roadway prior to construction, additional impacts could result. It is

anticipated that the application of the FDOT Standard Specifications for Road and Bridge Construction will minimize or eliminate most of the potential construction noise and vibration impacts. However, should unanticipated noise or vibration issues arise during the construction process, CFX and the Contractor will investigate additional methods of controlling these impacts.

Because no federally listed species are likely to be present in the action area and no critical habitat was identified, the construction of this project is not anticipated to impact any proposed threatened or endangered species, any threatened or endangered species, or affect or modify any critical habitat.

Further, construction will likely temporarily impact existing traffic patterns, but as with all construction impacts, will be temporary in nature and efforts will be made to minimize negative impacts by adhering to applicable state regulations and to applicable FDOT Standard Specifications for Road and Bridge Construction.

### **Bicycles & Pedestrians**

As stated earlier in this memo, there is sidewalk present along Old Winter Garden Road and W Colonial Drive parallel to the study area. There is also sidewalk present on the streets that interchange with or pass under the SR 408 (Kirkman Road, Pine Hills Road, Old Winter Garden Road, Ortman Drive, Ferguson Drive, John Young Parkway, and Church St). There are marked bike lanes present on Kirkman Rd.

This project's proposed improvements will provide more efficient connections via SR 408, potentially taking additional automobiles off surface roads to minimize potential conflicts with transit, pedestrians, and bicyclists.

The MetroPlan Orlando Metropolitan Transportation Plan (MTP) identifies Shingle Creek Trail Phase 4 as a Cost Feasible Pedestrian/Bicycle project within the study area. This project includes pedestrian and bicycle infrastructure located adjacent to the south of the SR 408 eastbound ramp at Kirkman Road. The trail continues north along Kirkman Road, traveling under SR 408. Additionally, there are safety improvements identified as Cost Feasible projects on SR 50 to the north of the project area and along Church Street from John Young Parkway, traveling under SR 408 to the Orlando Central Business District.

Other Unfunded Needs identified in the MTP that are located near the SR 408 improvements include the following as listed in **Table 9**.

Project	Limits	Туре	
W Colonial Rd/SR 50	Kirkman Rd Intersection	Safety Improvements	
Pine Hills Rd	Old Winter Garden Rd to Silver Star Rd	Operational/Safety	
President Barack Obama Pkwy	Old Winter Garden Rd to SR 50/Colonial Dr	New 4 Lane Roadway	
Old Winter Garden Rd	Kirkman Rd to Ivey Ln	Operational	
John Young Pkwy	33rd St to SR 408	Operational/Safety/Freight	
John Young Pkwy	LB McLeod to Church St	Complete Streets	

### Table 9: MetroPlan 2045 MTP Unfunded Needs Near Project
The Shingle Creek Trail is also identified in the Orange County Comprehensive Plan and the Orange County Trails Master Plan

The City of Orlando Bicycle Plan Update 2020 includes in its Visionary Bikeway Network proposed bicycle improvements on Kirkman Road, Shingle Creek Trail, Pine Hills Road, Ivey Lane, Orton Drive/Mercy Drive, Cottage Hill Road, John Young Parkway, and Church Street.

This project's proposed improvements will provide more efficient connections via SR 408, potentially taking additional automobiles off surface roads to minimize potential conflicts with transit, pedestrians, and bicyclists.

**Appendix A – Air Quality Technical Memorandum** 

# AIR QUALITY TECHNICAL MEMORANDUM

SR 408 Capacity Improvements from Kirkman Road to Church Street Project Development and Environment Study

Central Florida Expressway Authority



CFX Project No.: 408-174 Contract No.: 001844

August 2023

### Introduction

In September 2022, the Central Florida Expressway Authority (CFX) began a Project Development and Environment (PD&E) Study to add capacity to approximately three miles of SR 408 between SR 435 (Kirkman Road) and Church Street. This Technical Memorandum is to document the air quality analysis findings.

#### **Project Description**

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

#### General Existing Conditions and Land Uses of the Project Area

The project limits are within the City of Orlando which falls within Orange County, FL as well as in unincorporated Orange County. The project corridor is classified as a limited-access principal arterial-expressway rural.

The land use within this segment of SR 408 is primarily commercial along the north side of the project corridor. The south side of SR 408 includes commercial and residential. Downtown Orlando is located approximately two miles east of Church Street. **Table 1** summarizes and **Figure 1** shows the Future Land Use (FLU) designations of the area per the City of Orlando and Orange County.

FLU Code	Jurisdiction	Future Land Use (FLU) Designation
CONSERV		Conservation
INDUST		Industrial
MUC-MED		Mixed Use Corridor Medium Intensity
OFFICE-LOW	City of Orlando	Office Low Intensity
PUB-REC-INST		Public/Recreational & Institutional
RES-LOW		Residential Low Intensity
RES-LOW/RES-PRO		Residential Low Intensity/Resource Protection Overlay
UR-AC		Urban Reserve
С		Commercial
LD		Low-Density Residential
LM	Orange County	Low/Medium-Density Residential
0		Office
WB		Water Body

#### Table 1: Future Land Uses Within Project Area





Figure 1: Study Area Future Land Use (FLU) Map



Air Quality Technical Memorandum SR 408 Capacity Improvements Kirkman Rd to Church St PD&E Study Page 3

### Analysis and Results

As part of this study, an air quality evaluation has been performed consistent with the FDOT PD&E Manual, Part 2, Chapter 19. Based on this initial evaluation, a detailed Air Quality analysis is not needed because the project does not meet the two qualifying criteria per Section 19.2.2.1, Part 2, Chapter 19 of the PD&E Manual. It does not require an Environmental Impact Statement, and it is not expected to have community controversy regarding air quality.

This project is not expected to create adverse impacts on air quality because the project area is in attainment for all National Ambient Air Quality Standards (NAAQS) and because the project is expected to improve the Level of Service (LOS) and not change delay and congestion on all facilities within the study area.

Construction activities may cause short-term air quality impacts in the form of dust from earthwork and unpaved roads. These impacts will be minimized by adherence to applicable state regulations and to applicable FDOT Standard Specifications for Road and Bridge Construction.



### References

- Florida Department of Transportation. "Air Quality", Part 2, Chapter 19. Project Development and Environment Manual, Florida Department of Transportation, Tallahassee, July 1, 2020.
- Chapter 62-204, F.S., Air Pollution Control General Provisions. https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-204
- EPA, 1998. NOx, How Nitrogen Oxides Affect the Way We Live and Breathe. EPA 456/F98-005.
- EPA, 2016. The Green Book Nonattainment Areas for Criteria Pollutants. <u>https://www.epa.gov/green-book</u>
- EPA, 2014. National Emissions Inventory. https://epa.gov/air-emissionsinventories/nationalemissions-inventory-nei
- FDOT, CO FDOT Florida 2012 User's Guide and Screening Model. http://www.dot.state.fl.us/emo/software/software.shtm
- EPA, 2011 National Air Toxics Assessment Results. <u>https://www.epa.gov/national-air-toxicsassessment/2011-nata-assessmentresults</u>
- FHWA, Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(F) Documents, October 30, 1987; available from the FHWA Environmental Guidebook. https://www.environment.fhwa.dot.gov/projdev/impta6640.asp
- FHWA, Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. https://www.fhwa.dot.gov/environment/air\_quality/air\_toxics/policy\_and\_guidance /msat/
- FHWA, A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives.
- <u>https://www.fhwa.dot.gov/environment/air\_quality/air\_toxics/research\_and\_analy\_sis/mobile\_source\_air\_toxics/msatemissions.cfm</u>
- Memorandum of Understanding Between FHWA and FDOT Concerning the State of Florida's Participation in the Surface Transportation Project Delivery Program Pursuant to
- 23 U.S.C. 327, December 14, 2016. http://www.fdot.gov/environment/pubs/Executed-FDOT-
- NEPA-Assignment-MOU2016-1214.pdf



**Appendix B – Water Quality Impact Evaluation Checklist** 

🛛 No

Yes

PART 1: PROJECT INFO	DRMATION
Project Name:	SR 408 Westbound Capacity Improvements from Kirkman Rd to Church St
County:	Orange
FM Number:	N/A
Federal Aid Project No:	N/A
Brief Project Description:	This PD&E includes evaluating a proposed widening of a one-lane addition in the eastbound and westbound direction of SR 408 between SR 435 (Kirkman Road) and Church Street to provide greater capacity, reduce congestion and delay, and increase safety.
PART 2: DETERMINATION	ON OF WQIE SCOPE

Does project discharge to surface or ground water?	🛛 Yes 🗌	] No
Does project alter the drainage system?	🛛 Yes 🗌	] No
Is the project located within a permitted MS4? Name: Orange County and Co Permittees, Permit	🗌 Yes 🗵	No

#### FLS000011

If the answers to the questions above are no, complete the applicable sections of Part 3 and 4, and then check Box A in Part 5.

#### PART 3: PROJECT BASIN AND RECEIVING WATER CHARACTERISTICS

#### Surface Water

Receiving water(s) names: Shingle Creek Headwaters and Little Wekiva Cana	Receiving water(s) nat	ames: Shingle Creek	Headwaters and Little	Wekiva Canal
---	------------------------	---------------------	-----------------------	--------------

Water Management District: South Florida Water Management District

Environmental Look Around meeting date	Click here to enter a date.
Attach meeting minutes/notes to the checklist.	

Water Control District Name (list all that apply): <u>N/A</u>

Is the project located within a springshed or recharge area?

#### **Ground Water**

Sole Source Aquifer (SSA)? 🛛 Yes 🗌 No
Name Biscayne Sole Source Aquifer Streamflow and Recharge Source Zone
If yes, complete Part 5, D and complete SSA Checklist shown in Part 2, Chapter 11 of the PD&E Manual

Other Aquifer	? [	🛛 Yes	🗌 No
Name	Floridan Ac	quifer	

Well head protection area? □ Yes ⊠ No
 Name \_\_\_\_\_\_
 Groundwater recharge? ⊠ Yes □ No
 Name Biscayne Sole Source Aquifer Streamflow and Recharge Source Zone

Notify District Drainage Engineer if karst conditions are expected or if a higher level of treatment may be needed due to a project being located within a WBID verified as Impaired in accordance with Chapter 62-303, F.A.C.

Date of notification: <u>Click here to enter a date.</u>

#### PART 4: WATER QUALITY CRITERIA

List all WBIDs and all parameters for which a WBID has been verified impaired, or has a TMDL in <u>Table 1</u>. This information must be updated during each Re-evaluation.

Note: If BMAP or RAP has been identified in <u>Table 1</u>, <u>Table 2</u> must also be completed. Attach notes or minutes from all coordination meetings identified in <u>Table 2</u>.

EST recommendations confirmed with agencies?	🗌 Yes 🛛 No
BMAP Stakeholders contacted:	🗌 Yes 🛛 No
TMDL program contacted:	🗌 Yes 🖂 No
RAP Stakeholders contacted:	🗌 Yes 🖂 No
Regional water quality projects identified in the ELA	🗌 Yes 🛛 No
If yes, describe:	
Potential direct effects associated with project construction and/or operation identified? If yes, describe:	🗌 Yes 🖾 No

Discuss any other relevant information related to water quality.

#### PART 5: WQIE DOCUMENTATION

Attach the concurrence letter

- A. No involvement with water quality
- B. No water quality regulatory requirements apply.

C. Water quality regulatory requirements apply to this project (provide Evaluator's information below). Water quality and quantity issues will be mitigated through compliance with the design requirements of authorized regulatory agencies.

D. EPA Ground/Drinking Water Branch review required. Concurrence received? If Yes, Date of EPA Concurrence: Click here to enter a date..  $\Box Yes \boxtimes No$  $\Box Yes \boxtimes No$ 

 Evaluator Name (print): Hannah Smith

 Title:Environmental Scientist

 Signature:
 Hannah Smith

 Date:1/17/2023

#### Table 1: Water Quality Criteria

Receiving Waterbody Name (list all that apply)	FDEP Group Number / Name	WBID(s) Numbers	Classification (I,II,III,IIIL,IV,V)	Special Designations*	NNC limits**	Verified Impaired (Y/N)	TMDL (Y/N)	Pollutants of concern	BMAP, RA Plan or SSAC
Shingle Creek Headwater s	4/Kissi mmee River	3169G1	111		Stream	Yes	No	Dissolved oxygen	Lake Okeech obee
Little Wekiva Canal	2/Middl e St. Johns	3004	111		Stream	Yes	Yes	Dissolved oxygen and nutrients	Lake Okeech obee

\* ONRW, OFW, Aquatic Preserve, Wild and Scenic River, Special Water, SWIM Area, Local Comp Plan, MS4 Area, Other \*\* Lakes, Spring vents, Streams, Estuaries Note: If BMAP or RAP has been identified in <u>Table 1</u>, <u>Table 2</u> must also be completed.

## Table 2: REGULATORY Agencies/Stakeholders Contacted

Receiving Water Name (list all that apply)	Contact and Title	Date Contacted	Follow-up Required (Y/N)	Comments

**Appendix C – Contamination Screening Evaluation Technical Memorandum** 



#### **TECHNICAL MEMORANDUM**

January 27, 2023 Revised August 10, 2023

From: Richard McCormick, P.G. and Daniel C. Stanfill, P.E.

To: Mr. Michael Garau, P.E.

Subject: Existing Contamination Conditions Technical Memorandum SR 408 WB CAPACITY IMPROVEMENTS FROM KIRKMAN ROAD TO CHURCH STREET PD&E STUDY CFX 408-174 GEC Project No. 5202GE

Based on TWO 3 under Contract Number 001844 dated September 22, 2022, Geotechnical and Environmental Consultants, Inc. (GEC) is pleased to present this Existing Contamination Conditions Memorandum for the CFX SR 408 Capacity Improvements from Kirkman Road to Church Street PD&E study.

While this review of contamination status was performed using elements of Chapter 20 of the FDOT PD&E Manual, it does not represent a complete contamination screening evaluation in accordance with Chapter 20 of the FDOT PD&E Manual. Only the most recent public file documents were reviewed, and the limited scope of this evaluation did not allow for a more complete file review.

#### **Contamination Screening**

GEC conducted this evaluation using limited elements of the Chapter 20 of the FDOT PD&E Manual dated July 1, 2020. The study area is defined by the following distances from the right-of-way:

- All sites within 500 feet
- Non-landfill solid waste sites within 1,000 feet
- Solid waste landfills, CERCLA, or National Priorities List (NPL) sites within ½ mile

GEC reviewed relevant information from the following sources of information:

- USGS Quadrangle Map of Orlando, Florida (Figure 1),
- National Resource Conservation Service (NRCS) Soil Survey (Figure 2), and
- Limited Florida Department of Environmental Protection (FDEP) Map Direct and Nexus Information Portal file research was performed for the sites of concern identified within the study area.

Based on the results of the contamination screening activities, GEC assigned Contamination Risk Ratings (CRRs) to 75 potential contamination sites in the Study Area. The Contamination Risk Rating (CRR) system was developed by FDOT and incorporates four levels of risk: **No, Low, Medium and High**. For a description of the four risk levels please refer to **Appendix A**.

The project study area is shown on a 2021 aerial photograph with site locations shown in attached **Figures 2A – 2C**. Select portions of public record documents (Map Direct maps) are included as **Appendix B**.

**Table 1** – Potential Contamination Site Summary, presents the results of our evaluation. The information obtained from each source of information listed above is summarized for the study area and potential contamination site, along with the corresponding CRRs.

#### **Contamination Risk Sites Summary**

Our contamination risk ratings for the potential contamination sites are summarized below.

Site				Risk
No.	Facility Name	Facility ID	Concerns	Rating
1	All-Rite Fence	8629378	Assessment report was requested but not available.	Medium
2	Robert's Orthopaedics	74183	Non-generator of hazardous materials	Low
3	FL Fruit Shippers Association	N/A	Trucking yard with associated loading docks	Low
4	Former Walmart	FLR000075689	Former retail business	Low
5	Johnson Wrecker Service	9046940	Fuel tank and wrecking service	Medium
6	Jerry's Auto Air	9102596	Site Rehabilitation Completion Order, 2017	Low
7	Discount Auto Air	9201934	Site Rehabilitation Completion Order, 2019	Low

Table 1Potential Contamination Site Summary

Site No.	Facility Name	Facility ID	Concerns	Risk Rating
8	Brightview Landscape Svcs	9810929	Fueling tank and landscaping business	Medium
9	Empire Tire	95062	Waste tire processing facility	Medium
10	Contract Applications	FLD982121063	Hazardous waste/material generator	Low
11	Brightview Landscape Services	92021606	Fueling tank and landscaping business	Medium
12	Exclusive Auto Body Laster Paint & Body	128210, FLD982087694	Hazardous waste/material generator	Low
13	Terrick Construction	101061	Construction firm	Low
14	Booties	9102501	Tanks removed in 1998, assessment found no contamination	Low
15	House of Brick and Supply	ERIC_12865	Cleanup approved 2017	Low
16	Wareco #884	8513575	Tanks removed, remediation performed, clean-up approved in 2005	Low
17	Tire Max, Elmer's Paint & Body	FL0000108506	Hazardous waste/material generator	Low
18	Molded Fiberglass Industry	FLD982094674	Hazardous waste/material generator	Low
19	Rick's Auto Body Shop	FLR000033431	Hazardous waste/material generator	Low
20	Charles E Singleton Co of Florida	FLD980845630	Hazardous waste/material generator	Low
21	Affordable Auto Equipment	77119	Former paint and body shop	Low
22	KAB Soo Sang Properties	9200149	Elevated OVA values during tank closure – no closure report available	Medium
23	Classic Pools, Alderman Commercial Ctr	FLR000093633 9100006	Hazardous waste/material generator, 2018 completion order for tank discharge	Low
24	Robert Automotive Maint	FLD981752801	Hazardous waste/material generator, historical gas station	Medium
25	Central FL Truck Repair	FLD982129520	Hazardous waste/material generator	Low
26	Vacant	77120	Former small engine and vehicle repairs	Low
27	Gas N Shop	8513281	Active gas station	Medium
28	Fairclothes Paint & Body	FLR000017855	Hazardous waste/material generator	Low
29	Power Tech	FLR000140699	Hazardous waste/material generator	Low
30	Citrus Production Srvc	8521455	Historical tanks	Medium
31	Buxbaum Property	ERIC_12587	No further action status was approved for this property.	Low

Site No.	Facility Name	Facility ID	Concerns	Risk Rating
32	John Rogers Estate Property	9100815	No further action status approved 1993	Low
33	John Rogers Used Cars	8627870	Land use restrictions, existing contamination	Medium
34	Roadway Express	8513321	No further action status approved by FDEP 2022	Low
35	Foster's Auto Crushing	ERIC_12535	Contaminated, deed restricted property, petroleum impacts appear to extend into SR 408 R-O-W	High
36	National Ambulance Builders	ERIC_12540	No further action from FDEP 1995	Low
37	Suntuity	FLD982079691	Historical hazardous waste/material generator	Low
38	Track One Auto Sales	130991	Historical hazardous waste/material generator	Low
39	High Tech Auto Collision Repair	77340	Hazardous waste/material generator	Low
40	Jims Tropical Cleaners	ERIC_4952, 9500126	Dry cleaner cleanup site	Medium
41	Sunset Auto	9803870	Historical source removal approved by FDEP	Low
42	Classy One Auto Sales	74904	Historical hazardous waste/material generator	Low
43	Holiday Coachline	9700562	Tanks historically on-site	Medium
44	Bacchus Auto Sales	76696	Hazardous waste/material generator	Low
45	Pete & Mikes Used Cars	9804234	Assigned a cleaned-up completed status but well abandonment did not occur	Medium
46	Caswell Auto Repairs	131279	Hazardous waste/material generator	Low
47	FECC Inc.	FLD981748015	Hazardous waste/material generator	Low
48	Lemur Customs	103729	Historical hazardous waste/material generator	Low
49	Staff Zone	74858	Historical hazardous waste/material generator, dumping on-site	Low
50	Bennett Truck Equipment	8734912	2 small aboveground tanks	Low
51	L Johnston Properties	FLD984184762	Historical hazardous waste/material generator	Low
52	BOC Auto Sales	76968	Historical hazardous waste/material generator	Low
53	Dirt to Diamonds	75449	Historical hazardous waste/material generator	Low
54	Low Budget Auto Sales	FLR000029132	Historical hazardous waste/material generator	Low
55	Chad's Tire	140755	Historical hazardous waste/material generator, former scrap facility	Medium
56	Former Tennaco Site #083-08	9802446	Land use restrictions, existing contamination	Medium
57	Orlando Union Donation Center	74568	Historical hazardous waste/material generator	Low

Site				Risk
No.	Facility Name	Facility ID	Concerns	Rating
58	Orange City ROW Station #555	9800723	Contaminated former gas station	Medium
59	Auto Repair & Towing	FLR000054585 76369	Historical hazardous waste/material generator, towing yard	Medium
60	National Import Services	ERIC_12606	Sampling report accepted by FDEP	Low
61	Roadway Package System	8630425	Tank removed, site remediated, FDEP approved 1996	Low
62	Tri-W Rental	FLD982116691	Historical hazardous waste/material generator	Low
63	American Sunroof	FLD982151565	Historical hazardous waste/material generator	Low
64	Suburban Wrecker	FLR000069302	Historical hazardous waste/material generator	Low
65	Blown Away	143406	Hazardous waste/material generator	Low
66	La Flor De Mayo Express	9300116	Oil tank, fire in about 1998, coal tar concerns	Medium
67	Unlisted Scrapyard	N/A	Scrapyard/recycler	Medium
68	Quick Service Dry Cleaner	9501962	Dry Cleaner	Medium
69	K&D Auto Service	127141	Historical hazardous waste/material generator	Low
70	Orlando Orange County Expressway Authority	9802649	Tank removal and remediation, approved by FDEP 2000	Low
71	Robinsons Paint & Body Shop	74187	Hazardous waste/material generator	Low
72	Best Dry Cleaners	FLR000145243	Former dry cleaner, contaminated	Medium
73	Coachman Body & Paint Shop	FLD982167397	Hazardous waste/material generator	Low
74	Orlando Env. Svcs	FLD984167882	Historical hazardous waste/material generator	Low
75	Arent Soils	N/A	Area of Fill	Medium

#### Level II Impact to Construction Impact Assessments and Recommendations

Level II Impact to Construction Assessments (ICAs) or construction support will be dependent on the roadway improvement plans, dewatering requirements and the amount of right of way required that includes properties with tanks or known areas of impacts described in **Table 1**.

A Contamination Screening Evaluation Report will be required for this project.

#### Limitations

The findings, opinions, conclusions, and recommendations presented herein are based in part on reasonably ascertainable information contained in the public record. GEC does not warrant or guarantee the accuracy or completeness of this information. Some of this public record information may be dated and not representative of conditions at the time this report was prepared (January 2023), or in the future. Additional limitations are as follows:

- Not discussed in this report are properties that have been historically undeveloped land, are associated with residential use and do not appear to pose a contamination risk, or are professional/commercial establishments that are not associated with hazardous materials or petroleum products.
- This study also does not include surveys of wetlands, endangered species, asbestos containing materials, lead-based paints, or other potential hazardous building materials.

#### Use of This Memorandum

GEC has prepared this memorandum for the exclusive use of our client, The Balmoral Group, Kimley-Horn, and CFX and for application to our client's project. GEC will not be held responsible for any other party's interpretation or use of this report's data or recommendations without our written authorization.

GEC has performed the services described in this report in a manner consistent with that level of care and skill ordinarily exercised by members of our profession currently practicing in Central Florida. No other representation is made or implied in this document.

The conclusions and recommendations should be disregarded if the final project design differs from the project description in this report. If such changes are contemplated, GEC should be retained to review the new plans to assess the applicability of this report in light of proposed changes.

We appreciate the opportunity to work with The Balmoral Group, Kimley Horn, and CFX on this project. If you have any questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC.

Richard P. McCormick, P.G. Chief Geologist Florida License No. 2096

CFX No. 408-174 GEC Project No. 5202E

anif C. Starfiel

Daniel C. Stanfill, P.E. Senior Vice President Florida License No. 42763

Technical Memorandum SR 408 Capacity Improvements From Kirkman Road to Church Street

# **FIGURES**





1,000 2,000 Feet

DANIEL C. STANFILL, P.E. P.E. LICENSE NUMBER 42763 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS, INC. 919 LAKE BALDWIN LANE ORLANDO, FL 32814

STATE OF FLORIDA DEPARTMENT OF TRANSPORATATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 408	ORANGE	408-174



T:\J5202GE SR 408 PDE from Kirkman to Church\7 CADD Files\ArcGIS\5202G QUAD.mxd 1/11/2023





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Feet

CFX F	PROJ.	NC
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ESSWAY	
HORITY	

T:\J5202GE SR 408 PDE from Kirkman to Church\7 CADD Files\ArcGIS\5202G Contam 2C.mxd 1/27/2023

# **APPENDIX A**

**Contamination Risk Rating Descriptions**  The contamination potential risk rating system was developed by FOOT and is included in Part 2, Chapter 20 of the PD&E Manual, dated July 1, 2020. The rating system incorporates four levels of risk:

1. **No** - A review of available information on the property and a review of the conceptual or design plans indicates there is no potential contamination impact to the project. It is possible that contaminants have been handled on the property. However, findings from the Level I evaluation indicate that contamination impacts are not expected.

2. Low - A review of available information indicates that past or current activities on the property have an ongoing contamination issue; the site has a hazardous waste generator identification (ID) number, or the site stores, handles, or manufactures hazardous materials. However, based on the review of conceptual or design plans and/or findings from the Level I evaluation, it is not likely that there would be any contamination impacts to the project.

3. **Medium** - After a review of conceptual or design plans and findings from a Level I evaluation, a potential contamination impact to the project has been identified. If there is insufficient information (such as regulatory records or site historical documents) to make a determination as to the potential for contamination impact, and there is reasonable suspicion that contamination may exist, the property should be rated at least as a "Medium." Properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive this rating.

4. **High** - After a review of all available information and conceptual or design plans, there is appropriate analytical data that shows contamination will substantially impact construction activities, have implications to ROW acquisition or have other potential transfer of contamination related liability to the FDOT.

# **APPENDIX B**

Map Direct Maps

# Standard Map



- Site Investigation Section Sites
- ERIC Waste Cleanup
- ERIC Waste Cleanup
- Storage Tank Contamination Monitoring (STCM)
- Solid Waste Facilities

A PETROLEUM

Facility

ERIC Waste Cleanup

- Waste Processing Area
- - + Closed Hazardous Waste Facilities
  - + Hazardous Waste Transporter Facilities
  - $\diamond$ Small Quantity Hazardous Waste Generators (SQGs)
  - ♦ County SQGS

County of Orange, FL, FDEP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, FDEP, DWM, FDEP,DWM, Esri, NASA, NGA, USGS, FEMA

Map created by Map Direct, powered by ESRI.

**Appendix D – Highway Traffic Noise and Noise Study Report** 

# **Traffic Noise Study Report**

# Spessard Holland East-West Expressway (SR 408): Capacity Improvements from Kirkman Road to Church Street

Project Development and Environment (PD&E) Study Orange County, Florida CFX Project No: 408-174

> Prepared For: Central Florida Expressway Authority

### CENTRAL FLORIDA EXPRESSWAY AUTHORITY

Prepared By: Environmental Transportation Planning, LLC Ponte Vedra Beach, FL

> In Association With: Dewberry Engineers, Inc. Orlando, FL

> > **August 2023**



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### **1.0 INTRODUCTION**

CFX is conducting a Project Development and Environment (PD&E) Study for capacity improvements to SR 408 between Kirkman Road and Church Street.

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

This PD&E Study will analyze and evaluate a proposed widening of a one-lane addition in the eastbound and westbound direction of SR 408 between SR 435 (Kirkman Road) and Church Street to provide greater capacity, reduce congestion and delay, and increase safety. The project study area is illustrated in **Figure 1**.

The general objective of the PD&E Study is to provide documented information necessary for CFX to decide on the type, design, and location of the proposed improvement within the project limits. The PD&E Study includes evaluating and documenting the physical, natural, social, and cultural environment within the corridor and the potential impacts associated with the various mobility alternatives. This analysis also addresses economic and engineering feasibility, mobility capacity and service levels, conceptual geometry, drainage, and structures.

The goals of the project include:

- Enhance the mobility of the area's growing population and economy by providing additional transportation infrastructure
- Reduce congestion and delay and increase safety
- Provide consistency with local plans and policies
- Promote regional connectivity

#### **1.1 Build Alternative**

The PD&E's preferred build alternative is illustrated in **Appendix A** and **Appendix D**. Additional engineering detail can be found in the project's associated engineering documentation.



### **1.2 No-Build Alternative**

Consistent with FDOT guidelines, this analysis also considers an alternative that assesses what would happen to the environment in the future if this proposed project was not built. This Alternative, the No-Build Alternative, consists of the existing roadways within the study area, programmed improvements to existing facilities, and routine maintenance improvements. While the No-Build Alternative does not meet project needs, it provides a baseline condition to compare and measure the proposed project's effects.

#### **1.3 Study Objective**

This report summarizes the traffic noise analysis conducted for CFX Project #408-174. The analysis identifies the noise sensitive receptors within the study corridor, evaluates the noise levels predicted to occur due to the proposed project, and analyzes potential abatement options where noise impacts are predicted.

Sites and communities not specifically identified in **Appendix D** are 1) not within the project limits or 2) are located too far from the roadway to be considered noise sensitive.

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#### Figure 1: Project Location Map




## 2.0 METHODOLOGY

The traffic noise study conducted for this project is consistent with *Code of Federal Regulations* (C.F.R.), Title 23, § 772; Chapter 335, Section 335.17, *Florida Statutes*; Part II, Chapter 18 of the Florida Department of Transportation's (FDOT) *Project Development and Environment Manual*; and Federal Highway Administration's (FHWA) traffic noise analysis guidelines contained in *FHWA-HEP-10-025*. The FHWA Traffic Noise Model (TNM) - version 2.5 was used to predict traffic noise levels for this project. The analysis evaluated noise levels for the existing condition and the 2045 No-Build and Build Alternatives.

Noise receptor coordinates used in the TNM are located in exterior areas where frequent human use may occur, usually at the edge of the residential structure closest to the project roadways, unless the analyst's professional judgment determines otherwise.

Project engineering design files were used to determine the design alternative's location for input into TNM. Roadway elevation data for the study was obtained from the project engineering team. Data for the noise receptors and cross streets were obtained from the United States Geological Survey digital elevation models<sup>1</sup>.

#### 2.1 NOISE METRICS

Sound levels for this analysis are expressed in decibels (dB) using an "A"-scale weighting, expressed as dB(A). This scale most closely approximates the response characteristics of the human ear to typical traffic sound levels. All reported sound levels are hourly equivalent noise levels  $[L_{eq(h)}]$ . The  $L_{eq(h)}$  is defined as the equivalent steady-state sound level that, in a given hourly period, contains the same acoustic energy as the time-varying sound level for the same hourly period.

#### 2.2 TRAFFIC DATA

Traffic noise is heavily dependent on traffic volume and speed, with the amount of noise generated by traffic increasing as the vehicle speed and number of vehicles increase. Characteristics contributing to the 2045 Design Year's highest traffic noise levels were used to predict project noise levels. Worst-case noise conditions occur with the maximum traffic traveling at the posted speed and represent a Level of Service (LOS) C operating condition. However, if the traffic analysis indicates the roadway will operate below LOS C, the project's Demand peak-hour directional traffic volumes are used per Chapter 18 of the FDOT PD&E Manual. Traffic volumes and speeds used in the analysis are included in **Appendix B**.

<sup>&</sup>lt;sup>1</sup> USGS, https://apps.nationalmap.gov/lidar-explorer/#/



#### 2.3 NOISE ABATEMENT CRITERIA

Land use plays an important role in traffic noise analyses. To determine which land uses are "noise sensitive," this noise impact analysis used the FHWA Noise Abatement Criteria (NAC). **Table 1** shows these criteria are divided into individual land use activity categories. The FDOT has established noise levels at which noise abatement must be considered for each category, referred to in this report as the FDOT NAC. Another criterion for determining project impacts warrant abatement consideration occurs when project noise levels are below the NAC but show a substantial increase (15.0 dB(A) or more) over existing levels.

CENTRAL FLORIDA AUTHORITY

Hourl	y A-Wei	ghted Sou	nd Level-	
	decib	els (dB(A)		Description of Activity Category
Activity	Activity	/ Leq(h) <sup>1</sup>	Evaluation	Description of Activity Category
Category	FHWA	FDOT	Location	
A	57.0	56.0	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B <sup>2</sup>	67.0	66.0	Exterior	Residential.
C <sup>2</sup>	67.0	66.0	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, golf courses, places of worship, playgrounds, public meeting rooms, public/nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52.0	51.0	Interior	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public/nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E <sup>2</sup>	72.0	71.0	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F.
F	-	-	-	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	-	-	-	Undeveloped lands that are not permitted.
(Based on T	able 1 of 2	2 CER Part 7	77)	

#### **Table 1: Noise Abatement Criteria**

(Based on Table 1 of 23 CFR Part 772)

<sup>1</sup> The Leq(h) Activity Criteria values are for impact determination only and are not design standards for noise abatement measures.

<sup>2</sup> Includes undeveloped lands permitted for this activity category.



An illustration of typical exterior and interior noises and their corresponding sound level is presented in **Table 2**. This table gives the reader a better understanding of the noise levels discussed herein. In Florida, noise levels that reach 66.0 dB(A) at Activity Category B and C land use require noise abatement consideration. A 71.0 dB(A) noise level is required for an Activity Category E land use to be impacted by traffic noise.

Common Outdoor Activity	dB(A)	Inside Activity
Jet Flyover at 1,000 ft. Gas Lawn Mower at 3 ft.	110 100	Rock Band
Diesel Truck at 50 ft. (at50 mph) Busy Urban Area Daytime	90 80	Food Blender at 3 ft. Garbage Disposal at 3 ft.
Gas Mower at 100 ft. Commercial Area Heavy Traffic at 300 ft.	70 60	Vacuum Cleaner at 10 ft. Normal Speech at 3 ft. Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime Quiet Suburban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Rural Nighttime	30 20	Library Bedroom at Night
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing
Source: California Dept. of Transportation	Technical No	nise Supplement, Oct. 1998, Pg. 18

#### **Table 2: Comparative Sound Levels**

#### 2.4 Noise Abatement Measures

When traffic noise impacts are identified, noise abatement must be considered. The potential abatement alternatives include traffic management techniques, alternative roadway alignments, buffer zones, and noise barriers. The most common type of noise abatement measure is the



construction of a noise barrier that reduces traffic noise by blocking the sound path between the roadway and the adjacent noise receptor.

Consistent with the FDOT PD&E Manual – Chapter 18, the following factors must be evaluated to determine if a noise barrier is considered feasible and reasonable:

- The barrier must reduce traffic-related noise levels by at least 5.0 dB(A) for at least two impacted receptors to be considered acoustically feasible. Receptors that receive the 5.0 dB(A) reduction, or higher, are defined as "benefited" by FDOT. Consequently, noise barriers are not evaluated for isolated and single receptors.
- To be considered acoustically reasonable, the noise barrier must achieve the FDOT noise reduction design goal of 7.0 dB(A) for at least one benefited receptor.
- The cost per benefited receptor (CBPR) is calculated by multiplying the barrier's total square footage by \$30. Per Chapter 18, \$30 per/ft<sup>2</sup> is the statewide average used to determine cost reasonableness regardless of barrier type (shoulder/traffic railing mounted, right-of-way post/panel, etc.) To be considered cost reasonable, a barrier that meets all acoustical criteria should not exceed \$42,000 per benefited receptor.

In some locations, noise barriers may provide a benefit to non-impacted residences. Due to design considerations or aesthetics, CFX may propose noise barriers exceeding cost reasonableness limits. An example would be extending a noise barrier to maintain community continuity (i.e., avoiding terminating a noise barrier in the middle of a community).

Consistent with the FDOT Design Manual, Section 264<sup>2</sup>, noise barrier heights are limited as follows:

- Noise barriers on bridge and retaining wall structures are limited to a maximum height of 8 feet; unless otherwise specified;
- Shoulder-mounted noise barriers at the edge of shoulder pavement are limited to a maximum height of 14 feet; and
- Non-shoulder mounted noise barriers (i.e., post and panel) outside the clear recovery zone are limited to a maximum height of 22 feet. If a non-shoulder barrier is placed within the clear recovery zone, it must be shielded.

Other factors must also be considered when evaluating a barrier's feasibility, including accessibility, sight distance, and aesthetics. Accessibility refers to the ingress and egress to properties that would be affected by constructing a noise barrier. Sight distance is a safety issue

<sup>&</sup>lt;sup>2</sup> FDOT, *FDOT Design Manual* 



related to drivers' ability to see far enough in each direction to enter the roadway safely. Aesthetics refers to the noise barrier's physical appearance from the highway and affected property.

### **3.0 TRAFFIC NOISE ANALYSIS**

#### 3.1 Identification of Noise Sensitive Sites

Using **Table 1** as a guide, the noise sensitive land uses analyzed within the study corridor fall under Activity Category B [residential.

No land uses in the study corridor warrant an Activity Category A, C, D, or E analysis. A search of building permits for potentially noise sensitive Category G (undeveloped) and non-noise-sensitive Category F lands within the study area did not identify any active permits for future buildings that would be considered noise sensitive. Another search will be conducted during the final design process. Any noise sensitive land permitted between the time of this report and the approval of the Project Environmental Impact Report will be analyzed for project noise impacts if warranted.

#### 3.2 Model Validation

Existing noise levels are measured in the project corridor to confirm if traffic is the primary noise source. These field measurements are also required to verify the accuracy of the TNM before it can be used to predict noise levels. A series of three 10-minute measurements were taken on January 6, 2022, using an Extech Instruments Model 407780 Type 2 Integrating Sound Level Meter. The sound level meter, calibrated at 114.0 dB(A) with an Extech Instruments Model 407766 calibrator, was adjusted to the A-weighted frequency scale, which approximates the frequency sensitivity of the human ear. Traffic data, including vehicle volumes, speeds by type, and meteorological conditions, were recorded during each measurement session. The data collection effort also recorded the travel speed for each type of vehicle using a Bushnell Speedster handheld radar gun.

One location within the study corridor was selected to undergo a series of three 10-minute measurements. The validation site, illustrated in **Appendix D – Page D-4**, was selected for measurement because it presented a clear view of free-flow traffic conditions on SR 408. No unusual noise events occurred during this location's three 10-minute monitoring sessions. The weather during the monitoring session was 63°, with 80% humidity, under clear skies with no wind.

Validation of TNM occurs when the model-predicted noise levels are within three decibels of the field-measured levels. Since all noise levels in this analysis are based on one hour, each of the 10-minute sessions' field-recorded traffic volumes was adjusted upward by a factor of six to reflect



hourly traffic flow. Once adjusted, these volumes were input into the noise prediction model. As shown in **Table 3**, TNM predicted within the 3.0-decibel acceptance range for each 10-minute session. Consequently, the model is acceptable for predicting noise levels for this project.

			FIELD	TRAFFIC	COUNT:	1/6/202	2			
Session #1:	9:45 AM									
	Ca	ars	Mediur	n Trucks	Heavy	Trucks	Bus	es	Motor	cycles
SR 408	Volume	Avg. Speed	Volume	Avg. Speed	Volume	Avg. Speed	Volume	Avg. Speed	Volume	Avg. Speed
EB	505	59	33	55	7	53	0	0	1	57
WB	338	59	27	54	19	52	2	53	1	58
		Field Me	asuremen	t (dB(A)):	72.5					
		TNM	Predictio	n (dB(A)):	74.6					
				Variance:	2.1					
Session #2:	9:56 AM									
	Ca	ars	Mediur	n Trucks	Heavy	Trucks	Bus	es	Motor	cycles
SR 408	Volume	Avg. Speed	Volume	Avg. Speed	Volume	Avg. Speed	Volume	Avg. Speed	Volume	Avg. Speed
EB	411	59	26	55	14	53	0	0	1	57
WB	286	59	12	54	13	52	0	0	0	0
		Field Me	asuremen	t (dB(A)):	71.8					
		TNM	Predictio	n (dB(A)):	73.7					
				Variance:	1.9					
Session #3:	10:07 AN	/					-			
	Ca	ars	Mediur	n Trucks	Heavy	Trucks	Bus	es	Motor	cycles
SR 408	Volume	Avg. Speed	Volume	Avg. Speed	Volume	Avg. Speed	Volume	Avg. Speed	Volume	Avg. Speed
EB	400	59	21	55	9	53	1	53	2	57
WB	309	59	25	54	13	52	0	0	0	0
		Field Me	asuremen	t (dB(A)):	72.1					
		TNM	Predictio	n (dB(A)):	73.8					
				Variance:	1.7					

#### **Table 3: Field Measurement Data and TNM Validation Results**



#### **3.3** Predicted Noise Levels

Traffic on SR 408 is the dominant noise source within the project's evaluation area. For this project, 191 receptor sites, all Activity Category B, were analyzed for project-related impacts. The noise analysis divided the project corridor into eleven Noise Study Areas (NSA).

The 2022 existing condition and 2045 No-Build and Build Alternative noise analysis results discussed in this section are also presented in a noise impact comparison matrix in **Appendix C.** A summary of the results is provided in **Table 3**.

Eighteen receptors currently experience noise levels that meet or exceed the 66.0 dB(A) NAC. Predicted noise levels for the No-Build Alternative meet or exceed the NAC 19 sites. By comparison, the Build Alternative is predicted to meet or exceed the 66.0 dB(A) NAC at 95 sites, with an average 4.0 dB(A) increase in noise over the existing condition. The greatest increase over existing is 10.3 dB(A); thus, none of the noise increases are considered substantial (defined as 15 dB(A) or higher).

When discussing noise level increases, the general rule that applies to perception is:

- A 3 dB(A) increase is barely perceptible to most people.
- A 5 dB(A) increase is noticeable to most people.
- A 10 dB(A) increase is perceived as twice as loud and considered a doubling noise.

A discussion of each NSA and the corresponding impact and abatement analysis is provided in the following sections. A set of project aerials illustrating the NSA's and analyzed sites is included in **Appendix D**.



#### 3.3.1 Noise Study Area 1

NSA 1 is south of SR 408 between Kirkman Road and Pine Hills Road. Within this NSA is an existing eight-foot-tall post and panel barrier offset from the eastbound shoulder edge of pavement (EOP). The existing wall must be removed to accommodate the Build Alternative footprint. Twenty-eight single-family residences were included in the analysis and are represented by receptors 1-1 through 1-28. This NSA, its associated receptors, and existing barriers are illustrated in **Appendix D: Pages D-1 and D-2**.

Currently, the average noise level for all NSA 1 receptors is 61.8 dB(A), with the highest noise level being 64.6 dB(A) at receptor 1-3. No residences are currently affected by traffic noise, nor are they predicted to meet or exceed the 66.0 dB(A) NAC under the No-Build Alternative. Once the project is built, 27 sites represented by receptors 1-1 through 1-27 are predicted to exceed the impact criterion.

The overall traffic noise levels increase by an average of 8.3 dB(A), with the average projectrelated noise level predicted to be 70.1 dB(A). Receptor 1-3 has the highest build-related noise level, 74.3 dB(A), a 10.3 dB(A) increase over the existing condition. None of the increases over existing are considered substantial.

Because the predicted noise levels exceed NAC for the 27 residences, they are considered impacted. Noise abatement was considered to mitigate these impacts, as summarized in **Section 3.4.1**.

#### 3.3.2 Noise Study Area 2

NSA 2 is north of SR 408, across from NSA 1. Because there are no noise sensitive sites, this area was not analyzed for noise impacts. This NSA is illustrated in **Appendix D: Pages D-1 and D-2**.

#### 3.3.3 Noise Study Area 3

NSA 3 is south of SR 408 from Pine Hills Road to Ortman Drive. Within this NSA are two existing eight-foot-tall cast-in-place barriers, one located along the mainline eastbound shoulder EOP and the other along the Pine Hills entry ramp shoulder EOP. The project involves removing the mainline shoulder barrier to make room for the Build Alternative improvements. Eighteen residences represented by receptors 3-1 through 3-18 were analyzed for project noise impacts. Much of NSA 3 east of the residential receptors comprises industrial land uses. This NSA, its associated receptors, and existing barriers are illustrated in **Appendix D: Pages D-2 through D-4**.

Currently, the average noise level for NSA 3 is 63.7 dB(A), with the highest noise level being 69.1 dB(A) at receptor 3-17. Currently, three sites represented by receptors 3-4, 3-17, and 3-18 are affected by traffic noise. These sites and receptor 3-3 are predicted to be impacted by the No-



Build Alternative. Once the project is built, the overall traffic noise levels increase by an average of 3.2 dB(A), with the average project-related noise level predicted to be 67.0 dB(A). Eleven sites are predicted to meet or exceed the NAC. Receptor 3-4 has the highest predicted build noise level (72.7 dB(A)). None of the increases over existing are considered substantial.

Because the predicted noise levels meet or exceed the 66.0 dB(A) NAC at eleven residential receptors, they are considered impacted. Noise abatement was considered to mitigate these impacts, as summarized in **Section 3.4.1**.

#### 3.3.4 Noise Study Area 4

NSA 4 is north of SR 408 across from NSA 3. Within this NSA are two existing eight-foot-tall barriers. The barrier along the westbound mainline shoulder edge of pavement (EOP) is post and panel west of Pine Hills Road and cast-in-place east of Pine Hills Road. The proposed improvements involve expanding the SR 408; thus, the existing mainline shoulder barrier will be removed as part of the project. Eighteen residential sites, represented by receptors 4-1 through 4-18, were evaluated for project noise impacts. Much of NSA 4 east of the residential receptors comprises industrial land uses. This NSA, its associated receptors, and existing barriers are illustrated in **Appendix D: Pages D-2 through D-4**.

Currently, the average noise level for NSA 4 is 64.8 dB(A), with the highest noise level being 71.4 dB(A) at receptor 4-18. Six residences represented by receptors 4-4 through 4-8 and 4-18 are currently affected by traffic noise and are predicted to be impacted under the No-Build Alternative. Once the project is built, the overall traffic noise levels increase by an average of 3.4 dB(A), with the average project-related noise level predicted to be 68.1 dB(A). Fifteen sites represented by receptors 4-1 through 4-10, 4-12 through 4-15, and 4-18 are predicted to exceed the 66.0 dB(A) impact criterion. Receptor 4-18 has the highest predicted build noise level (73.0 dB(A)). None of the increases over existing are considered substantial.

Impacted receptor 4-18 is considered isolated; therefore, a barrier at this location cannot achieve the minimum noise reduction requirements outlined in **Section 2.4**. Because the predicted noise levels exceed NAC for the remaining seventeen residences, noise abatement was considered, as summarized in **Section 3.4.2**.

#### 3.3.5 Noise Study Area 5

NSA 5 is south of SR 408 from Ortman Drive to Ferguson Drive. Within this NSA, three existing noise barriers are along the eastbound shoulder edge of pavement (EOP) and offset from SR 408, near the CFX right-of-way (ROW) line. The existing eight-foot-tall barriers (post and panel barrier and cast-in-place) adjacent to Ortman Drive and the eight-foot-tall post and panel barrier at the



eastern end of NSA 5 will be removed because of the project. The existing sixteen-foot-tall ROW barrier is not affected. Fifty-seven residential sites, represented by receptors 5-1 through 5-51, were analyzed for project noise impacts. This NSA, its associated receptors, and existing barriers are illustrated in **Appendix D: Pages D-4 and D-5**.

Currently, the average noise level for all NSA 5 receptors is 60.5 dB(A), with the highest noise level being 63.6 dB(A) at receptor 5-27. None of the sites are currently affected by traffic noise and are not predicted to be impacted under the No-Build Alternative. Once the project is built, the overall traffic noise levels increase by an average of 4.3 dB(A), with the average project-related noise level predicted to be 64.8 dB(A). Fourteen sites are predicted to meet or exceed the NAC under the Build Alternative. Receptor 5-21 has the highest predicted build noise level (71.2 dB(A)). None of the increases over existing are considered substantial.

Because the predicted noise levels for the nine sites meet or exceed the 66.0 dB(A) NAC, they are considered impacted. Noise abatement was considered to mitigate these impacts, as summarized in **Section 3.4.3**.

#### 3.3.6 Noise Study Area 6

NSA 6 is north of SR 408, across from NSA 5. Because there are no noise sensitive sites, this area was not analyzed for noise impacts. This NSA is illustrated in **Appendix D: Pages D-4 through D-5**.

#### 3.3.7 Noise Study Area 7

NSA 7 is south of SR 408 from Ferguson Drive to John Young Parkway. Within this NSA are two existing eight-foot-tall barriers. One barrier, which is a continuation of the barrier from NSA 5, is the post and panel in the western section and then transitions to a cast-in-place barrier in the eastern section. A second post and panel barrier is offset from the mainline EOP west of the John Young Parkway overpass. The project involves removing the entire barrier to accommodate the roadway expansion. Twenty-one residences, represented by receptors 7-1 through 7-21, were evaluated for noise impacts. This NSA, its associated receptors, and existing barriers are illustrated in **Appendix D: Pages D-5 and D-6**.

Currently, the average noise level in this NSA is 61.8 dB(A), with the highest noise level being 65.6 dB(A) at receptor 7-7. None of the sites are affected by traffic noise, nor are they predicted to be impacted by the No-Build Alternative. Once the project is built, the overall traffic noise levels increase by an average of 5.3 dB(A), with the average project-related noise level predicted to be 67.2 dB(A). Fourteen sites are predicted to meet or exceed the NAC under the Build Alternative.



Receptor 7-7 has the highest predicted build noise level (43.2 dB(A)). None of the increases over existing are considered substantial.

Because the predicted noise levels for the fourteen sites meet or exceed the 66.0 dB(A) NAC, they are considered impacted. Noise abatement was considered to mitigate these impacts, as summarized in **Section 3.4.1**.

#### 3.3.8 Noise Study Area 8

NSA 8 is north of SR 408, across from NSA 7. Within this NSA, there are no existing noise barriers. Six residential sites represented by receptors 8-1 through 8-6 were analyzed for noise impacts. A large portion of NSA 8 west of the residential receptors comprises forested and industrial land uses. This NSA and its associated receptors are illustrated in **Appendix D: Pages D-5 and D-6**.

Currently, the average noise level for the analyzed sites in NSA 8 is 66.0 dB(A), with the highest noise level being 68.7 dB(A) at receptor 8-6. Receptors 8-1 and 8-6 are currently affected by traffic noise and are predicted to be impacted under the No-Build Alternative. Once the project is built, overall traffic noise levels increase by an average of 1.3 dB(A), with the average project-related noise level predicted to be 67.2 dB(A). ). Five sites are predicted to meet or exceed the NAC under the Build Alternative. Receptor 8-6 has the highest predicted build noise level (70.0 dB(A)). None of the increases over existing are considered substantial.

Because the predicted noise levels exceed NAC for the five receptors, they are considered impacted. Noise abatement was considered to mitigate these impacts, as summarized in **Section 3.4.4**.

#### 3.3.9 Noise Study Area 9

NSA 9 is south of SR 408 from John Young Parkway to Church Street. There are no existing barriers within this NSA. Three residential sites were analyzed for noise impacts. This NSA and its associated receptors are illustrated in **Appendix D: Pages D-5 and D-6**.

Currently, the average noise level for all NSA 9 receptors is 66.6 dB(A), with the highest noise level being 67.1 dB(A) at receptor 9-1. All three sites are currently affected by traffic noise and are predicted to meet or exceed the NAC under the No-Build Alternatives. After the project is built, the average noise level is predicted to be 67.7 dB(A), with the highest noise level being 67.9 at receptor 9-1. The average project-related noise increase over existing conditions is 1.1 dB(A). None of the increases over existing are considered substantial.



Because the predicted noise levels exceed NAC for the five receptors, they are considered impacted. Noise abatement was considered to mitigate these impacts, as summarized in **Section 3.4.5**.

#### 3.3.10 Noise Study Area 10

NSA 10 is north of SR 408, across from NSA 9. Within this NSA are two existing eight-foot-tall barriers. One is the post and panel barrier offset from the westbound mainline shoulder EOP. The other is cast-in-place on the mechanically stabilized earth (MSE) wall along the John Young Parkway exit ramp. Twelve residences, represented by receptors 10-1 through 10-12, were evaluated for noise impacts. This NSA and its associated receptors are illustrated in **Appendix D: Pages D-5 and D-6**.

Currently, the average noise level for the analyzed sites in NSA 10 is 64.2 dB(A), with the highest noise level being 68.2 dB(A) at receptor 10-9. Receptors 10-9 through 10-12 are currently affected by traffic noise and are predicted to meet or exceed NAC under the No-Build Alternative. Once the project is built, the overall traffic noise levels increase by an average of 2.3 dB(A), with the average project-related noise level predicted to be 66.5 dB(A). Six sites are predicted to exceed the NAC under the Build Alternative. Receptor 10-9 has the highest predicted build noise level (69.5 dB(A)). None of the increases over existing are considered substantial.

Because the predicted noise levels exceed NAC for the six impacted receptors, they are considered impacted. Noise abatement was considered to mitigate these impacts, as summarized in **Section 3.4.4**.

#### 3.3.11 Noise Study Area 11

NSA 11 is north of SR 408 from Church Street to the west of Tampa Avenue. An existing eightfoot-tall barrier is on the MSE wall adjacent to the westbound ramp/mainline. The proposed improvements to the westbound direction only include restriping the existing pavement; thus, they do not require the removal of the existing barrier, which is already at the maximum allowed height. Twenty-eight sites represented by receptors 11-1 through 11-25 were evaluated for noise impacts. The residences represented by receptors 11-18 through 11-20 are part of the two-story buildings. The noise analysis assigned a specific letter to indicate the floor on which a unit is located. The letter "a" represents ground-floor units while "b" represents 2nd-floor units. This NSA, its associated receptors, and existing barriers are illustrated in **Appendix D: Page D-7**.



Currently, the average noise level for the analyzed sites in NSA 11 is 63.9 dB(A), with the highest noise level being 67.7 dB(A) at receptor 11-25. Receptors 11-7 and 11-23 through 11-25 are currently affected by traffic noise and are predicted to meet or exceed NAC under the No-Build Alternative. Once the project is built, the overall traffic noise levels increase by an average of 0.8 dB(A), with the average project-related noise level predicted to be 64.7 dB(A). Eight sites are predicted to exceed the NAC under the Build Alternative. None of the increases over existing are considered substantial.

Since the existing noise wall is at the maximum allowed height [8 feet on top of MSE] and length for the NSA, additional abatement consideration for the eight impacted sites is not warranted.

### **3.4** Barrier Analysis

Four noise barriers were evaluated to mitigate the impacts resulting from the project.

### 3.4.1 Noise Barrier EB1

Barrier EB1 illustrated in **Appendix E - Pages E-1 and E-2** was evaluated parallel to the eastbound SR 408 as a two-segment barrier system to abate the project-related noise impacts for 27 NSA 1 and 11 NSA 3 receptors. The proposed barrier system replaces the existing 8-foot-tall mainline barrier with a 14-foot-tall barrier on the shoulder EOP [Segment 1] and 8 feet on the bridge over Pine Hills Road. Segment 2 consists of a new 8-foot-tall shoulder barrier along the Pine Hills entry ramp, which ties into the existing 8-foot-tall cast-in-place (CIP) barrier. As shown in **Table 4**, the Option 1 barrier system, at the maximum allowed heights of 14 and 8 feet, benefits 37 receptors (36 impacted and one non-impacted) and meets all acoustic and cost reasonableness criteria. Barrier EB1 is considered feasible and reasonable and is recommended for further consideration during the final design process.

Two legally permitted, conforming billboards (FDOT Tag Numbers: CF399 and CFR400) are located behind this barrier system. Any potential noise barrier/billboard conflict will be addressed during the final design process.



				NS	As 1 an	d 3: Ba	rrier EB1	L Evaluatio	on Summa	iry				
	Evaluated Barrier Opti	ons		Number of	Numb Sites Red	er of Im Within a uction R	pacted Noise ange	Nu	mber of Be	enefited Si	tes <sup>*1</sup>			Recommended
Option	Barrier Type/Location	Height (feet) <sup>*6</sup>	Length (feet)	Impacted Residential Sites	5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) <sup>*2</sup>	Impacted	Other *3	Total	Avg / Max Reduction dB(A)	Total Estimated Cost <sup>*4</sup>	Cost per Benefited Receptor <sup>*5</sup>	for further consideration in final design?
	Seg. 1 - m/l shoulder	14	2,993											
1 Illustrated	Seg. 1 - on structure	8	171		8	1	27	36	1	37	8.6/12.3	\$ 1,366,500	\$ 36,932	Yes
	Seg. 2 - ramp shoulder	8	285	20										
	Seg. 1 - m/l shoulder	14	2,584	50										
2	Seg. 1 - on structure	8	171		9	4	23	36	0	36	7.8/11.9	\$ 1,194,720	\$ 33,187	Yes
	Seg. 2 - ramp shoulder	8	285											

#### Table 4: Noise Barrier EB1 Evaluation Summary

\*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.

\*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.

\*3 = Refers to non-impacted noise-sensitive sites.

\*4 = Based on FDOT Statewide average of \$30 per square foot.

\*5 = FDOT Reasonable Cost Guideline is \$42,000.
\*6 = 8-ft max on MSE/Bridge; 14-ft max on shoulder; 22-ft max at ROW or offset from shoulder.

#### 3.4.2 Noise Barrier WB1

To abate for impacts to the 14 homes in NSA 4, Barrier WB1 was evaluated parallel to westbound SR 408 and placed at the westbound mainline shoulder EOP. The analysis included the existing 8-foot-tall barrier along the Pine Hills exit ramp for acoustical purposes but was not factored into the cost reasonableness calculations. The proposed barrier replaces the existing 8-foot-tall mainline barrier. As shown in **Table 5**, Option 5, at the maximum allowed heights, benefits 11 of the 14 impacted receptors, meets acoustic criteria, and is the CFX preferred option to carry forward into the project's final design phase. Thus, Barrier WB1, as illustrated in **Appendix E** – **Pages E-1 and E-2**, is recommended for further consideration during the project's final design phase.

Two legally permitted, conforming billboards (FDOT Tag Numbers: CE315 and CM805) are located behind this barrier system. Any potential noise barrier/billboard conflict will be addressed during the final design process.



					NSA 4:	Barrie	WB1 Ev	aluation S	Summary					
	Evaluated Barrier Opti	ons		Number of	Numb Sites Red	er of Im Within a luction F	pacted Noise ange	Nu	mber of Be	enefited Si	tes <sup>*1</sup>			Recommended
Option	Barrier Type/Location	Height (feet) <sup>*6</sup>	Length (feet)	Impacted Residential Sites	5-5.9 dB(A)	6-6.9 dB(A)	≥7.0 dB(A) <sup>*2</sup>	Impacted	Other *3	Total	Avg / Max Reduction dB(A)	Total Estimated Cost <sup>*4</sup>	Cost per Benefited Receptor <sup>*5</sup>	for further consideration in final design?
1	Seg.1 m/l shoulder	0	0		1	1	0	2	0	2	59/63	¢ 421 E20	¢ 215 760	No
1	Seg.2 m/l shoulder	8	1,798		1	-	0	2	0	2	5.0/0.5	\$ 451,520	\$ 215,700	NO
2	Seg.1 m/l shoulder	10	1,620		3	1	1	5	0	5	59/73	\$ 528 720	\$ 105 7 <i>11</i>	No
2	Seg.2 m/l shoulder	8	178		3 1	1	-	,	0	,	3.577.5	Ş 528,720	Ş 105,744	NO
2	Seg.1 m/l shoulder	12	1,620	14	2	_	2	8	0	8	64/84	¢ 625.020	¢ 79.240	No
3	Seg.2 m/l shoulder	8	178	14	5	5		0	0	0	0.47 8.4	\$ 023,920	Ş 78,240	NO
4	Seg.1 m/l shoulder	14	1,620		-	4	2	11	0	11	61/20	¢ 722 120	¢ 65 729	No
-	Seg.2 m/l shoulder	8	178		5	4	2	11	0	11	0.47 8.5	\$ 723,120	Ş 03,738	NO
5 Illustrated	Seg.1 m/l shoulder	14	1,017		-	4	2	11	0 11	0 11 6.3/8.9	¢ 460.960	¢ 40.715	Vos	
	Seg.2 m/l shoulder	8	178		5	4	2				0.5/ 8.9	\$ 409,800	ş 42,715	185

#### Table 5: Noise Barrier WB1 Evaluation Summary

\*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.

\*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.

\*3 = Refers to non-impacted noise-sensitive sites.

\*4 = Based on FDOT Statewide average of \$30 per square foot.

\*5 = FDOT Reasonable Cost Guideline is \$42,000.

\*6 = 8-ft max on MSE/Bridge; 14-ft max on shoulder; 22-ft max at ROW or offset from shoulder.

#### 3.4.3 Noise Barrier EB2

To abate for impacts to the 28 receptors in NSA 3 [14 residences] and NSA 5 [14 residences], Barrier EB2 was evaluated as a four-segment barrier system parallel to eastbound SR 408. The analyzed system incorporates the existing 16-foot-tall post and panel barrier, replaces the existing 8-foot tall barriers removed by the build alternative with 8-foot and 14-foot barriers on the shoulder EOP, depending on location, and extends the 16-foot-tall post and panel wall further west. As shown in Table 6, two barrier system options were evaluated, with the primary difference being that Option 1 maintains the Segment 3 section at a height of 8 feet. In contrast, Option 2 increases the height of the barrier to 14 feet, where an MSE wall is not proposed. The cost per benefited receptor calculations accounted only for the lengths of replacement barrier but used the benefits gained by the entire barrier system/length.

While both barrier system options meet acoustic feasibility and cost criteria, Option 2, as illustrated in **Appendix E – Pages E-3 and E-4**, benefits 52 homes, six more than Option 1. The four-segment Option 2 barrier system is recommended for further consideration during the project's final design phase.



One legally permitted, conforming billboard (FDOT Tag Number: AT785) is located behind this barrier system. Any potential noise barrier/billboard conflict will be addressed during the final design process.

				NS	As 5 ar	nd 7: Ba	rrier EB2	2 Evaluatio	on Summa	ary				
	Evaluated Barrier Opti	ons		Number of	Numb Sites Red	er of Im Within a uction R	pacted Noise ange	Nu	mber of Be	enefited Si	tes *1			Recommended
Option	Barrier Type/Location	Height (feet) <sup>*6</sup>	Length (feet)	Impacted Residential Sites	5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) <sup>*2</sup>	Impacted	Other *3	Total	Avg / Max Reduction dB(A)	Total Estimated Cost <sup>*4</sup>	Cost per Benefited Receptor <sup>*5,7</sup>	for further consideration in final design?
	Seg. 1 - m/l shoulder	8	542											
	Seg. 2 - post/panel	16	603		5	1	3				8.4/11.2	\$ 1,506,240		
1	Seg. 3 - shoulder	8	3,257					9	37	46			\$ 32,744	Yes
1	Seg. 3 - shoulder	14	0					5	57	40	0.47 11.2			163
	Seg. 4 - m/l shoulder	8	263											
	Seg. 4 - m/l shoulder	14	576	28										
	Seg. 1 - m/l shoulder	8	542	20										
	Seg. 2 - post/panel	16	603											
2	Seg. 3 - shoulder	8	2,546		10	1	з	14	38	52	80/112	\$ 1 634 220	\$ 31 <i>4</i> 27	Ves
Illustrated	Seg. 3 - shoulder	14	711		10	1	5	14	50	52	0.07 11.2	÷ 1,034,220	÷ 31,427	163
	Seg. 4 - m/l shoulder	8	263											
	Seg. 4 - m/l shoulder	14	576											

#### Table 6: Noise Barrier EB2 Evaluation Summary

1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.

\*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.

\*3 = Refers to non-impacted noise-sensitive sites.

\*4 = Based on FDOT Statewide average of \$30 per square foot.

\*5 = FDOT Reasonable Cost Guideline is \$42,000.

\*6 = 8-ft max on MSE/Bridge; 14-ft max on shoulder; 22-ft max at ROW or offset from shoulder.

\*7 = CPBR calculated using only the replacment barrier length but all receptors benefited by the entire barrier system.

#### 3.4.4 Noise Barrier WB-A1

Barrier WB-A1 was evaluated as a three-segment barrier system to abate the project-related impacts to eleven receptors in NSA 8 [five residences] and NSA 10 [six residences] parallel to westbound SR 408 mainline and John Young Parkway entry/exit ramps. There are no existing barriers in this section. Depending on location, the barrier system was evaluated using the maximum allowed heights of eight and fourteen feet. As shown in **Table 7**, the barrier system only benefits four of the eleven impacted and four non-impacted residences. The estimated cost for the three-segment system equates to a cost per benefited receptor (CPBR) of \$190,403, greatly exceeding the \$42,000 CPBR threshold. Barrier WB-A1, as illustrated in **Appendix E** – **Pages E-4 and E-5**, does not meet the necessary cost reasonableness criterion; thus, it has been



removed from further consideration. At CFX's discretion, other options may be considered during the final design phase to provide a visual buffer between the residences and the expressway.

				NSA	As 8 & 1	.0: Barri	ier WB-A	1 Evaluati	ion Summ	nary				
Evaluated Barrier Options Number of Impacte Sites Within a Nois Number of Reduction Range							pacted Noise ange	Nu	mber of Be	enefited Si	tes <sup>*1</sup>			Recommended
Option	Barrier Type/Location	Height (feet) <sup>*6</sup>	Length (feet)	Impacted Residential Sites	5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) <sup>*2</sup>	Impacted	Other *3	Total	Avg / Max Reduction dB(A)	Total Estimated Cost <sup>*4</sup>	Cost per Benefited Receptor *5	for further consideration in final design?
	Seg. 1 - ramp shoulder	14	1,041											
1	Seg. 2 - m/l shoulder	14	1,768	11	1	0	3	Λ	Λ	8	63/70	\$ 1 523 220	\$ 190.403	No
-	Seg. 2 - m/l shoulder	8	249		1	5	5	-	4	5	0.577.0	φ 1,523,220	÷ 130,403	110
	Seg. 3 - ramp shoulder	8	1,182											

#### **Table 7: Noise Barrier WB-A1 Evaluation Summary**

\*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.

\*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.

\*3 = Refers to non-impacted noise-sensitive sites.

\*4 = Based on FDOT Statewide average of \$30 per square foot.

\*5 = FDOT Reasonable Cost Guideline is \$42,000.

\*6 = 8-ft max on MSE/Bridge; 14-ft max on shoulder; 22-ft max at ROW or offset from shoulder.

#### 3.4.5 Noise Barrier EB-A1

Barrier EB-A1 was evaluated as a two-segment barrier system to abate the project-related impacts to three receptors in NSA 9 parallel to the eastbound SR 408 mainline and John Young Parkway entry ramps. There are no existing barriers in this section. Depending on location, the barrier system was evaluated using the maximum allowed heights of eight and fourteen feet. As shown in **Table 8**, the barrier system cannot provide the required minimum 5 dB(A) reduction for any impacted residences. Barrier EB-A1, as illustrated in **Appendix E – Page E-5**, is not considered feasible; thus, it has been removed from further consideration. At CFX's discretion, other options may be considered during the final design phase to provide a visual buffer between the residences and the expressway.



#### Table 8: Noise Barrier WB3 Evaluation Summary

					NSAs 9:	Barrier	EB-A1 E	valuation	Summary	1					
	Evaluated Barrier Opti	ons		Number of	Numb Sites Red	er of Im Within a uction R	pacted Noise ange	Nu	mber of Be	enefited Si	tes <sup>*1</sup>			Recommended	
Option	Barrier Type/Location	Height (feet) <sup>*6</sup>	Length (feet)	Impacted Residential Sites	Reduction Range           5-5.9         6-6.9         ≥ 7.0           dB(A)         dB(A)         dB(A) <sup>*2</sup>			Impacted	Other *3	Total	Avg / Max Reduction dB(A)	Total Estimated Cost <sup>*4</sup>	Cost per Benefited Receptor *5	for further consideration in final design?	
1	Seg. 1 m/l shoulder	14	657	2	0	0	0	0	0	0	< 5.0	¢ 426.190	n/2	No	
1	Seg. 2 ramp shoulder	8	626	3	0	0	0	0	0	0	< 5.0	\$ 420,180	ii/ a	NO	

1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.

\*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.

\*3 = Refers to non-impacted noise-sensitive sites.

\*4 = Based on FDOT Statewide average of \$30 per square foot.

\*5 = FDOT Reasonable Cost Guideline is \$42,000.

\*6 = 8-ft max on MSE/Bridge; 14-ft max on shoulder; 22-ft max at ROW or offset from shoulder.

# 4.0 CONCLUSION

Of the 191 analyzed residential sites, 18 are currently affected by traffic noise. The noise levels associated with the 2045 No-Build Alternative are predicted to meet or exceed the 66.0 dB(a) NAC at 19 sites.

The analysis concluded that once the project is built, which requires the removal of a majority of the existing walls, the overall traffic noise levels will increase by an average of 4.0 dB(A), with the average project-related noise level predicted to be 66.9 dB(A). The 2045 Build Alternative's noise levels are predicted to meet or exceed the applicable NAC at 95 sites. The greatest noise level increase is predicted to be 10.3 dB(A) in NSA 1. None of the increases are considered substantial (i.e., 15 dB(A) or more over existing levels).

As required, noise abatement consideration was given to all 95 impacted sites. Five noise barrier systems were evaluated to abate the project-related impacts. Barrier systems WB-A1 and EB-A1 are not deemed feasible and reasonable for impacted receptors 8-5, 10-6, 10-8 through 10-12, and 9-1 through 9-3. Receptor 4-18 is considered isolated; therefore, a barrier at this location cannot achieve the minimum noise reduction requirement. Consequently, a barrier was not analyzed for this location.

Barriers EB1, WB1, and EB2, as described in **Table 9**, were evaluated to abate the remaining impacted receptors in NSAs 1, 3, 4, 5, and 7 and are the CFX preferred options recommended for further consideration during the final design process.

Barrier EB1 is predicted to abate impacts to 37 residences (36 impacted and one non-impacted). Effective noise reduction for receptors 3-17 and 3-18 is not possible.



Barrier WB1 is predicted to abate impacts to 11 impacted residences. Effective noise reduction for the three impacted receptors, 4-8 through 4-10, is not possible.

Barrier EB2 is predicted to abate impacts to 52 residences (14 impacted and 38 non-impacted. Effective noise reduction for the 14 residences represented by receptors 5-23 through 5-27, 5-49 through 5-51, 7-1, 7-5, 7-9, 7-12, 7-13, and 7-16 is not possible.

As described in **Table 9**, noise barriers EB1, WB1, and EB2 are the CFX preferred options recommended for further consideration during the final design process. For areas where barriers are not feasible and reasonable, but barriers currently exist, CFX will evaluate other options for providing visual buffers between the residences and the expressway during the final design process.

Noise Study Area	Barrier ID	Barrier Height (ft) <sup>*2</sup>	Barrier Length (ft)	Barrier Location	Estimated Barrier Cost <sup>*1</sup>	Recommended for Further Evaluation?
1 and 3	EB1	8 & 14	456 [8'] 2,993 [14']	m/l shoulder; on bridge; ramp shoulder	\$1,366,500	Yes
4	WB1	8 & 14	178 [8'] 1,017 [14']	m/l shoulder; on bridge	\$469,860	Yes
5 and 7	EB2	8, 14 & 16	3,351 [8'] 1,287 [14'] 603 [16']	m/l shoulder; ramp sholder ROW post/panel	\$1,634,220	Yes
8 and 10	WB-A1	8&14	1,431 [8'] 2,809 [14']	m/l shoulder; ramp shoulder	\$1,523,220	No
9	EB-A1	8 & 14	626 [8'] 657 [14']	m/l shoulder; ramp shoulder	\$426,180	No

#### Table 9: CFX Project #408-174 PD&E Noise Barrier Recommendations

\*1 = Based on FDOT Statewide average of \$30 per square foot.

\*2 = 8-ft max on MSE/Bridge; 14-ft max on shoulder; 22-ft max at ROW or offset from shoulder.



#### 4.1 Statement of Likelihood

The Central Florida Expressway Authority is committed to the construction of feasible and reasonable noise abatement measures (Noise Barriers EB1, WB1, and EB2) identified in **Table 9**, 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.
- 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.
- Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed, and any conflicts or issues resolved.

Any potential noise barrier/billboard [legally permitted and conforming] conflict will be addressed during the final desing process.

### **5.0 CONSTRUCTION NOISE AND VIBRATION IMPACTS**

Construction of the proposed roadway improvements is not expected to have significant vibration or construction noise impacts. Applying the FDOT Standard Specifications for Road and Bridge Construction is anticipated to minimize or eliminate most potential short-term noise and vibration impacts. Should any construction noise or vibration issues arise during construction, the Project Engineer, in concert with the CFX Noise Specialist and the Contractor, will investigate additional methods of controlling these impacts.

### 6.0 COMMUNITY COORDINATION

#### 6.1 Noise Impact Contours

To aid in promoting land use compatibility, this report, which provides information that can be used to protect future land development from becoming incompatible with anticipated traffic noise levels, can be used by Orange County and officials. In addition, generalized noise impact contours for the Build Alternative have been developed, identifying the distances between the Build Alternative and the location where traffic noise levels approach the NAC for Activity Categories A, B, C, and E. The contour distances provided in **Table 10** do not account for any reduction in noise levels that berms, privacy walls, or intervening structures may provide. These



distances also do not account for any increase in noise levels caused by local roads not included in the modeling, variation in the noise path, increased roadway elevation, or increased elevation of a noise sensitive site (e.g., second-floor patio). To minimize the potential for incompatible land use, future noise sensitive land uses should be located beyond these distances.

	Impact Contours	
Activity Category <sup>*1</sup>	Corresponding Noise Abatement Criterion	Approximate Distance to SR 408 <sup>*2</sup>
Category A	56 dB(A)	1,280 ft
Category B and C	66 dB(A)	440 ft
Category E	71 dB(A)	235 ft

#### **Table 10: Critical Distance Impact Contours**

\*1 Activity Categories as defined in 23 CFR 772.

\*2 Does not account for variation caused by topography, local roads, intervening structures, etc.

#### 6.2 Public Meetings

A public meeting was held for this project on February 28, 2023. Any comments received during the public meeting comment period about the PD&E Study in general and those pertinent to the noise analysis will be documented under separate cover.

The noise barriers proposed in this PD&E Study will be reevaluated during the final design process. CFX will hold a meeting to present the proposed noise barriers that continue to meet criteria and other pertinent project construction-related information to the public. To aid in the decision-making process, CFX will directly solicit the opinions of the property owners and renters found to benefit (e.g., receive a minimum 5 dB(A) reduction in noise) from the proposed noise barrier. The CFX decision-making process and survey results for this project will be documented under separate cover.



## 7.0 REFERENCES

- FHWA. *Code of Federal Regulations,* Title 23 Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise." July 13, 2010.
- FHWA. *Highway Traffic Noise: Analysis and Abatement Guidance, FHWA-HEP-10-025.* December 2011.
- FHWA. *Recommended Best Practices for the Use of the FHWA Traffic Noise Model (TNM.* December 8, 2015.
- FDOT. A+ Plus Aerial Photo Look-Up System. 2022.
- FDOT. FDOT Design Manual
- FDOT. Project Development and Environment Manual: Part II, Chapter 18. Effective July 1, 2020.
- FDOT. Standard Specifications for Road and Bridge Construction.
- FDOT. Traffic Noise Modeling and Analysis Practitioners Handbook. December 2018.
- Google Earth, @2022 Google. Imagery and elevation data.
- Section 335.17, Florida Statutes. State Highway Construction; Means of Noise Abatement. 2012.
- USGS. National Map 2022; https://apps.nationalmap.gov/lidar-explorer/#/.



# Appendix A:

# **Typical Sections**





# Appendix B:

# Noise Study Traffic Data

				Freewo	ay Mainline				1.2				
Maintine Segment	Number of Lanes	Two-Way AADT	Two-Way LOS C AADT	Peak Hour Peak Direction	Hour Peak Direction	Design Hr. % T	Design Hr. % MT	Design Ht. % HT	Design Hr. % Duces	Design Hr. % Motorcyclas	Standard K-factor	D-factor	Posted Speed (mph)
SR 405													
West of Kirkinan Road	8	93,205	116,500	B.008 .	5,320	2.00%	0.61%	1.15%	0.23%	0.02%	8.6%	63.7%	60
From Keleman Road to Pine Hills Road	8	98,590	116,600	4,952	5,320	2.00%	D.61%	1.16%	0.23%	0.02%	8.6%	83.7%	60
From Pine Hills Road to Old Weiter Galden Road		106,700	87,400	5,322	3,990	2.00%	0.61%	1,15%	0.23%	0.02%	8.5%	53.7%	60
From Gid Winer Garden Head to John Young Parkway		113,860	31,400	5,544	5,990	2.00%	0.81%	1,12%	0.23%	0.02%	8.5%	03.7%	60
From John Toung Paneway to Tanga Avenue		110,000	1 10.0vg	1,303	D. S. C.	1.00%	1.0.01%	1.1376	0.417	1. 0.04.78	1 nam	1.00.2 14	1 00
		_	-	Porth Hinat	LLOS C Peas		1			-		<u> </u>	
SR 408 Ramps	Number of Lanes	One-Way AADT	LOS C AADT	Peak	Hour Peak Direction	Design Hr. % 7	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % Notorcycles	K-factor	D-factor	Operational Speed (mph)
Kirkman Road											-		
Eantbound off	1	5,150	12,900	630	1,270	2.00%	0.61%	1.16%	0.23%	0.02%	0.0%	54.9%	46
Wentbound on	1	5,150	12,900	416	1,270	2.00%	0.81%	1,15%	0.23%	0.02%	9.0%	54.9%	45
Eastbound on	1	5.326	12.500	600	1.270	2.00%	0.61%	1.15%	0.23%	0.02%	9.6%	82.6%	45
Westbourd.off		5.325	12,500	53g	1,270	2.00%	0.61%	1.12%	0.22%	0.02%	0.6.%	12.0%	43
Pine Hills Road													
Eaklound pil	1	4.075	13,200	370	1.270	2.00%	0.61%	1,15%	0.23%	0.02%	9.0%	53.5%	45
Wintbound of		4,075	13,200	338	1,270	2.00%	0.61%	1.13%	0.22%	0.02%	9.0%	110.075	43
Old Winter Garden Road			_										
Eastbound be		3,575	11,500	262	1,270	2.00%	0.61%	1.10%	0.23%	0.02%	9.5%	80.5%	45
Weitbound of		3,075	11,109	414.	1,278	2.00%	0.61%	1.13%	0.23%	0.02%	1 11.12	. 80.875	45
John Young Parkway					-		_	_				_	
Eastbound of		4.325	11,000	210	1,270	2.00%	0.61%	1,15%	0.23%	0.02%	9.0%	64.3%	45
Westbound on		4,325	11,000	001	1,270	2.00%	0.81%	1.10%	0.23%	0.02%	9.0%	04.2%	43
Matheurid of	1.1	0,070	10,300	478	1,270	2 00%	0.0175	1,1075	0.2379	0.02%	8.8%	89.8%	45
Trends Autour		2,010	10,305	4.0	1,210	2.000	- ouris	1.10.9	9220	0.000 18		100.014	80
Tartiga Avenue	_		1 10 100	1000	1000	1		1 1 1 1 1	1	1 2 2 2 2 2	1 10 10		
EBSDOWID OF		2,450	10,200	290	1,270	2.00%	0.61%	1,1070	0.2379	0.02%	10.0 %	40.7%	40
Hestodato of		2,9420	19,200	620	Latio	2.00%	0.0119	.1.1976		0.0279	10.0.20	14407.78	
				Arteriaria de	to Cross Strag		-			1		_	
Arterial Segment	Number of Lanes	Two-Way AADT	Two-Way LOS C AADT	Peak	Hour Peak Direction	Design Hr. % 7	Dasign Hr. % MT	Design Hr. % HT	Design Hr. % Buren	Design Hr. % Notorcycles	K-factor	D-factor	Posted Speed (mph)
Kirkman Road													
North of SR 408	- 6	28,200	61,100	1,410	3,070	\$ 00%	1.05%	0,75%	0.20%	0.18%	8.0%	15.8%	45
South of SR 408		32,800	52.400	1.609	3,070	2.00%	1.05%	9,79%	0.20%	0.10%	.9.0.%	04.6%	43
Pine Hills Road													
North of BR 408	4	19,100	16,000	926	730	2.00%	1.05%	0.75%	0.20%	0.18%	9.0%	64.1%	38
30/F 0/ SK 403	1 4	18,100	38,800	734	1.900	2.00%	1.09%	9.727	0.2376	0.38%	1.0.7s	24.4%	40
Old Winter Garden Road							1			-			
sam or set 408 Westbound of-eing		11,100	36,200	999	1,900	2.00%	1.05%	9.73%	0.20%	0.00%	1 10.049	10.4%	85
Jann Toang Parkady				-	1 0 10				0.010		0.00	1 22 22	
North of arc408	2	42,909	e1,800	2,127	3,070	4.00%	1,23%	2,22%	0.54%	0.08%	9.0%	65.2%	46
actual of an AUI	_	24.102	54,100	1.050	3,979	4.00%	1.21%	5.55 Th	0.54%	0.00%	9.0%	BACH	49
Lange Avenue					-					Y			
North of SH 408	2	8,900	1,700	410	3.70	2.00%	1.05%	0.75%	0.20%	0.15%	9.0%	83.2%	30
South of SH 405	and the second	9,300	7,700	580	210	2.00%	1.05%	5/67	2,673	.0.38%	4.0.76	2227	
AADT Annual Astrongo Daily Traffic Mit Mediu	175m84		PT HARRY TO	10.00									

### Noise Analysis Traffic Data - SR 408, from Kirkman Road to Church Street 2022 Existing Conditions

(1) Number of lanes were obtained from field observations and actial maps. Number of lanes shown are based on direction with fower lanes. Noise analysis to consider correct lanage per guidelines.
 (2) Traffic data is obtained from the operational analysis for the SR 408 (Killman Road to Church Steet) PD6E study.
 (3) Po6k hour domand and LOS C poak hour maximum concerve values and provided directionally.
 (3) Po6k hour domand and LOS C poak hour maximum concerve values and provided directionally.
 (3) PO6k hour domand and LOS C poak hour maximum concerve values and provided directionally.
 (3) FD6K hour domand and LOS C poak hour maximum concerve values and provided directionally.
 (3) LOS C Inalign and based on the FUOZ 1220 CountilyLow of Service Namitook tables. And adjusted for local constitions.
 (5) LOS C AADTs are entimated using K and D factors and the design hour poak direction LOS C maximum service volumes.
 (5) The vehicle classification relations and the data Table. Online.
 (7) Posted tapeed data are obtained by field observations.

Munimize Segurint         Number of Tarwing         Tarwing in the last of the last o					Freew	ny Mainline								
Set 48	Meinlise Segment	Number of Lanes	Two-Way AADT	Two-Wity LOS C AADT	Peak Hour Peak Direction	Hour Peak Direction	Design Hr. S T	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % Matorcycles	Standard K-factor	D-factor	Posted Speed (mph)
Aller of Antrans Risod         8         195,700         716,200         7.290         3.200         2.00%         6.475         1.35%         0.02%         0.04%         4.35%         5.37%         40           From Advant Floated Part Ha, Fload         6         1.151,100         116,000         7.196         3.200         2.05%         6.475         1.155%         0.02%         8.35         8.37%         60           From Advant Floated Part Ha, Fload         1.151,000         116,000	SH 438													
Fram Konten Ridel to Yes Wine State Road         6         195,100         118,00         7,190         3,200         2,00%         6,01%         1,15%         0,23%         0,02%         6,3%         8,37%         60           Incomes estic Right Over Wine State Road         6         1,627,000         2,700         3,380         2,00%         6,41%         1,15%         0,23%         0,02%         8,3%         8,37%         60           Incomes estic Right Over Wine State Road         1,15%         0,23%         0,02%         8,3%         8,37%         60           State Other State Road         1,15%         0,23%         0,02%         0,02%         9,5%         8,37%         60           State Other State Road         1,15%         0,23%         0,02%         0,02%         9,5%         8,57%         60           State Other State Road         1,15%         0,23%         0,02% <td< td=""><td>West of Kirkman Hoest</td><td>.8.:</td><td>150,799</td><td>116,500</td><td>7,230</td><td>1,320</td><td>2.00%</td><td>0.51%</td><td>1.35%</td><td>0.22%</td><td>0.02%</td><td>8.5%</td><td>53.7%</td><td>୍ ଗର ୍</td></td<>	West of Kirkman Hoest	.8.:	150,799	116,500	7,230	1,320	2.00%	0.51%	1.35%	0.22%	0.02%	8.5%	53.7%	୍ ଗର ୍
Frame Res         Res         1500         0.03% <t< td=""><td>From Kehmen Road to Pine Hilk Road</td><td>8</td><td>151,100</td><td>116,900</td><td>7,190</td><td>5,320</td><td>2.00%</td><td>0.61%</td><td>1.15%</td><td>0.23%</td><td>0.02%</td><td>8.5%</td><td>\$8.7%</td><td>09</td></t<>	From Kehmen Road to Pine Hilk Road	8	151,100	116,900	7,190	5,320	2.00%	0.61%	1.15%	0.23%	0.02%	8.5%	\$8.7%	09
Prim CM Water Gastes Range         6         (77,000) </td <td>From Plike Hills Road to Old Writer Garden Road</td> <td>8</td> <td>162,100</td> <td>87,400</td> <td>7,720</td> <td>3.990</td> <td>2.00%</td> <td>0.61%</td> <td>1.15%</td> <td>0.23%</td> <td>0.02%</td> <td>8.5%</td> <td>53,7%</td> <td>60</td>	From Plike Hills Road to Old Writer Garden Road	8	162,100	87,400	7,720	3.990	2.00%	0.61%	1.15%	0.23%	0.02%	8.5%	53,7%	60
Hom.Jobin Voorg Perkey's Fange Average         6         (74,600         100/0         8/70         2/80         2/00         0.01%	From Old Winter Galden Road to John Young Parlowy	6	171,200	87,400	8,025	3,990	2.00%	0.01%	1.15%	0.23%	0.02%	4.5%	53.7%	60
SR 401 Barryn         Nurder of Lanes         One-May Akor         Part Mark Doc C Akor         Part Mark Doc C Akor         Part Mark Doc C Akor         Part Mark Doc C Akor         Design fr. St 400	From John Young Parkway to Tampa Avenue	8	174,600	116,500	8,970	5,320	2.05%	9.61%	1.15%	0.23%	0.02%	3.5%	58.7%	80
SR. 401 Rangen         Unsein M. Design Hr. D					SR.4	DE Rampe								
Kritena Made         1 <t< td=""><td>SR 408 Ramps</td><td>Number of Lones</td><td>One-Way AADT</td><td>One-Way LOS C AADT</td><td>Peak</td><td>Hour Peak Direction</td><td>Design Hr. % T</td><td>Design Hr. % MT</td><td>Design Hr. % HT</td><td>Design Hr. % Exces</td><td>Design HV. % Motorcycles</td><td>K-factor</td><td>D-factor</td><td>Operational Speed (mph)</td></t<>	SR 408 Ramps	Number of Lones	One-Way AADT	One-Way LOS C AADT	Peak	Hour Peak Direction	Design Hr. % T	Design Hr. % MT	Design Hr. % HT	Design Hr. % Exces	Design HV. % Motorcycles	K-factor	D-factor	Operational Speed (mph)
Exet control off         1         6.800         12,800         700         5.270         2,055         0.675         0.235         0.025         0.035	Kirkman Noad	- 20 - HE - 2	1.4.1.1.1.1.1.1	2000 B-0-0			A SEALAR CO	20-20-0	Contraction of the second		(b) 11 and 11 and 12	1	i se a contra te	de la compañía de la
Weetsourd or         1         6,000         12,500         670         1,270         2,00%         0,01%         1,35%         0,23%         0,02%         0,00%         54,0%         45           Weetsourd of         1         7,000         12,560         100         1,270         2,00%         0,61%         1,55%         0,23%         0,02%         0,05%         4,5%         4,5           Understand or         1         4,550         11,100         411         1,270         2,00%         0,61%         1,5%         0,22%         0,02%         0,05%         4,5%         4,5           Understand or         1         5,460         1,500         0,30%         4,270         2,00%         0,61%         1,5%         0,22%         0,02%	Eastbound off	1	6.800	12,900	790	1.270	2.00%	0.81%	1.15%	0.23%	0.02%	0.0%	54.9%	45
Limition or Weatloard off         1         7,000         12,260         000         1,270         2,02%         0,02% </td <td>Westbound on</td> <td>1.</td> <td>6,800</td> <td>12,900</td> <td>876</td> <td>1,270</td> <td>2.00%</td> <td>0.61%</td> <td>1.15%</td> <td>0.23%</td> <td>0.02%</td> <td>0.0%</td> <td>54.0%</td> <td>45</td>	Westbound on	1.	6,800	12,900	876	1,270	2.00%	0.61%	1.15%	0.23%	0.02%	0.0%	54.0%	45
Weak Count off         1         7,000         12,000         7.56         1.270         2.075         0.65%         1.15%         0.22%         0.02%         9.0%         5.27%         45           First Hits Kead         1         5.500         13.200         550         1270         2.00%         6.65%         1.15%         0.23%         0.02%         9.0%         53.65%         45           Cheft Weat Count of Mead         1         4.550         17.160         5302         1.270         2.00%         6.65%         1.75%         0.23%         0.02%         9.0%         53.65%         45           Cheft Orde         1         4.560         17.160         5302         1.270         2.00%         6.65%         1.75%         0.23%         0.02%         9.0%         54.5%         45           John Yeadg Parkway	Lestbourd ox		7,000	12,500	600	1,270	2.00%	0.01%	1.15%	0.23%	B-02%	9.0%	52.6%	45
Pres Hills Read	Weltowntoff	1	7,000	12,500	730	1,270	2.07%	0.81%	1.15%	0.23%	0.02%	9.0%	52.8%	45
Eastboard off         1         5.800         13.200         530         1.270         2.0%         0.0%         1.1%         0.02%         0.0%         8.3.5%         45           Old Wintbroard off         1         5.300         13.200         2.0%         0.0%         8.3.5%         45           Continuer Cardian Read         1         4.350         11.100         322         1.270         2.0%         0.0%         8.3.5%         45           Continuer Cardian Read         1         4.350         11.100         322         1.270         2.0%         0.0%         1.5%         0.02%         0.0%         8.3.5%         45           Continuer Cardian Read         1         4.450         11.100         322         1.270         2.0%         0.0%         1.5%         0.02%         0.0%         6.45%         45           Understand off         1         5.460         11.200         500         1.270         2.0%         0.0%         1.5%         0.02%         0.0%         6.45%         45           Westhound off         1         5.400         10.200         400         1.270         2.0%         0.0%         1.5%         0.02%         0.0%         6.45% <tr< td=""><td>Pine Hills Road</td><td></td><td></td><td>-</td><td></td><td></td><td>*****</td><td></td><td></td><td></td><td></td><td>-</td><td>-</td><td>-</td></tr<>	Pine Hills Road			-			*****					-	-	-
Windbound off         1         5,500         12,200         500         1270         2,00%         6,07%         135%         0.23%         0.02%         0.03%         53,85%         45           Lindbourd of         1         4,850         17,160         322         5,270         2,03%         0.85%         1,35%         0.23%         0.02%         8,3%         60,5%         45           Vestbound of         1         4,460         11,000         401         1,270         2,03%         0.65%         1,35%         0.22%         0.02%         8,3%         45           Join Young Parkway         1         5,460         11,000         800         1,270         2,03%         0.67%         1,35%         0.22%         0.02%         8,4%         45           Lindbound of         1         5,400         11,000         800         1,270         2,05%         0.67%         1,5%         0.22%         0.02%         8,4%         45           Westbound of         1         7,100         10,900         476         2,700         2,05%         0.67%         1,5%         0.25%         0.02%         1,05%         52,7%         45           Westbound of         1         3,2	Endbound on	1 1	5,500	13,200	530	1,270	2.00%	0.61%	1.15%	0.23%	0.02%	9.0%	53.5%	45
Old With Cardie Res         1         4.350         11,100         382         5.270         2.05%         6.85%         1.35%         0.23%         0.02%         9.3%         60.5%         45           Vestbound of Westbound of         1         4.360         11,100         411         5.270         2.05%         6.65%         1.35%         0.23%         0.02%         9.3%         60.5%         45           John Yoong Perkway         1         5.460         11,000         450         1.270         2.05%         6.65%         1.35%         0.23%         0.02%         9.0%         64.3%         45           Vestbound of         1         5.450         11,000         430         1.270         2.05%         6.65%         1.35%         0.22%         0.02%         43%         45           Listbourd of         1         7.160         10,300         478         5.270         2.05%         6.65%         1.35%         0.22%         0.02%         43%         45           Vestbound of         1         3.200         10.200         405         1.270         2.05%         6.65%         1.55%         0.22%         0.02%         7.7%         45         457           Vestbound of<	Westbound off	1	5,500	13,200	5.39	1,270	2.00%	0.01%	1.15%	9.23%	0.02%	9,0%	20,0%	45
Linkburd of         1         4.450         11,100         411         1270         200%         0.6%%         1.5%         0.2%         0.0%         9.3%         40.5%         43           John Young Perkway         -         4.450         11,100         411         1270         200%         6.6%%         1.5%         0.2%         0.0%         9.3%         40.5%         43           John Young Perkway         -         1         5.450         11,000         530         1.270         2.00%         6.6%%         1.5%         0.2%         0.02%         9.0%         64.3%         45           Contourd of         1         7.150         10.300         622         1.270         2.00%         6.6%%         1.5%         0.2%         0.02%         8.4%         69.5%         45           Targa Aresa         -         7.100         10,200         405         1.270         2.00%         6.6%         1.5%         0.2%         0.02%         9.5%         45           Westbound of         1         3.200         10,200         405         1.270         2.00%         6.6%         1.5%         0.23%         0.02%         0.05%         1.5%         1.5%         0.23%         <	Old Winter Garden Road			1					1					
American Control         1         4,500         11,700         411         1,270         2,075         6,875         1,356         0,22%         0,02%         9,05%         45           Linethound off         4         5,460         11,000         500         5,270         2,00%         6,645%         1,35%         0,22%         0,02%         9,0%         44,35%         45           Linethound off         1         7,150         10,300         602         1,270         2,00%         6,645%         1,55%         0,22%         0,02%         8,2%         9,6%         45           Linethound off         1         7,160         10,300         478         5,270         2,00%         6,645%         1,55%         0,22%         0,02%         8,2%         9,8%         45           Tampa Aremaa         1         3,200         10,250         400         1,270         2,00%         6,645%         1,55%         0,22%         0,02%         10,35%         9,07%         45           Vesthound off         1         3,200         10,300         405         1,270         2,00%         6,645%         155%         0,22%         0,02%         10,35%         9,07%         45	Emiliound on	1	4,550	11,190	382	1,270	2.90%	0.61%	1.15%	0.23%	0.02%	9.3%	60.5%	45
John Yoong Paraway         4         5,450         11,000         500         5,270         2,00%         6,65%         1,15%         0,2%         9,0%         54,3%         45           Wettound or         1         5,450         11,000         530         1,270         2,00%         6,65%         1,15%         0,2%         9,0%         54,3%         45           Wettound or         1         7,150         10,300         602         1,270         2,00%         6,65%         1,15%         0,2%         9,0%         54,3%         45           Tampa Arenas         1         7,160         10,200         406         1,270         2,00%         6,65%         1,55%         0,22%         0,02%         9,0%         54,3%         45           Wettound of         1         3,200         10,200         406         1,270         2,00%         6,65%         1,55%         0,22%         0,02%         7,7%         58,97%         45           Ubettound or         1         4,200         13,960         385         1,270         2,00%         6,65%         155%         0,22%         0,02%         7,7%         58,97%         45           Veettound or         1         4,200 <td>Westboard of</td> <td>-</td> <td>4,550</td> <td>13,100</td> <td>414</td> <td>1,270</td> <td>5.04%</td> <td>0.0104</td> <td>1.30%</td> <td>0.22%</td> <td>0.02%</td> <td>1.3.2</td> <td>.90.778</td> <td>45</td>	Westboard of	-	4,550	13,100	414	1,270	5.04%	0.0104	1.30%	0.22%	0.02%	1.3.2	.90.778	45
Listicul of m         1         5.450         17,050         5.09         1,270         2.0%         0.0%         1.1%         0.0%	John Young Pareway			-				-	-				-	
America in Space         1         5.430         10,000         6000         2.010         2.035         0.035         1.035         0.025	Eastbound off	1 1	5,450	11,000	559	1,270	2.00%	6776.0	1.15%	0.23%	0.02%	9.0%	64.3%	45
Control of M         1         7.100         10.200         400         2.000         2.000         0.02%         0.02%         0.02%         2.00%         2.00%         4.00           Tampa Arenae         I         7.100         10.200         400         1.270         2.00%         0.02%	Westboard on	1.1	3,450	11,000	0,99	1,270	2.00%	0.0106	1.3509	0.23%	0.02%	4.0%	04.275	40
Amount of the construction         Construlic is an enditing in the construction	Castbourd of		7,150	10,300	476	+ 270	2,00%	0.01%	1,1278	0.27%	0.02%	4.0%	00.076	10
Normal         1         3,200         10,250         400         1,270         2,00%         0,61%         1,15%         0,22%         0,02%         10,5%         39,7%         45           Westfound of         1         3,200         10,200         400         1,270         2,00%         0,61%         1,15%         0,22%         0,02%         10,5%         39,7%         45           Centron of or         1         4,200         13,920         365         1,270         2,00%         0,61%         1,15%         0,22%         0,02%         10,5%         39,7%         45           Westfound of         1         4,200         13,920         365         1,270         2,00%         0,61%         1,15%         0,23%         0,02%         7,7%         49,7%         45           Advestige met.         0,23%         0,02%         7,7%         39,7%         45           Advestige met.         0,23%         0,02%         7,7%         39,7%         45           Advestige met.         0,23%         0,23%         0,22%         0,23%         0,02%         7,7%         49,7%         45           Advestige met.         1,200         1,200	Terrers Avanta		1,100	19,000	-	1.2.210	2.0178	1 9.07.8	1.7978	0.825	0.04.35	44.0	1.446.4478	1 40
Limitation on Westloard on Limitation of Limitation of Limitatin Limitation of Limitation of Limitation of Limitation o	Louis and all		3,200	10,350	405	1 7750	2.025	0.855	1.145	0.225	0.025	10.000	10.75	1 45
Normal To Company         1         2,200         10,200         3000         1,200         2,000         2,000         2,000         1,1500         0,220         0,000         7,7%         30,7%         45           Westbound off         1         4,200         13,800         366         1,270         2,005         0,0155         1,1500         0,225         0,025         0,025         0,025         1,755         40,75         45           Westbound off         Mamber of Lance         Yee-May Lance         Two-May Antrials and Cross Breats         Messign Hr.         Design Hr.         Design Hr.         Design Hr.         Design Hr.         Design Hr.         Design Hr.         Messign Hr.         Messign Hr.         Design Hr.         Design Hr.         Design Hr.         Messign Hr.         Design Hr.         Design Hr.         Design Hr.         Design Hr.         Messign Hr.         Design Hr.         Messign Hr.         Design Hr.         Start	Minitouri or		3,200	10,200	400	+ 220	2.00%	0.0106	1.101	0.23%	0.02%	10.9%	80.7%	45
Westbound off         1         4,200         13,900         385         1,270         2,00%         0.61%         1,15%         0.23%         0.02%         1,7%         49,7%         45           Arterial Segment         Two Way         Activation and Create Stream           Arterial Segment         Two Way         Two Way         Pack Mark         Design Hr. Hear Peak         Design Hr. Net         Design Hr. St. H	Eastbound on		4.200	13.900	385	9.270	2.00%	0.61%	1.15%	0.23%	0.02%	7.7%	59 7%	45
Arterials and Crass Stream           Activities and Crass Stream         Activities and Crass Stream         Design Hr.         Net Start         Net Start         Design Hr.         Design Hr.         Design Hr.         Design Hr.         Net Start         Net Start </td <td>Westboard off</td> <td>1 1</td> <td>4,200</td> <td>13,900</td> <td>385</td> <td>1,270</td> <td>2.00%</td> <td>0.61%</td> <td>1.15%</td> <td>0.23%</td> <td>0.02%</td> <td>2.7%</td> <td>69.7%</td> <td>45</td>	Westboard off	1 1	4,200	13,900	385	1,270	2.00%	0.61%	1.15%	0.23%	0.02%	2.7%	69.7%	45
Arterial Segment         Number of Lance         Two-Way Aug         Two-Way Aug         Two-Way USS C AUCT         Peak Hear Pack         Cols C Fusk Heat Hear Direction         Design Hr. S. T         Design Hr. S. MT         Design Hr. S. MT         Design Hr. S. MT         Design Hr. S. HT         Design Hr. S.	A STREET AND A STR	100		100	Arterials an	of Cross Stress	ta		11				1.5	
Kittman Road         Direction         Direction         Direction           Noth of SR 408         0         41360         01170         1.170         3.070         2.03%         1.05%         0.75%         0.22%         0.18%         9.0%         36.8%         45           Staum of SR 408         6         33.350         62.460         2.020         3.070         2.03%         1.05%         0.75%         0.22%         0.18%         9.0%         54.6%         45           Pise Hills Road         4         20.450         1.200         2.03%         1.05%         0.75%         0.20%         0.18%         9.0%         54.4%         45           Staum of SR 408         4         20.050         1.200         2.03%         1.05%         0.75%         0.20%         0.18%         9.0%         54.4%         40           Old Wither Garden Road         1         2.000         1.000         2.00%         1.05%         0.75%         0.20%         0.18%         9.0%         54.4%         45           John Yearg Parkany         4         13.350         91.200         1.050         2.05%         0.16%         0.75%         0.20%         0.18%         9.0%         53.2%         45	Anterial Segment	Number of	Two-Way	Two-Way	Peak Hour Peak	LOS C Poak Hour Peak	Design Hr.	Design He	Design Hr.	Design Hr.	Design Hr. N. Meterrorian	K-factor	D-factor	Postori Speer
Karman Noted         6         41,350         0         1,170         3,070         2,00%         1,05%         0,75%         0,20%         0,18%         9,0%         36,8%         45           Staum of SR 408         8         39,900         62,460         2,020         3,070         2,00%         1,05%         0,75%         0,20%         0,18%         9,0%         36,8%         45           Netto of SR 408         4         20,950         1,270         730         2,00%         1,05%         0,75%         0,20%         0,18%         9,0%         54,4%         45           Netto of SR 408         4         20,950         1,270         730         2,00%         1,05%         0,75%         0,20%         0,18%         9,0%         54,4%         45           Old Writer Garden Road         4         20,950         1,000         2,00%         1,00%         0,75%         0,20%         0,18%         9,0%         54,4%         40           Old Writer Garden Road         4         13,320         38,200         1,190         2,00%         1,00%         0,75%         0,20%         0,18%         9,0%         53,2%         45           Dann Young Parkway         1         1,200	CONTRACTOR OF A				Direction	Direction	1.00			Contraction of the second	The ortenance provide	ALC: N	10-64520	- Property
North of Six 408         0         47,360         01,100         1,070         30,70         2,00%         1,10%         0,20%         0,11%         9,0%         9,0%         44,86           Bissun of Six 400         6         39,300         62,460         2,020         30,70         2,00%         1,10%         0,7%         0,20%         0,11%         9,0%         54,41%         45           Prior of Six 400         4         20,000         31,600         1,20%         1,05%         0,75%         0,22%         0,11%         9,0%         54,41%         45           Sourm of Six 400         4         20,000         31,800         1,00%         1,05%         0,75%         0,22%         0,11%         9,0%         54,41%         45           Sourm of Six 400         4         20,000         31,800         1,00%         200%         1,05%         0,75%         0,22%         0,18%         9,0%         54,41%         40           Old Miter Garden Read         East of Six 400         4,13,350         36,200         1,10%         2,00%         1,05%         0,75%         0,20%         0,18%         9,0%         53,2%         45           John Yoang Parkway         Fact of Six 400         4,3900	Kiraman Noad	_		-			-	-	-			-	-	-
South of Sin 400         6         39/300         10/200         2000         2000         2000         0.000	NOTE OF SHADE		41,300	61,100	1.770	3,070	2.00%	1.03%	0.75%	0.20%	0.18%	9.0%	50.8%	45
Print mile Road         4         25.450         15.000         1.270         7.00         2.02%         1.58%         0.75%         0.20%         0.18%         0.0%         54.1%         35           Source SR 405         4         20.020         1.000         1.000         2.00%         1.00%         0.75%         0.20%         0.18%         0.0%         54.1%         35           Source SR 405         4         20.020         1.000         2.00%         1.00%         0.75%         0.20%         0.18%         0.0%         54.1%         35           Old Weiter Gardnen Read	- South to SK 400	1 5	38,300	82.400	2 0 2 0	3.070	2.00%	1.39%	9.7279	9,493	0.185	1. 8,0.8	24.03	42
Next of 267 4/35         4         20.950         1.00%         0.20%         0.01%         0.0%         54.1%         35           South of 367 4/06         4         20.030         1.000         1.000         20.0%         1.00%         0.20%         0.10%         0.0%         54.1%         35           South of 367 4/06         4         20.030         38.450         1.000         1.000         0.0%         0.20%         0.10%         0.20%         0.10%         0.0%         54.4%         40           Old Witter Garden Read	Pine mile nord	1	20.000	1	6.000		0.000	1	1	0.000	1	1 2 2 2		
Control Strate         Total         Control Strate         Control Strate </td <td>Nexts of SR 408</td> <td></td> <td>23,400</td> <td>12,000</td> <td>1,279</td> <td>730</td> <td>2.00%</td> <td>1.00%</td> <td>0.75%</td> <td>0.20%</td> <td>0.18%</td> <td>9.0%</td> <td>24 125</td> <td>35</td>	Nexts of SR 408		23,400	12,000	1,279	730	2.00%	1.00%	0.75%	0.20%	0.18%	9.0%	24 125	35
And Writer General         4         13.350         38.200         T.100         1.000         2.00%         1.05%         0.25%         0.18%         0.0%         38.4%         45           John Young Parkway	And Markes Condex Hand	1 1	20,000	21,200	1.020	300	1 2000	1 1.000	9.121	1 0.000	1 9.183	-		
Line of SR 400         1         1         1         200         1.000         1.000         1.000         0.005         0.00	And writter Gerden Roed	1	49.950	54.960		* 1850	1 0.000	1	0.200	n alle	T nast	1 0.05	1. 10.15	1 45
Start of Sk 408         6         56,580         61,800         2,090         3,070         4,00%         1,276         2,22%         0.54%         0.00%         55,2%         45           Start of Sk 408         6         43,890         64,100         2,120         3,070         4,00%         1,276         2,22%         0.54%         0.00%         55,2%         45           Tanga Areasa         7         700         605         37%         2,00%         1,0%         0.75%         0.2%         0.18%         9.0%         55,2%         45           Tanga Areasa         2         12,060         7,700         605         37%         2,00%         1,0%         0.75%         0.2%         0.18%         9.0%         55,2%         45           Scient of Sk 408         2         12,060         7,700         605         37%         2,00%         1,0%         0.75%         0.2%         0.18%         9.0%         55,2%         30           Scient of Sk 408         2         14,400         7,700         605         37%         2,00%         1,0%         0.75%         0.2%         0.18%         9.0%         55,2%         30           Othetee arease this 1,000         4	Last of the 408 water of the presence		13,300	1	STREET, STREET	1.1.1500	1 2005	1 1.03%	1.9.150	0.602	1 . 10 . 10	and the second	30.478	42
Textor of ser store         P         59,900         07,400         2,400         30/0         4,000         1,275         2,22%         0.94%         0.00%         55,2%         45           Tampa Areasa         2         12,000         2,000         1,00%         1,27%         2,22%         0.04%         0.00%         55,2%         45           Tampa Areasa         2         12,000         7,000         605         27%         2,00%         1,07%         0.24%         0.04%         0.00%         55,2%         45           Tampa Areasa         2         12,000         7,000         605         27%         2,00%         1,07%         0.24%         0.04%         0.00%         55,2%         45           Bound SR 408         2         12,000         7,000         605         27%         2,00%         1,05%         0.7%%         0.24%         0.18%         9,0%         55,2%         30           Bound SR 408         2         14,400         7,000         605         370         2,00%         1,05%         0.7%%         0.24%         0.18%         9,0%         53,2%         30           C07         bound SR 408         400         400%         50.5         370<	And the state of t		11.000	1 22 222	1000	3.030	1	1 2 50	I SAME	0.249	1 0.000	1 2.25	1 12 12	1
International or wear         I         I         Space         International (Stress)         Space         <	Pacific of any 408	2	54,500	01,800	2,090	3,070	6.00%	1.23%	2,2679	0.54%	0.00%	9.0%	85.26	12
Arritor of SNA         Parth of SN	Toronto Accession	_	43,870	84,100	2129	3,070	4.00%	1,4,1/8	2.44.78	0.54%	0.003	4/4/16	100.0	49
Fremin of SR 400         Z         12,050         7,700         505         37%         2,05%         1,05%         0,75%         0,26%         0,18%         53,2%         30         50         370         2,05%         1,05%         0,25%         0,18%         53,2%         30         50         370         2,05%         1,05%         0,25%         0,18%         53,2%         30         30         32,2%	Annual Avenue		12.030	1	-		0.000	1 1 100	1 0.945	0.344	1 0.105	1 0.00	1 20.00	1 10
1007 August 101 Table 101 Kalas Table 17 Kalas Tabl	Route of SE 408		12.900	7,700	605	2/10	200%	1.05%	0.75%	0.20%	0.18%	9.0%	88.2%	30
	AND ADD A DOWN THE SHARE		16.400	La cherry and	202	3(0	2.077	1.0014	0.154	0.200	- e 10 %		and hits	

#### Noise Analysis Traffic Data - SR 408, from Kirkman Road to Church Street 2045 No Build Conditions

(1) Nonther of larses were obtained from failt observations and senial maps. Auribus of larses shown are based on direction with fewerlanes. Noise analysis to consider co

#### Noise Analysis Traffic Data - SR 408, from Kirkman Road to Church Street 2045 Build Conditions

				Franks	zy Maistre								
Munvine Segment	Namber of Lates	Two-May AADT	Two-Way LOS C AADT	Peak Hour Peak Direction	Hour Peak Direction	Design Hr. % T	Design Hr. % MT	Design Hr. % HT	Design Hr. % Busins	Design Hr. % Motorcycles	Standard K-factor	D-factor	Posted Speed (mph)
SR 406	- 10/ 12/2 12/	- 10.000 cm	00-02-02-02					100000000				Sec. Sala	C
West of Kalumen Road	1.1	150,700	148,500	7,230	8,329	2.00%	0.61%	1.15%	9.23%	0.02%	8.5%	53.7%	60
Hom Refunds Houd to Pine Hills Houd	10	151,100	145,700	7,199	6.650	2.00%	0.01%	1,15%	0.23%	0.02%	3.5%	53.7%	60
From Ohi Mediae Contine Month to Joine Version Reducers	10	102,100	145,700	8 000	0,000	7.00%	0.01%	1.1079	0.2.7%	0.02%	4.5%	41.7%	45
From John Young Pletwey to Tanga Avenue	ta	174.800	145,700	8,070	6.650	2.00%	0.01%	1.15%	0.23%	0.02%	8.5%	53.7%	60
				59.4	08 Romps							And the second se	
124012-10	Number of	One-Way	One-Way	Peak Hour	LOS C Feak	Dealers Mr.	Desires by	Dealers Mr.	Desilver bir	Occurry Hr	1154.500	12041333	Operational
SR 400 Ramps	Lanas	AADT	LOS C AADT	Peak	Hour Peak Direction	%T	% MT	% HT	% Bases	% Motorcycles	K-factor	D-factor	Speed (mph)
Kirkmen Road	- 10 - 10 - 10		10 million of the	111 A 11	1		a second second	i for and the second	1				1
Eastbourd off		6,600	12,900	700	1,270	2.00%	0.61%	1.15%	0.23%	0.02%	9.0%	54.9%	45
Weatbourd-on	1.1	6,800	12,900	\$70	1,270	2,00%	0.65%	1.35%	0.23%	0.02%	9.0%	54.8%	45
Earlbourd on	1	7,000	12,609	660	1,270	2.90%	0.61%	1.15%	0.23%	0.02%	9.6%	52.6%	45
Weitbourd of	- 2	7,000	25,009	210	2,540	2.90%	0.01%	1.15%	0.23%	0.02%	9.9%	16.0%	45
Pine Hills Road			1										
Lastound on	1	5,502	13:209	500	1,270	2.00%	0.61%	1.18%	0.23%	0.02%	9.0%	53.9%	45
Old States Gooden Breed		20,000	20,400	-3676	8,040	2.50%	- whether	1,1078	0.4,05	9.0678	2.2.1	31.28	
Contraction of the	1 1 1	1 655	1 11 100	101	4 3 3 3	1 2000	0.0440	1 1 105	0.255	1 6.039	1 2 2 2	100.00	1
Vestboard of		4,555	11.105	411	1.270	2.00%	0.01%	1.1079	0.23%	0.02%	9.5%	60.5%	45
John Young Parkway				-							-		
Forthoose of	1 2 1	5,450	22 000	560	2.540	2.00%	0.61%	1.16%	0.23%	0.02%	9.0%	64.9%	45
Westbound on	1	5,450	11.000	620	1,270	2.00%	0.61%	1.55%	0.20%	0.02%	9.0%	64.3%	45
Eastbound on	. 1	7,150	10.300	662	1.270	2:00%	0.61%	1.15%	0.23%	0.02%	8.8%	69.8%	45
Westboard off	11	7,150	10,300	478	1,270	2.00%	0.61%	1.10%	0.23%	0.02%	8.8%	69.8%	- 45
Tienpa Avenue	- 21 - 22 - 21	100.00								- 11 - 15 March		0.000000	5 - NR - 22
Earlbourd off	1 1	3,200	10,200	409	1,270	2.00%	0.61%	1,15%	0.23%	0.02%	10,5%	39.7%	45
Westbould on	1	3.209	10.200	400	1,270	2.50%	0.61%	1,1036	0.23%	0.02%	10.5%	59.7%	45
Emittoued on		4,200	13,900	285	1,270	2.00%	0.01%	1.10%	0.23%	0.02%	7.7%	50.7%	45
Westbourg bri		9,602	13,909	101	1,270	6.59076	376139	1.1978	9,63%	35.9658	7,7.78	- 1917 A.	40
			1	Four lines	of Lines after	14		1		1			1
Actorial Segment	Number of Lanes	Two-Way AADT	Two-Way LOS C AADT	Peak	Hour Peak	Design Hr. 16 T	Design Hr. % MT	Design Hr. 15 HT	Design Hr. % Bases	Design Hr. % Motorcycles	K-factor	D-factor	Posted Speed (mph)
Kirkman Road	10 ac 10		Louis and the			(Norma	Margaret -	Contractor in the	Set and the	1	2001010		5 10 0
North of SR 408	. 6	41,300	61,100	1,770.	3,070	2.00%	1.05%	0.75%	0.20%	0.18%	9.0%	55,8%	45
South of SR 408		35,300	82.400	2.020	3,070	2.00%	1,00%	4.75%	0.20%	0.18%	0.0%	54.0%	- 45
Pine Hills Road	- W - 23 - 6		CLEVER DAY	ALC: STATES					Section 2011				2 - 10 - 11
North of SR 406	4	25,400	15,000	1,270	730	2.00%	3.05%	0.75%	0.20%	0.18%	9.0%	54.15	35
South of SR 408.	4	20.650	38,800	1,020	1,900	2,00%	1/90%	0.75%	0.20%	0.18%	9.0%	54.4%	. 40
Old Writer Garden Road											1		
Last of SR 408 werbound of sing	4	53,350	36,200	1,185	1,900	2.60%	1,05%	9.75%	0.20%	9,18%	2.0%	58.4%	45
John Young Parkway			_	_									-
North of SR 408	- 8	54,500	61.809	2,690	3,070	4.00%	1.23%	2.22%	0.54%	0.08%	9.0%	55.2%	45
ECUTO OF BR 408		#3.800	84,100	2,625	3.070	4.90%	1.2204	2.22%	0.54%	0.04%	4.0%	51.2%	- 45
Tanga Avenue				-	-								
North of SH 408	Z	12,900	7.700	805	370	2.00%	1,00%	9.75%	0.20%	0.18%	9.0%	53.25	30
acum ce an sue		24,400	1 7.700		370	2,00%	1,40%	0.70%	0,00%	9,18%	2,0%	20.13	30
AADY: Ashual Arwage Daily: Haho 30, Methol	1 modela		- NY: ARR/9: 70	200									

(1) Number of linnes for freeway segments and simple ware obtained from the design concept. Number of linnes for asterials were obtained from field observations and avail maps. Number of linnes shown as based on descloor with lever linnes. Noise analysis to consider concept linning per publishes.
(2) Indicate this is obtained from the observations and avail maps. Number of linnes shown as based on descloor with lever linnes. Noise (2) Indicate this is obtained from the observations and avail maps. Number of linnes shown as based on descloor with lever linnes. Noise (2) Indicate this is obtained from the observations and avail maps. Number of linnes shown as based on descloor with lever linnes. Noise (2) Indicate this is obtained from the observations and avail maps. Number of linnes shown as based on descloor with lever linnes. Noise (2) Indicate this is obtained from the observations and avail maps. Number of linnes shown as based on descloor with lever linnes. Noise (2) Indicate this observations are used as observations and the observations are provided expected to the linnes (2) Indicate the observations are used as observations are observed as a gravitating for linnes the linnes (2) Observations (2) Indicate the observations adjusted for line (2) Indicate the observations are observed as a gravitating of the line (2) Indicate the observations are observed as a gravitating of the line (2) Indicate the observations are observed as a gravitating of the line (2) Indicate the observations are observed as a gravitating of the line (2) Indicate the observations are observed as a gravitating of the line (2) Indicate the observations are observed as a structure observed as a structure observed (2) Indicate the observations (2) Indicate the observati



# Appendix C:

# **Noise Impact Comparison Matrix**



Noise Impact Comparison Matrix											
Nois	se Sensitive Sites			Predicted Noise Levels (dB(A)) Red = Noise Level above NAC							
Receptor ID	# Sites Represented	Impact Criterion (dB(A))	2022 Existing	2045 No-Build Alternative	2045 Build Alternative	Build Change From Existing	Consider Abatement				
NSA 1: South of	NSA 1: South of SR 408 from Kirkman Rd to Pine Hills Rd Illustrated on Pages D-1 and D-2 - Appendix D										
1-1	1	66.0	63.7	64.1	74.0	10.3	Yes				
1-2	1	66.0	64.3	64.8	74.3	10.0	Yes				
1-3	1	66.0	64.6	65.1	74.3	9.7	Yes				
1-4	1	66.0	64.1	64.6	73.2	9.1	Yes				
1-5	1	66.0	63.5	64.0	72.7	9.2	Yes				
1-6	1	66.0	61.8	62.3	70.4	8.6	Yes				
1-7	1	66.0	62.6	63.1	72.1	9.5	Yes				
1-8	1	66.0	63.0	63.5	72.2	9.2	Yes				
1-9	1	66.0	63.3	63.9	72.3	9.0	Yes				
1-10	1	66.0	62.8	63.3	70.9	8.1	Yes				
1-11	1	66.0	62.3	62.8	69.9	7.6	Yes				
1-12	1	66.0	61.6	62.0	70.0	8.4	Yes				
1-13	1	66.0	62.0	62.5	70.7	8.7	Yes				
1-14	1	66.0	62.2	62.8	70.8	8.6	Yes				
1-15	1	66.0	61.6	62.1	69.1	7.5	Yes				
1-16	1	66.0	61.3	61.8	68.3	7.0	Yes				
1-17	1	66.0	60.9	61.5	67.8	6.9	Yes				
1-18	1	66.0	60.8	61.1	68.3	7.5	Yes				
1-19	1	66.0	60.8	61.2	69.0	8.2	Yes				
1-20	1	66.0	61.1	61.6	69.4	8.3	Yes				
1-21	1	66.0	61.0	61.6	69.5	8.5	Yes				
1-22	1	66.0	60.1	60.4	67.3	7.2	Yes				
1-23	1	66.0	60.0	60.4	67.7	7.7	Yes				
1-24	1	66.0	60.2	60.7	68.3	8.1	Yes				
1-25	1	66.0	60.1	60.6	68.3	8.2	Yes				
1-26	1	66.0	60.2	60.7	68.3	8.1	Yes				
1-27	1	66.0	60.0	60.5	66.7	6.7	Yes				
1-28	1	66.0	59.8	60.3	65.7	5.9	-				
NSA Summary	28		61.8	62.3	70.1	8.3	27				

NSA 2: North of SR 408 from Kirkman Rd to Pine Hills Rd. - Illustrated on Pages D-1 and D-2 - Appendix D



Noise Impact Comparison Matrix											
Noi	se Sensitive Sites	;	Predicted Noise Levels (dB(A)) Red = Noise Level above NAC								
Receptor ID	# Sites Represented	Impact Criterion (dB(A))	2022 Existing	2045 No-Build Alternative	2045 Build Alternative	Build Change From Existing	Consider Abatement				
No noise sensit	No noise sensitive sites										
NSA 3: South o	NSA 2: South of SP 400 from Dino Hills Date Orthograp Dr. Illustrated on Dances D. Otherson, D. 4. Anna and a D										
N3A 3. 30011 0	1 3K 400 11011111										
	-										
3-1	1	66.0	65.0	65.8	69.0	4.0	Yes				
3-2	1	66.0	65.0	65.6	68.4	3.4	Yes				
3-3	1	66.0	65.4	66.0	68.4	3.0	Yes				
3-4	1	66.0	67.3	68.0	72.7	5.4	Yes				
3-5	1	66.0	63.0	63.5	67.1	4.1	Yes				
3-6	1	66.0	63.5	64.0	67.1	3.6	Yes				
3-7	1	66.0	63.6	64.1	66.6	3.0	Yes				
3-8	1	66.0	64.0	64.4	67.1	3.1	Yes				
3-9	1	66.0	61.9	62.5	66.0	4.1	Yes				
3-10	1	66.0	62.1	62.6	65.4	3.3	-				
3-11	1	66.0	62.6	63.1	65.5	2.9	-				
3-12	1	66.0	61.8	62.2	64.3	2.5	-				
3-13	1	66.0	62.3	62.6	64.7	2.4	-				
3-14	1	66.0	61.8	62.4	65.9	4.1	-				
3-15	1	66.0	61.1	61.6	64.6	3.5	-				
3-16	1	66.0	61.1	61.6	64.3	3.2	-				
3-17	1	66.0	69.1	69.3	70.5	1.4	Yes				
3-18	1	66.0	66.3	66.4	67.7	1.4	Yes				
NSA Summary	18		63.7	64.2	67.0	3.2	11				
NSA 4: North c	of SR 408 from Pir	ne Hills Rd to	Ortman Dr -	Illustrated on P	ages D-2 throu	gh D-4 - App	pendix D				
4-1	1	66.0	62.4	62.9	66.8	4.4	Yes				
4-2	1	66.0	63.4	63.9	68.6	5.2	Yes				
4-3	1	66.0	64.0	64.6	69.6	5.6	Yes				
4-4	1	66.0	67.0	67.6	71.6	4.6	Yes				
4-5	1	66.0	67.6	68.2	70.9	3.3	Yes				
4-6	1	66.0	67.1	67.6	70.0	2.9	Yes				
4-7	1	66.0	66.5	67.0	69.1	2.6	Yes				
4-8	1	66.0	66.4	66.8	68.7	2.3	Yes				



Noise Impact Comparison Matrix										
Nois	se Sensitive Sites		Predicted Noise Levels (dB(A)) Red = Noise Level above NAC							
Receptor ID	# Sites Represented	Impact Criterion (dB(A))	2022 Existing	2045 No-Build Alternative	2045 Build Alternative	Build Change From Existing	Consider Abatement			
4-9	1	66.0	65.6	65.9	67.8	2.2	Yes			
4-10	1	66.0	64.3	64.6	66.3	2.0	Yes			
4-11	1	66.0	63.1	63.3	65.0	1.9	-			
4-12	1	66.0	62.6	63.1	67.3	4.7	Yes			
4-13	1	66.0	62.8	63.3	67.0	4.2	Yes			
4-14	1	66.0	63.1	63.6	66.9	3.8	Yes			
4-15	1	66.0	63.1	63.6	66.5	3.4	Yes			
4-16	1	66.0	63.0	63.4	65.9	2.9	-			
4-17	1	66.0	62.7	63.1	65.4	2.7	-			
4-18	1	66.0	71.4	71.4	73.0	1.6	Yes			
NSA Summary	18		64.8	65.2	68.1	3.4	15			
NSA 5: South c	NSA 5: South of SR 408 from Ortman Dr to Ferguson Dr - Illustrated on Pages D-4 and D-5 - Appendix D									
5-1	1	66.0	62.6	62.6	67.8	5.2	Yes			
5-2	1	66.0	62.9	62.9	68.2	5.3	Yes			
5-3	1	66.0	62.9	62.9	68.5	5.6	Yes			
5-4	1	66.0	60.7	60.7	65.4	4.7	-			
5-5	1	66.0	60.5	60.5	64.3	3.8	-			
5-6	1	66.0	60.4	60.4	63.9	3.5	-			
5-7	1	66.0	60.3	60.3	63.6	3.3	-			
5-8	1	66.0	60.2	60.2	63.3	3.1	-			
5-9	1	66.0	60.7	60.7	63.3	2.6	-			
5-10	1	66.0	60.6	60.6	63.2	2.6	-			
5-11	1	66.0	60.6	60.6	63.1	2.5	-			
5-12	1	66.0	60.4	60.4	62.8	2.4	-			
5-13	1	66.0	60.4	60.4	62.7	2.3	-			
5-14	1	66.0	60.4	60.5	62.8	2.4	-			
5-15	1	66.0	60.4	60.4	62.8	2.4	-			
5-16	1	66.0	60.5	60.5	63.0	2.5	-			
5-17	1	66.0	60.6	60.6	63.1	2.5	-			
5-18	1	66.0	60.6	60.6	63.2	2.6	-			
5-19	1	66.0	60.6	60.6	63.5	2.9	-			
5-20	1	66.0	60.7	60.7	65.0	4.3	-			



Noise Impact Comparison Matrix									
Nois	se Sensitive Sites		Predicted Noise Levels (dB(A)) Red = Noise Level above NAC						
Receptor ID	# Sites Represented	Impact Criterion (dB(A))	2022 Existing	2045 No-Build Alternative	2045 Build Alternative	Build Change From Existing	Consider Abatement		
5-21	1	66.0	63.7	63.7	71.2	7.5	Yes		
5-22	1	66.0	63.1	63.1	70.6	7.5	Yes		
5-23	1	66.0	62.2	62.2	69.4	7.2	Yes		
5-24	1	66.0	61.7	61.7	68.8	7.1	Yes		
5-25	1	66.0	62.2	62.2	68.8	6.6	Yes		
5-26	1	66.0	62.5	62.5	69.1	6.6	Yes		
5-27	1	66.0	63.6	63.6	69.8	6.2	Yes		
5-28	1	66.0	60.0	60.0	64.6	4.6	-		
5-29	1	66.0	60.0	60.0	65.3	5.3	-		
5-30	1	66.0	59.3	59.3	64.7	5.4	-		
5-31	1	66.0	59.3	59.3	64.7	5.4	-		
5-32	1	66.0	59.8	59.8	65.5	5.7	-		
5-33	1	66.0	59.5	59.5	64.4	4.9	-		
5-34	1	66.0	58.8	58.8	63.0	4.2	-		
5-35	1	66.0	58.7	58.7	62.6	3.9	-		
5-36	1	66.0	58.6	58.6	62.2	3.6	-		
5-37	1	66.0	59.3	59.3	62.4	3.1	-		
5-38	1	66.0	60.0	60.0	62.8	2.8	-		
5-39	1	66.0	59.4	59.4	62.3	2.9	-		
5-40	1	66.0	58.9	58.9	62.0	3.1	-		
5-41	1	66.0	58.3	58.3	61.3	3.0	-		
5-42	1	66.0	57.9	57.9	60.7	2.8	-		
5-43	7	66.0	57.8	57.8	60.8	3.0	-		
5-44	1	66.0	58.4	58.4	61.8	3.4	-		
5-45	1	66.0	59.0	59.0	62.8	3.8	-		
5-46	1	66.0	60.0	60.0	64.8	4.8	-		
5-47	1	66.0	60.7	60.7	65.7	5.0	-		
5-48	1	66.0	62.1	62.1	68.5	6.4	Yes		
5-49	1	66.0	60.5	60.5	66.0	5.5	Yes		
5-50	1	66.0	61.4	61.4	67.7	6.3	Yes		
5-51	1	66.0	62.0	62.0	68.4	6.4	Yes		
NSA Summary	57		60.5	60.5	64.8	4.3	14		



Noise Impact Comparison Matrix											
Nois	se Sensitive Sites	1		Predicted Noise Levels (dB(A)) Red = Noise Level above NAC							
Receptor ID	# Sites Represented (dB(A)		ceptor ID # Sites Represented		eceptor ID # Sites Represented		2022 Existing	2045 No-Build Alternative	2045 Build Alternative	Build Change From Existing	Consider Abatement
NSA 6: North of	NSA 6: North of SR 408 from Ortman Dr to Ferguson Dr - Illustrated on Pages D-4 and D-5 - Appendix D										
No noise sensit	ive sites										
NSA 7: South c	NSA 7: South of SR 408 from Ferguson Dr to John Young Pkwy - Illustrated on Pages D-5 and D-6 - Appendix D										
7-1	1	66.0	60.2	60.2	66.3	6.1	Yes				
7-2	1	66.0	60.9	60.9	68.2	7.3	Yes				
7-3	1	66.0	59.7	59.8	65.8	6.1	-				
7-4	1	66.0	60.9	60.9	67.0	6.1	Yes				
7-5	1	66.0	62.5	62.6	68.6	6.1	Yes				
7-6	1	66.0	64.4	64.4	71.0	6.6	Yes				
7-7	1	66.0	65.6	65.7	73.2	7.6	Yes				
7-8	1	66.0	63.2	63.3	69.5	6.3	Yes				
7-9	1	66.0	60.6	60.7	66.3	5.7	Yes				
7-10	1	66.0	64.0	64.0	70.1	6.1	Yes				
7-11	1	66.0	63.2	63.3	68.6	5.4	Yes				
7-12	1	66.0	62.6	62.7	67.6	5.0	Yes				
7-13	1	66.0	61.9	62.0	66.5	4.6	Yes				
7-14	1	66.0	60.0	60.1	64.6	4.6	-				
7-15	1	66.0	62.8	63.1	68.0	5.2	Yes				
7-16	1	66.0	61.7	61.9	66.1	4.4	Yes				
7-17	1	66.0	61.6	61.8	65.7	4.1	-				
7-18	1	66.0	61.3	61.5	65.1	3.8	-				
7-19	1	66.0	60.9	61.1	64.4	3.5	-				
7-20	1	66.0	60.8	61.0	64.0	3.2	-				
7-21	1	66.0	59.8	59.9	63.7	3.9	-				
NSA Summary	21		61.8	61.9	67.2	5.3	14				
NSA 8: North o	NSA 8: North of SR 408 from Ferguson Dr to John Young Pkwy - Illustrated on Pages D-5 and D-6 - Appendix D										
8-1	1	66.0	66.7	66.8	67.9	1.2	Yes				
8-2	1	66.0	65.8	65.9	67.2	1.4	Yes				

1

1

66.0

66.0

64.7

65.2

64.8

65.4

65.9

66.4

1.2

1.2

8-3

8-4

-

Yes



Noise Impact Comparison Matrix										
Nois	se Sensitive Sites	i	Predicted Noise Levels (dB(A)) Red = Noise Level above NAC							
Receptor ID	# Sites Represented	Impact Criterion (dB(A))	2022 Existing	2045 No-Build Alternative	2045 Build Alternative	Build Change From Existing	Consider Abatement			
8-5	1	66.0	64.8	65.0	66.0	1.2	Yes			
8-6	1	66.0	68.7	69.0	70.0	1.3	Yes			
NSA Summary	6		66.0	66.2	67.2	1.3	5			
NSA 9: South of SR 408 from John Young Pkwy to Church St - Illustrated on Pages D-5 and D-6 - Appendix D										
9-1	1	66.0	67.1	67.2	67.9	0.8	Yes			
9-2	1	66.0	66.7	66.8	68.3	1.6	Yes			
9-3	1	66.0	66.1	66.2	67.0	0.9	Yes			
NSA Summary	3		66.6	66.7	67.7	1.1	3			
NSA 10: North of SR 408 from John Young Pkwy to Church St - Illustrated on Pages D-5 and D-6 - Appendix D										
10-1	1	66.0	60.7	60.8	63.7	3.0	-			
10-2	1	66.0	61.1	61.2	64.6	3.5	-			
10-3	1	66.0	62.6	62.6	65.3	2.7	-			
10-4	1	66.0	62.2	62.2	65.1	2.9	-			
10-5	1	66.0	62.6	62.6	65.6	3.0	-			
10-6	1	66.0	63.5	63.5	66.1	2.6	Yes			
10-7	1	66.0	63.4	63.4	65.9	2.5	-			
10-8	1	66.0	65.6	65.7	67.5	1.9	Yes			
10-9	1	66.0	68.2	68.2	69.5	1.3	Yes			
10-10	1	66.0	68.0	68.0	69.4	1.4	Yes			
10-11	1	66.0	66.3	66.3	67.9	1.6	Yes			
10-12	1	66.0	66.2	66.2	67.8	1.6	Yes			
NSA Summary	12		64.2	64.2	66.5	2.3	6			
NSA 11: North	of SR 408 from C	hurch St to T	ampa Ave- I	llustrated on Po	age D-7 - Appe	endix D				
11-1	1	66.0	63.0	63.0	63.9	0.9	-			
11-2	1	66.0	63.0	63.0	63.9	0.9	-			
11-3	1	66.0	62.9	62.9	63.9	1.0				
11-4	1	66.0	63.7	63.7	64.4	0.7				
11-5	1	66.0	63.9	63.9	64.7	0.8				


Noise Impact Comparison Matrix							
Noise Sensitive Sites			Predicted Noise Levels (dB(A)) Red = Noise Level above NAC				
Receptor ID	# Sites Represented	Impact Criterion (dB(A))	2022 Existing	2045 No-Build Alternative	2045 Build Alternative	Build Change From Existing	Consider Abatement
11-6	1	66.0	65.4	65.4	66.0	0.6	Yes
11-7	1	66.0	66.1	66.0	66.7	0.6	Yes
11-8	1	66.0	65.7	65.6	66.4	0.7	Yes
11-9	1	66.0	63.7	63.7	64.5	0.8	
11-10	1	66.0	63.4	63.4	64.1	0.7	
11-11	1	66.0	62.8	62.8	63.6	0.8	
11-12	1	66.0	62.9	62.9	63.7	0.8	
11-13	1	66.0	62.6	62.6	63.4	0.8	
11-14	1	66.0	62.4	62.4	63.3	0.9	
11-15	1	66.0	61.9	61.8	62.8	0.9	
11-16	1	66.0	61.9	61.8	62.8	0.9	
11-17	1	66.0	61.6	61.5	62.5	0.9	
11-18a	1	66.0	63.1	63.0	63.9	0.8	
11-18b	1	66.0	65.3	65.3	66.2	0.9	Yes
11-19a	1	66.0	62.8	62.7	63.5	0.7	-
11-19b	1	66.0	65.0	64.9	65.9	0.9	-
11-20a	1	66.0	62.4	62.4	63.2	0.8	-
11-20b	1	66.0	64.6	64.5	65.5	0.9	-
11-21	1	66.0	63.2	63.1	64.0	0.8	-
11-22	1	66.0	65.5	65.4	66.2	0.7	Yes
11-23	1	66.0	66.1	66.1	66.9	0.8	Yes
11-24	1	66.0	66.9	66.8	67.6	0.7	Yes
11-25	1	66.0	67.7	67.6	68.4	0.7	Yes
NSA Summary	28		63.9	63.9	64.7	0.8	8



# Appendix D:

### **Project Aerials**

















# Appendix E:

#### **Noise Barrier Maps**













#### Traffic Noise Study Report



