

BRIDGE ANALYSIS REPORT

PROJECT DEVELOPMENT AND ENVIRONMENT STUDY
SR 408 Eastern Extension
From SR 50 to SR 50/SR 520 Intersection
Orange County, Florida

CFX Project Number: 408-254

Prepared for

**CENTRAL
FLORIDA
EXPRESSWAY
AUTHORITY**

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Prepared by
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JULY 2018




I hereby certify that I am a registered professional engineer in the State of Florida practicing with Metric Engineering, Inc., a corporation, authorized to operate as an engineering business (EB 2294), FEID No. 59-168555-0, by the State of Florida, Department of Professional Regulation, Board of Professional Engineers, and that I have reviewed or approved the evaluation, findings, opinions, conclusions, or technical advice hereby reported for:

Project: Project Development and Environment Study SR 408 Eastern Extension
From SR 50 to SR 50/SR 520 Intersection

Location: Orange County, Florida

Client: Metric Engineering, Inc.

This Bridge Analysis Report documents the preliminary structural evaluation for different build alternatives for this segment of the SR 408. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering and planning as applied through professional judgment and experience.



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July 2018

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ABBREVIATIONS

CFX	Central Florida Expressway Authority
FDOT	Florida Department of Transportation
PD&E	Project Development and Environment
AASHTO	American Association of State Highway and Transportation Officials
LRFD	Load and Resistance Factor Design
SR	State Road
CR	County Road
PER	Preliminary Engineering Report

1.0 PROJECT DESCRIPTION

1.1 Introduction

The purpose of the SR 408 Eastern Extension Project Development and Environment (PD&E) study is to develop a proposed improvement strategy that is technically sound, environmentally sensitive and publicly acceptable. As with every PD&E Study, emphasis has been placed on the development, evaluation and documentation of detailed engineering and environmental studies including data collection, conceptual design, environmental analyses, project documentation and the preparation of a Bridge Analysis Report.

The Central Florida Expressway Authority (CFX) is presently evaluating the potential to extend State Road (SR) 408 from its current eastern terminus at SR 50, locally known as East Colonial Drive, to SR 520 in northeastern Orange County. This new seven mile eastern extension of SR 408 would constitute the first stage towards providing a east-west high speed corridor with future connectivity to I-95, enhancing safety, capacity and mobility for the region and CFX's customers.

1.2 Project Scope

The PD&E project scope includes the evaluation of strategies to enhance mobility in eastern Central Florida with an expansion of SR 408 from its current eastern terminus at East Colonial Drive (SR 50) to SR 520 in northeastern Orange County (see Figure 1-1). There are four existing /projected corridor needs that serve as the main justification for the proposed improvements, as follows:

1. Providing additional capacity in the east-west direction to mitigate or eliminate capacity deficiencies.
2. Provide additional emergency evacuation service to supplement the limited number of evacuation routes in this area of Central Florida.
3. Provide improved transportation connectivity/linkage to satisfy needs generated by the continued population growth and land use development reflected in various local comprehensive plans.
4. Provide transit support.

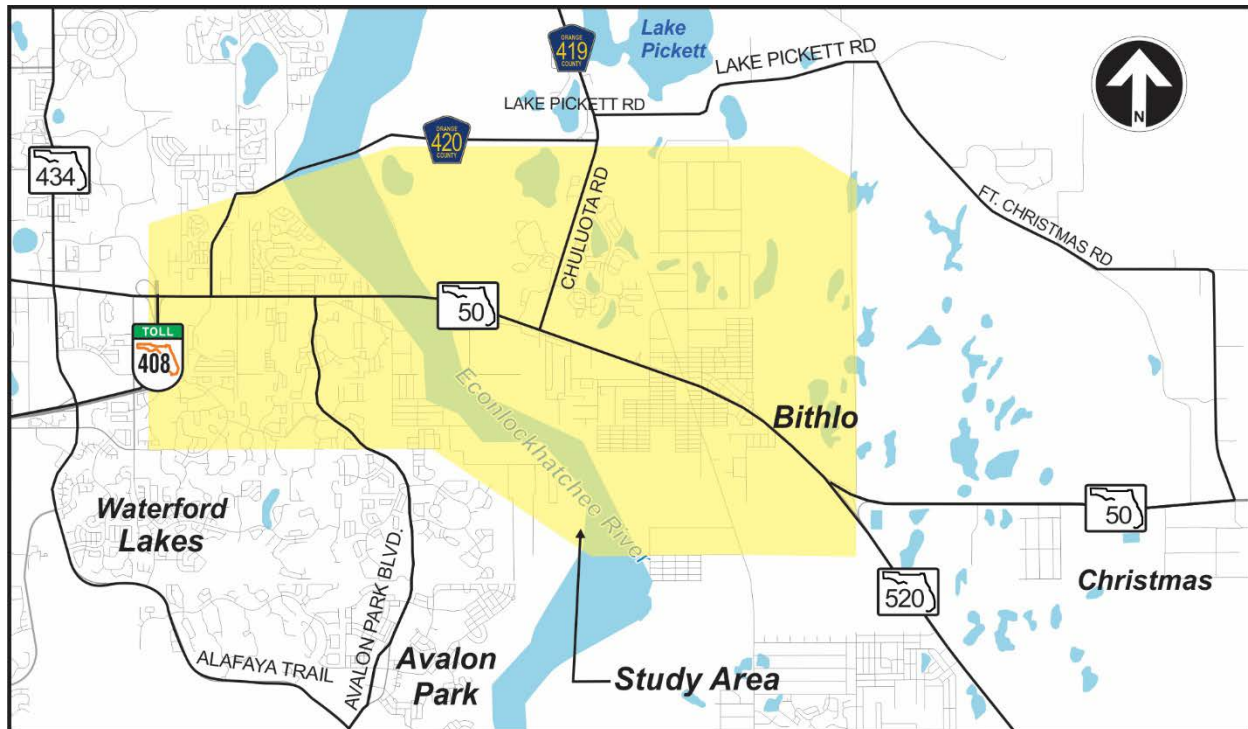


Figure 1-1 – Project Area

The initial step in generating adequate solutions involved breaking down the project area in various distinct segments with unique characteristics and patterns as well as potential differences in environmental, operational and access issues. The segmental breakdown methodology was used to ensure that the generated alternatives are more responsive to the needs of each segment rather than to the generalized project's needs. The resulting segments are summarized as follows:

Segment 1: From Begin Project to Avalon Park Boulevard.

Segment 2: From Avalon Park Boulevard to Chuluota Road (CR 419). This segment features a crossing of the Econlockhatchee River.

Segment 3: From Chuluota Road (CR 419) to SR 50.

A number of alternatives were then evaluated, including the No Build Alternative and several Build Alternatives. For a complete review of the alternatives that have been evaluated see the SR 408 Eastern Extension Preliminary Engineering Report.

This Bridge Analysis Report will focus on evaluating the bridge requirements and feasible bridge types for the preferred alternative, as documented in the Preliminary Engineering Report. Bridge typical sections are based on matching the adjoining roadway segments. Note that due to sight distance related issues with curved sections of roadway that were tightened in order to avoid additional right-of-way impacts and relocations, some bridges are proposed with non-standard shoulder widths. In Segment 1, the preferred alternative provides a divided four-lane rural expressway with several grade separations for access to local streets. The preferred alternative for Segment 2 provides a divided four-lane rural expressway that includes the crossing of the Econlockhatchee River and a full diamond interchange at Chuluota Road (CR 419). The preferred alternative for Segment 3 also features a four-lane divided rural expressway with several grade separations at intersecting streets and terminating at SR 50 north of SR 520.

1.3 Design Specifications and Methodology

- FDOT Structures Manual dated January 2017
- AASHTO LRFD Bridge Design Specifications, 7th Edition with Interims to 2016
- FDOT Plans Preparation Manual dated January 2017

Design Methodology: Load and Resistance Factor Design Method

1.4 Location of Structures

Figure 1-2 illustrates a Bridge Key Map for the preferred alternative. Each bridge proposed for this project is numbered sequentially from west to east. Appendix A includes a plan and elevation of proposed bridges at the interchange locations.

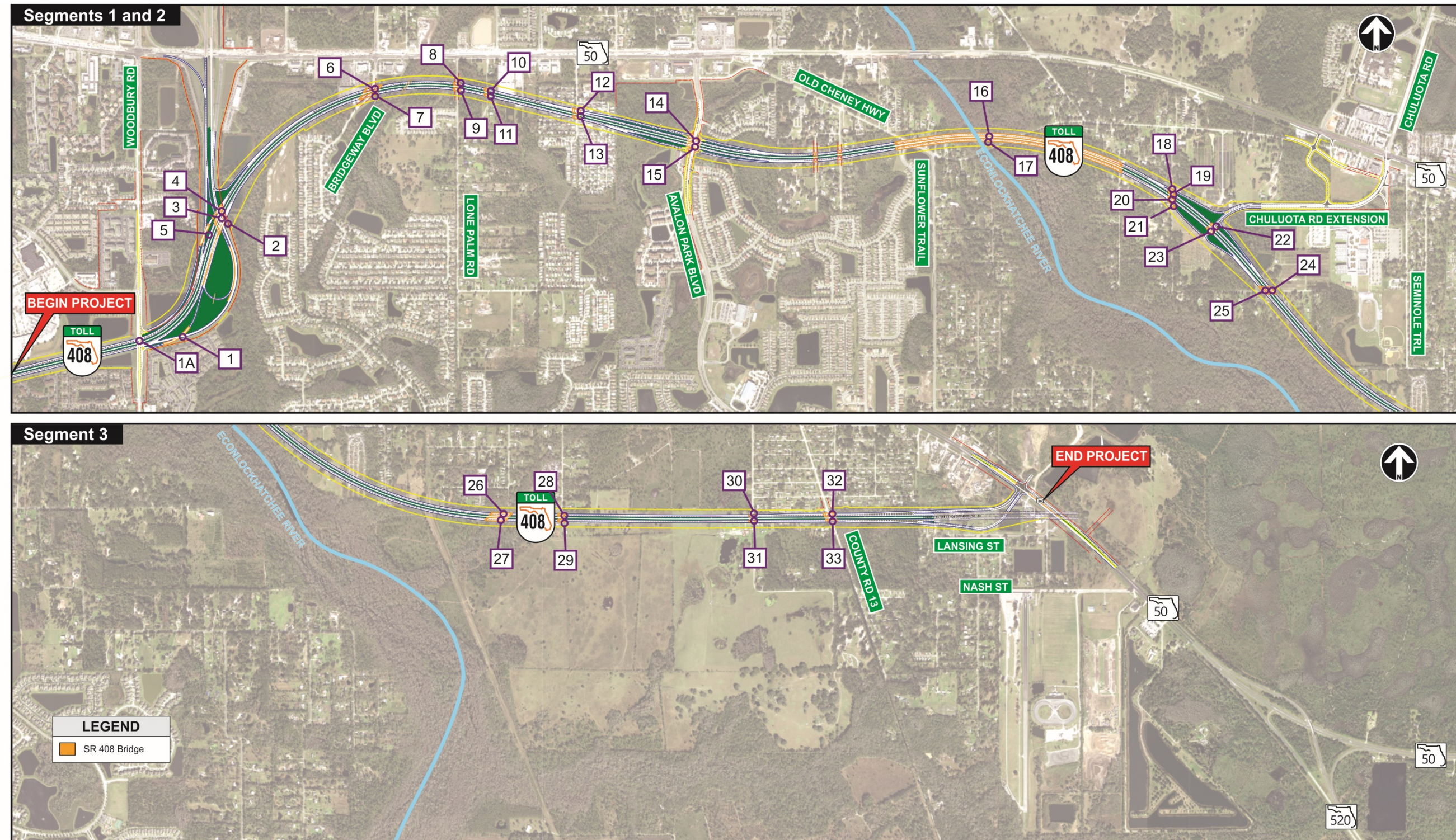


Figure 1-2 – Bridge Key Map

2.0 SEGMENT 1 BRIDGES

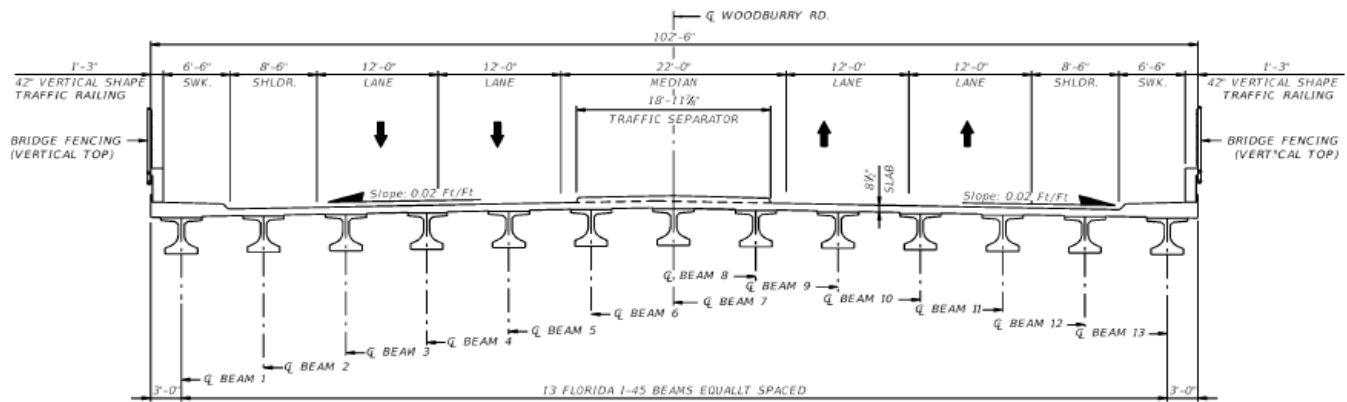
As previously stated, Segment 1 extends from the beginning of the project to Avalon Park Boulevard. A total of 14 new bridges are proposed within this segment. Six of the 14 have long spans and are recommended to be composed of steel plate or steel tub girder type superstructures. The remaining 8 have medium length spans and are recommended to be composed of prestressed concrete Florida I beam type superstructures. Unless otherwise noted, bridge superstructures are recommended to be supported by pile bent piers.

Possible foundation types for the bridges in this segment include 18-inch and 24-inch square prestressed concrete piles, steel H-piles, steel pipe piles, and drilled shafts. Selection of the foundation system should give significant consideration for systems that reduce the potential for vibration and noise impacts at locations within a 1,000-foot radius of residential and/or commercial structures. Therefore prestressed concrete piles would be less desirable than low displacement piling such as steel H-piles and steel pipe piles for bridges within close proximity of existing structures. Low displacement piles require lower impact hammer energy levels and thus create lower noise and vibration levels during installation. Large non-redundant drilled shaft foundations, if feasible, would also have lower noise and vibration levels, and will also have the potential to reduce the area of impact at ground level.

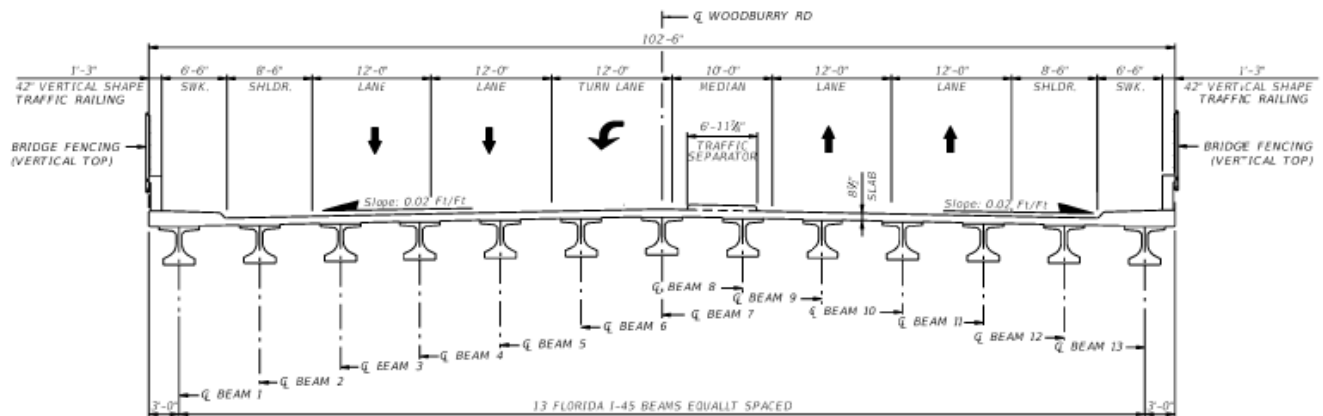
2.1 Bridge #1A – Woodbury Road Over SR 408

This is a two span skewed bridge that carries both northbound and southbound traffic along Woodbury Road over SR 408. The bridge also provides access to the westbound SR 408 on ramp for southbound Woodbury Road traffic as well as access to southbound Woodbury Road for eastbound SR 408 traffic exiting the off ramp to Woodbury Road.

The bridge has an approximate length of 269 feet of structure with an overall width of 102'-6". The typical section consists of five 12-foot wide lanes (2-northbound, 2-southbound and 1 left turn lane for southbound traffic entering onto eastbound on ramp to SR 408), 22-foot and 10-foot wide medians in spans 1 & 2, respectively, 8.5-foot wide shoulders and 6.5-foot wide sidewalks on each side. The recommended superstructure type for this bridge is 45" deep prestressed concrete Florida I beams. For bridge typical section and plan layout, see Figure 2-1A and Appendix A.1, respectively.



Bridge 1A-Span 1



Bridge 1A-Span 2

Figure 2-1A: Bridge #1A Typical Section

Pile bents are recommended at the end bents and a multiple column concrete pier founded on piles is recommended for intermediate Pier 1. Due to the close proximity of residences and businesses, steel H piles or steel pipe piles are recommended at end bent and intermediate pier locations.

2.2 Bridge #1 – SR 408 Eastbound On Ramp Over SR 408 Eastbound Off Ramp

This is a single-lane ramp structure carrying traffic from Woodbury Road to eastbound SR 408. The bridge is horizontally curved with a centerline radius of 1,390 feet, an approximate overall required length of 470 feet and 3 spans with a center span length of 250 feet.

The proposed bridge is 35'-8" wide, with one 15-foot wide lane, a 6-foot wide right shoulder and a 12-foot wide left shoulder. The recommended superstructure type for this bridge is curved steel plate girders or curved steel tub girders. For bridge typical section, plan and elevation, see Figure 2-1 and Appendix A.2, respectively.

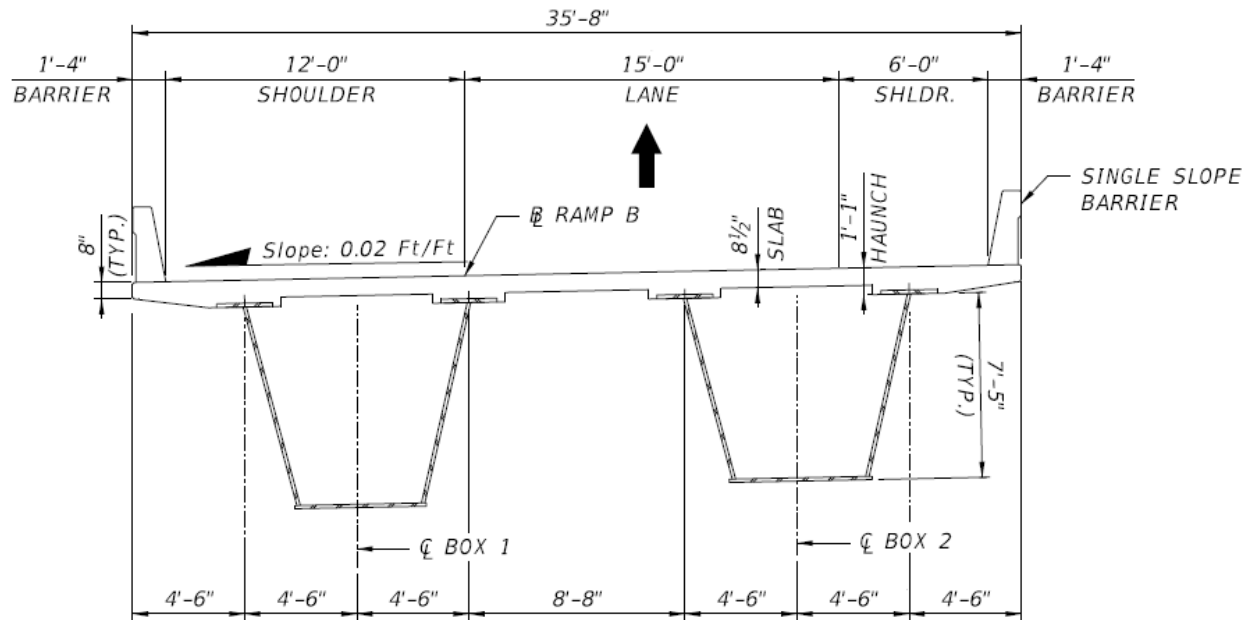


Figure 2-1: Bridge #1 Typical Section

Since this bridge is not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended for the end bents and intermediate piers.

2.3 Bridge #2 – SR 408 Eastbound Over SR 408 Eastbound On/Off Ramps

This is a single span skewed bridge with an approximate overall required length of 207 feet. The bridge is divided into two separate sections: the first section on the north side consisting of two mainline lanes carrying eastbound SR 408 traffic over on/off ramps associated with Challenger Parkway; and a second single lane section on the south side over these same on/off ramps that is a continuation of the SR 408 eastbound on ramp associated with Bridge #1.

The first section services two 12-foot wide lanes, a 14-foot wide right shoulder and a 6-foot wide left shoulder. The second section services one lane with a variable width ranging from 16'-10" (begin bridge) to 15' (end bridge), a 6-foot wide right shoulder and a left shoulder with variable width ranging from 9'-7" (begin bridge) to 2'-4" (end bridge).

The recommended superstructure type for this bridge is steel plate girders. For bridge typical section, plan and elevation, see Figure 2-2 and Appendix A.3, respectively.

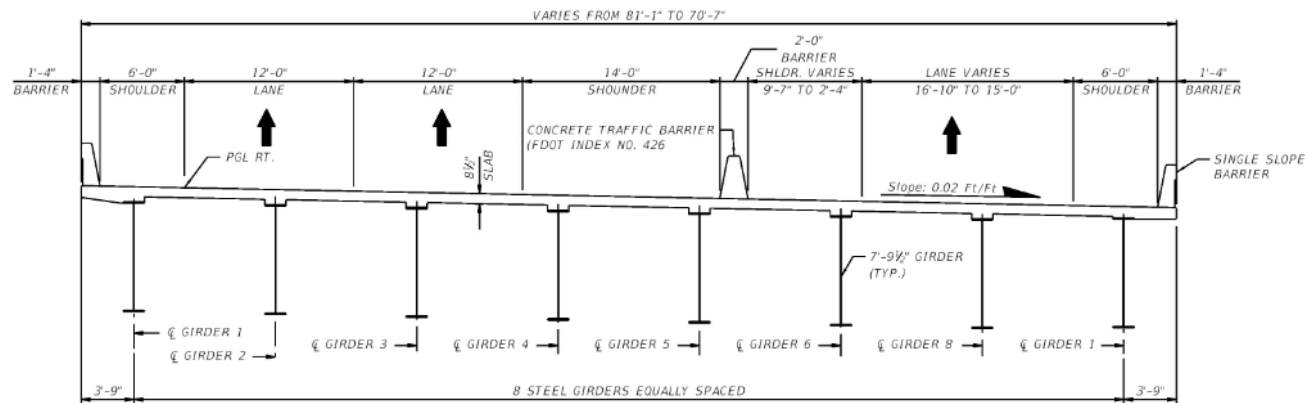


Figure 2-2: Bridge #2 Typical Section

Since this bridge is not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended at each end bent.

2.4 Bridge #3 - SR 408 Westbound Over SR 408 Eastbound On/Off Ramps

This is a single span skewed bridge with an approximate required overall length of 211 feet with two lanes carrying westbound SR 408 traffic over on/off ramps associated with Challenger Parkway.

The proposed bridge is 50'-8" wide, with two 12-foot wide lanes and 12-foot wide shoulders. The recommended superstructure type for this bridge is steel plate girders. For bridge typical section, see Figure 2-3.

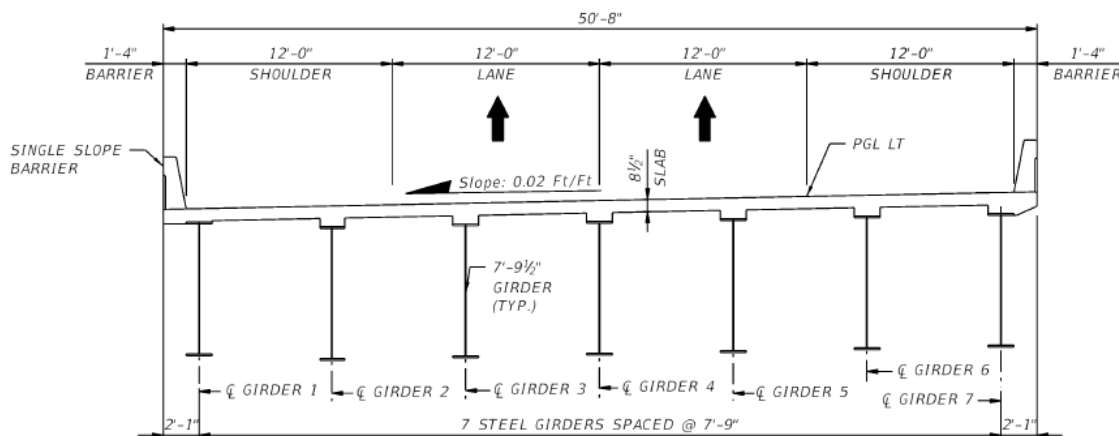


Figure 2-3: Bridge #3 Typical Section

Since this bridge is not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended at each end bent.

2.5 Bridge #4 - SR 408 Westbound Off Ramp Over SR 408 Eastbound On/Off Ramps

This bridge is a single lane ramp structure carrying traffic from westbound SR 408 to Woodbury Road. It is a single span skewed bridge with an approximate required overall length of 197 feet.

The proposed bridge is 29'-8" wide with a 15-foot wide lane and 6-foot wide shoulders. The recommended superstructure type for this bridge is steel plate girders. For bridge typical section, see Figure 2-4.

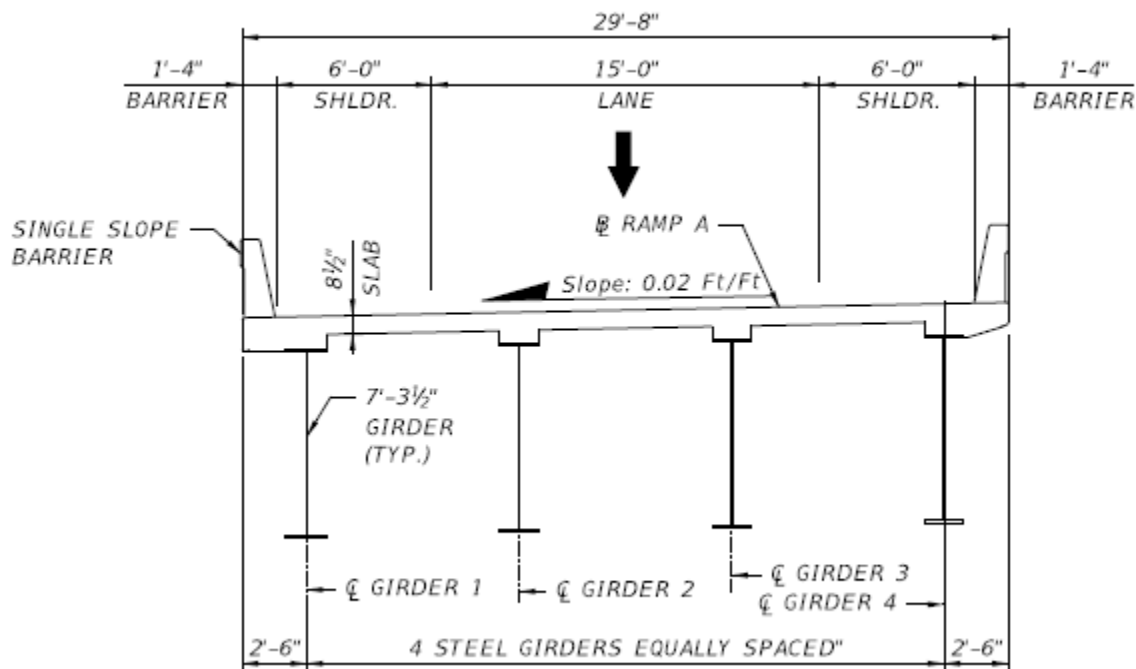


Figure 2-4: Bridge #4 Typical Section

Since this bridge is not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended at each end bent.

2.6 Bridge #5 - SR 408 Westbound Off Ramp Over SR 408 Westbound On Ramp from southbound

This bridge is a single lane ramp structure carrying traffic from westbound SR 408 to Woodbury Road. The bridge is composed of two equal spans with an approximate required overall length of 347 feet.

The proposed bridge is 41'-8" wide, with a 15-foot wide lane, a 12-foot wide inside shoulder and an outside shoulder that varies from 6-foot to 12-foot. 84" deep prestressed concrete Florida I beams is the recommended superstructure type for this bridge. For bridge typical section, plan and elevation, see Figure 2-5 and Appendix A.4, respectively.

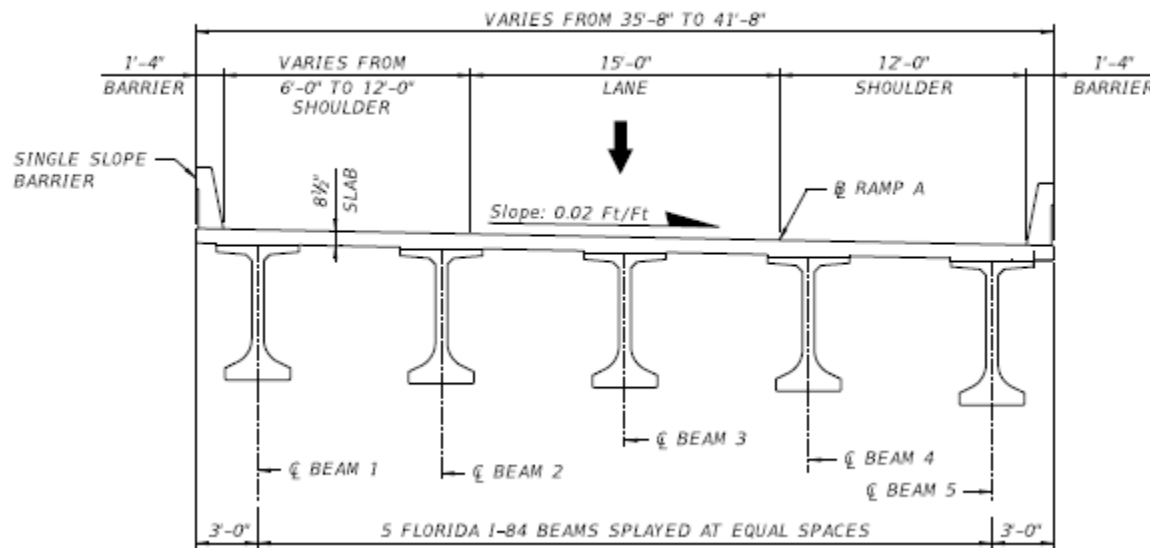


Figure 2-5: Bridge #5 Typical Section

Since this bridge is not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended at each end bent and intermediate pier locations. The intermediate bent for this bridge will need to be a straddle pier with protected supports on either side of the on-ramp underpass below. To reduce bridge height, a post tensioned inverted T is recommended for the straddle bent cap.

2.7 Bridge #6 - SR 408 Westbound Over Bridgeway Boulevard

This bridge is a two-lane structure carrying westbound mainline SR 408 traffic over Bridgeway Boulevard. This single span skewed bridge has an approximate required overall length of 229 feet.

The proposed bridge is 64'-2" wide, with two 12-foot wide lanes, a 22-foot wide right shoulder and a 15'-6" wide left shoulder. The recommended superstructure type for this bridge is steel plate girders. For bridge typical section, see Figure 2-6.

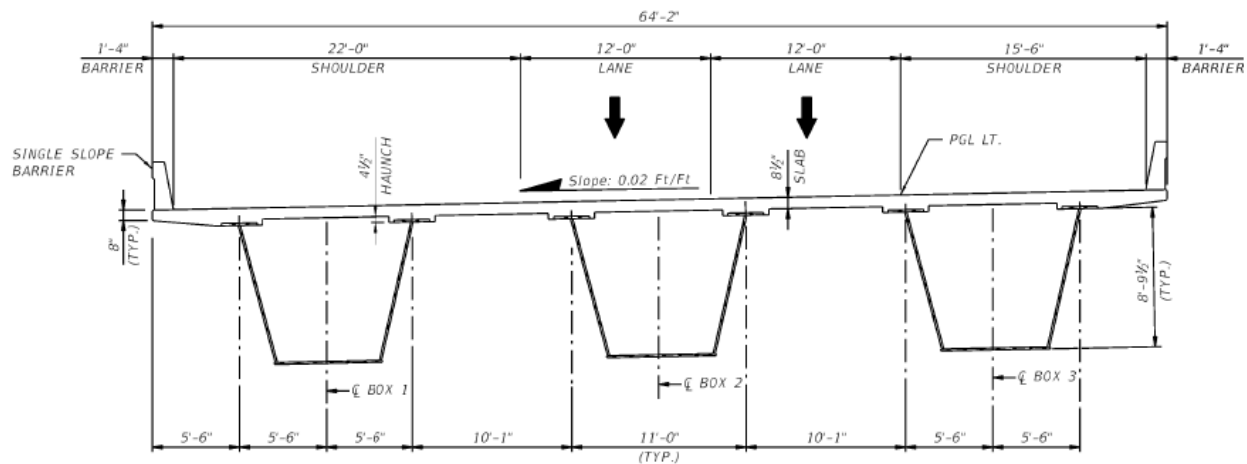


Figure 2-6: Bridge #6 Typical Section

Since this bridge is in close proximity to businesses, steel H piles or steel pipe piles are recommended at each end bent.

2.8 Bridge #7 - SR 408 Eastbound Over Bridgeway Boulevard

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over Bridgeway Boulevard. This single span skewed bridge has an approximate required overall length of 237 feet.

The proposed bridge is 48'-2" wide, with two 12-foot wide lanes, a 15'-6" wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is steel plate girders. For bridge typical section, see Figure 2-7.

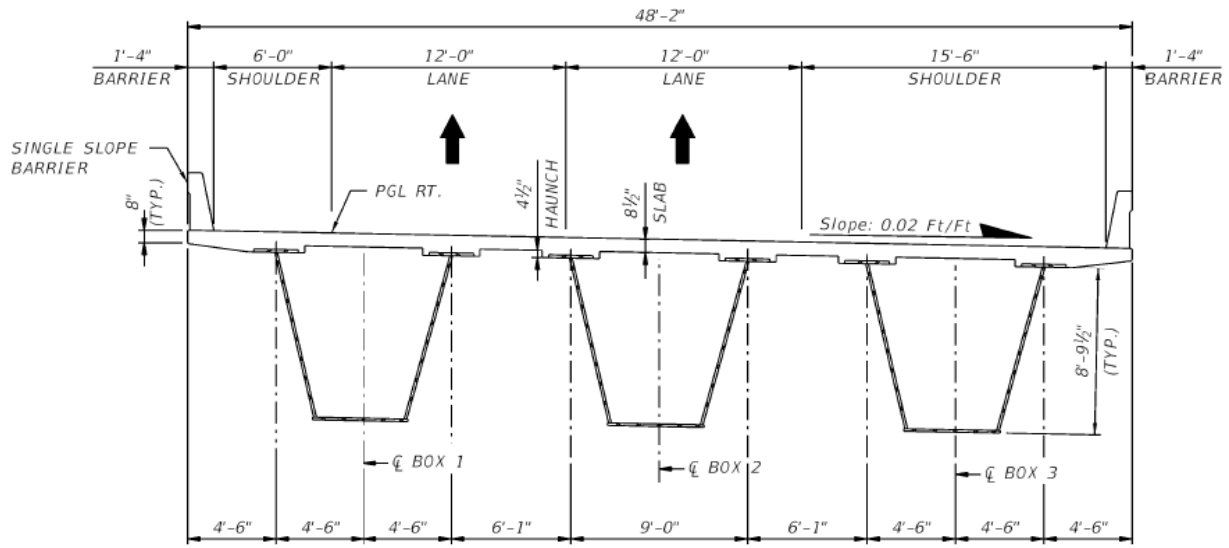


Figure 2-7: Bridge #7 Typical Section

Since this bridge is in close proximity to businesses, steel H piles or steel pipe piles are recommended at each end bent.

2.9 Bridge #8 - SR 408 Westbound Over Hancock Lone Palm Road

This bridge is a two-lane structure carrying westbound mainline SR 408 traffic over Hancock Lone Palm Road. This single span skewed bridge has an approximate required overall length of 71 feet.

The proposed bridge is 54'-2" wide, with two 12-foot wide lanes, a 12-foot wide right shoulder and a 15'-6" wide left shoulder. The recommended superstructure type consists of 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 2-8.

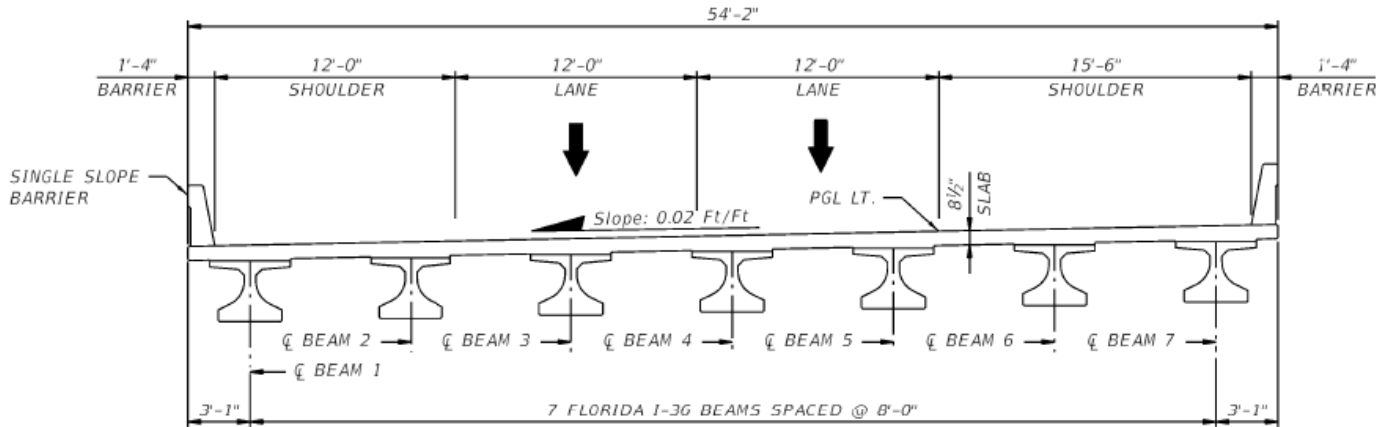


Figure 2-8: Bridge #8 Typical Section

Since this bridge is not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended at each end bent and intermediate pier locations.

2.10 Bridge #9 - SR 408 Eastbound Over Hancock Lone Palm Road

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over Hancock Lone Palm Road. This single span skewed bridge has an approximate required overall length of 72 feet.

The proposed bridge is 48'-2" wide, with two 12-foot wide lanes, a 15'-6" wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type consists of 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 2-9.

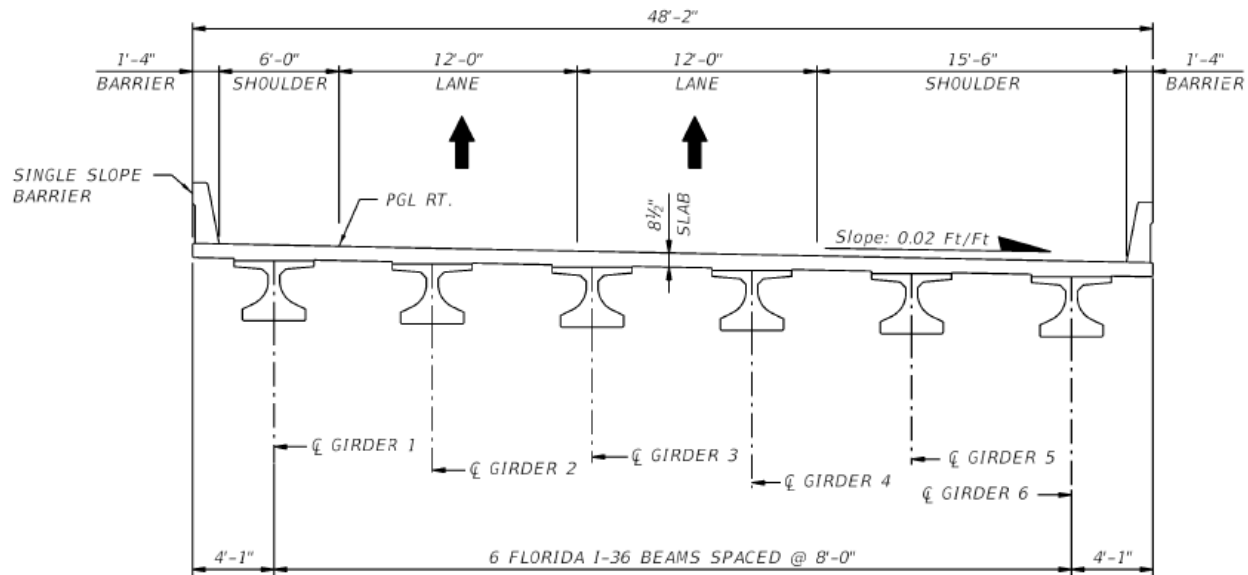


Figure 2-9: Bridge #9 Typical Section

Since this bridge is not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended at each end bent and intermediate pier locations.

2.11 Bridge #10 - SR 408 Westbound Over Fricke Avenue

This bridge is a two-lane structure carrying westbound mainline SR 408 traffic over Fricke Avenue. This single span skewed bridge has an approximate required overall length of 42 feet.

The proposed bridge has an average width of 51', with two 12-foot wide lanes, a 12-foot wide right shoulder and a left shoulder with variable width ranging from 14'-5" (begin bridge) to 9' (end bridge). The recommended superstructure type for this bridge consists of 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 2-10.

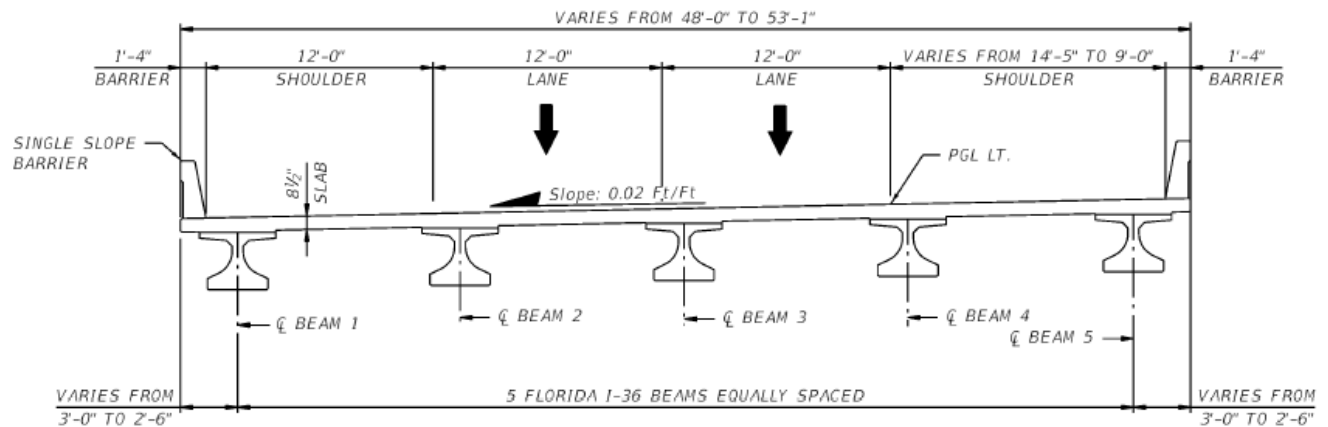


Figure 2-10: Bridge #10 Typical Section

Since this bridge is in close proximity to businesses, steel H piles or steel pipe piles are recommended at each end bent.

2.12 Bridge #11 - SR 408 Eastbound Over Fricke Avenue

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over Fricke Avenue. This single span skewed bridge has an approximate required overall length of 42 feet.

The proposed bridge is 44'-8" wide, with two 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge consists of 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 2-11.

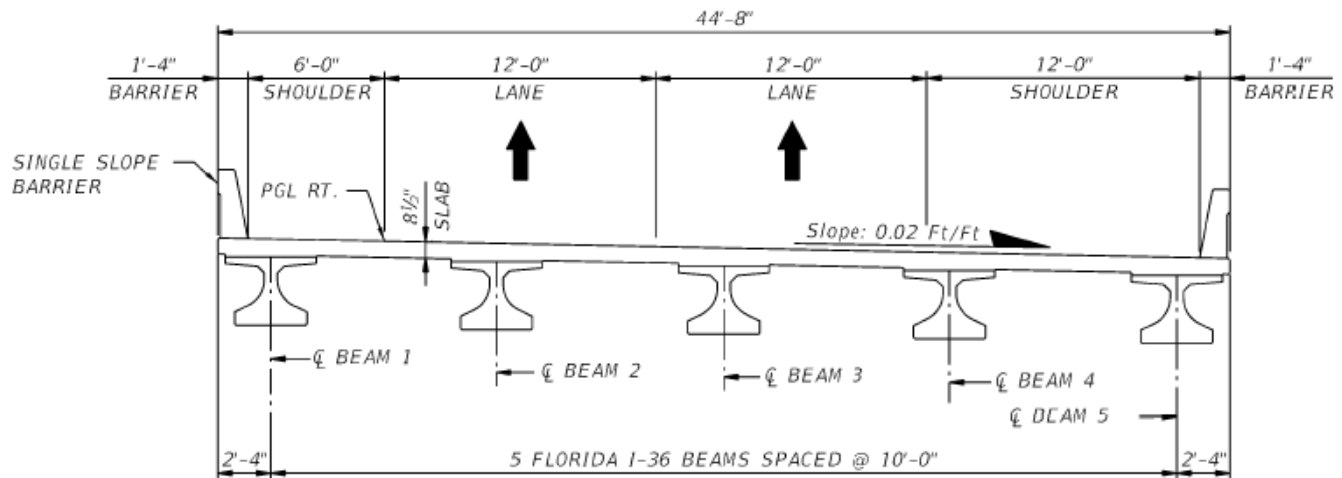


Figure 2-11: Bridge #11 Typical Section

Since this bridge is in close proximity to businesses, steel H piles or steel pipe piles are recommended at each end bent.

2.13 Bridge #12 - SR 408 Westbound Over Pel Street

This is a single span skewed bridge with an approximate required overall length of 73 feet. The bridge is divided into two separate sections: the first section on the north side consisting of a westbound single lane on ramp over Pel Street; and the second section on the south side consisting of two mainline lanes carrying westbound SR 408 traffic over Pel Street. The two sections are separated by a gore area of variable width ranging from 10'-7" (begin bridge) to 13'-2" (end bridge).

The first section comprises a lane with variable width ranging from 12'-1" (begin bridge) to 14'-3" (end bridge) and a 12-foot wide right shoulder. The second section comprises two 12-foot wide lanes and a 6-foot wide left shoulder. The recommended superstructure type for this bridge consists of 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 2-12.

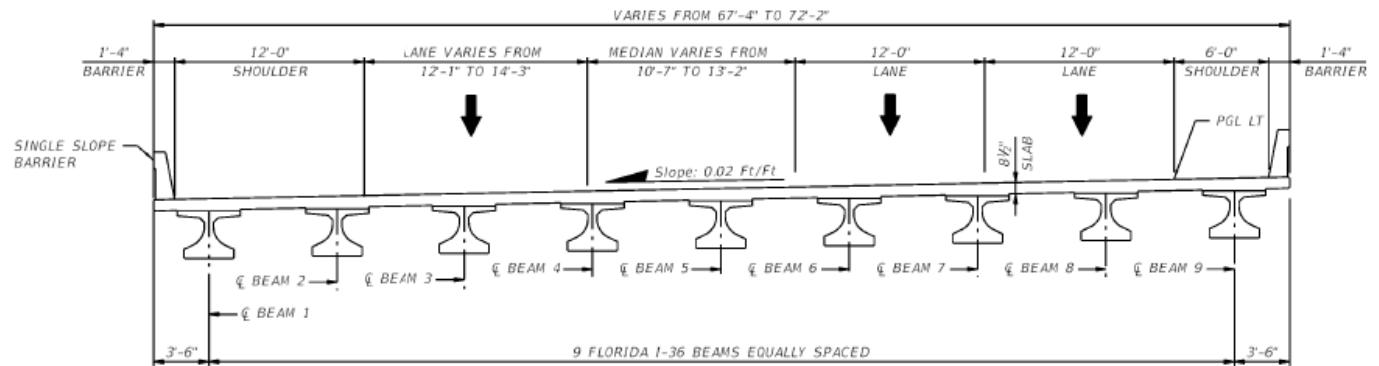


Figure 2-12: Bridge #12 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

2.14 Bridge #13 - SR 408 Eastbound Over Pel Street

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over Pel Street. This single span skewed bridge has an approximate required overall length of 73 feet.

The proposed bridge is 44'-8" wide, with two 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge consist of 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 2-13.

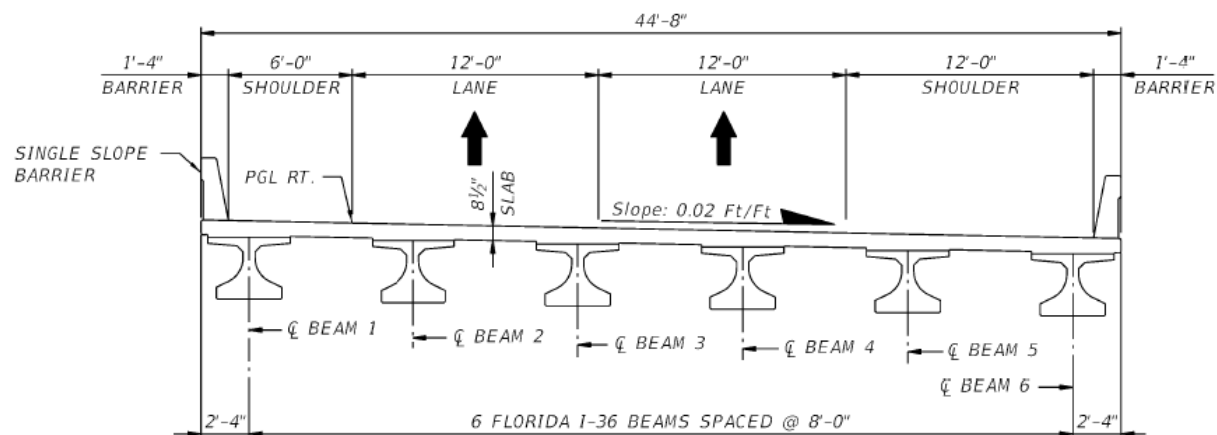


Figure 2-13: Bridge #13 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

3.0 SEGMENT 2 BRIDGES

Segment 2 extends from the Avalon Park Boulevard interchange to Chuluota Road (CR 419). This segment is more urban in nature and exhibits a lower traffic demand than Segment 1. A total of 8 new bridges are proposed within this segment. With the exception of Bridges 14 to 17, the proposed bridges are single span bridges composed of prestressed concrete Florida I beam type superstructures founded on pile end bents. Bridge #16 and #17 are 39 span bridges over the Econolockhatchee River and its floodplain and have a combination of steel and concrete superstructures.

Possible foundation types for the bridges in this segment include 18-inch and 24-inch square prestressed concrete piles, steel H-piles, steel pipe piles, and drilled shafts. Selection of the foundation system should give significant consideration for systems that reduce the potential for vibration and noise impacts at locations within a 1,000-foot radius of residential and/or commercial structures. Therefore prestressed concrete piles would be less desirable than the low displacement piling such as steel H-piles and steel pipe piles for bridges within close proximity of existing structures. Low displacement piles require lower impact hammer energy levels and thus create lower noise and vibration levels during installation. Large non-redundant drilled shaft foundations, if feasible, would also have lower noise and vibration levels, and will also have the potential to reduce the area of impact at ground level.

3.1 Bridge #14 - SR 408 Westbound Over Avalon Park Boulevard

This bridge is a two-lane structure carrying westbound mainline SR 408 traffic over Avalon Park Boulevard. This single span bridge has an approximate required overall length of 230 feet.

The proposed bridge is 50'-8" wide, with two 12-foot wide lanes and 12-foot wide shoulders. The recommended superstructure type for this bridge is steel plate girders. For bridge typical section, plan and elevation, see Figure 3-1 and Appendix A.5, respectively.

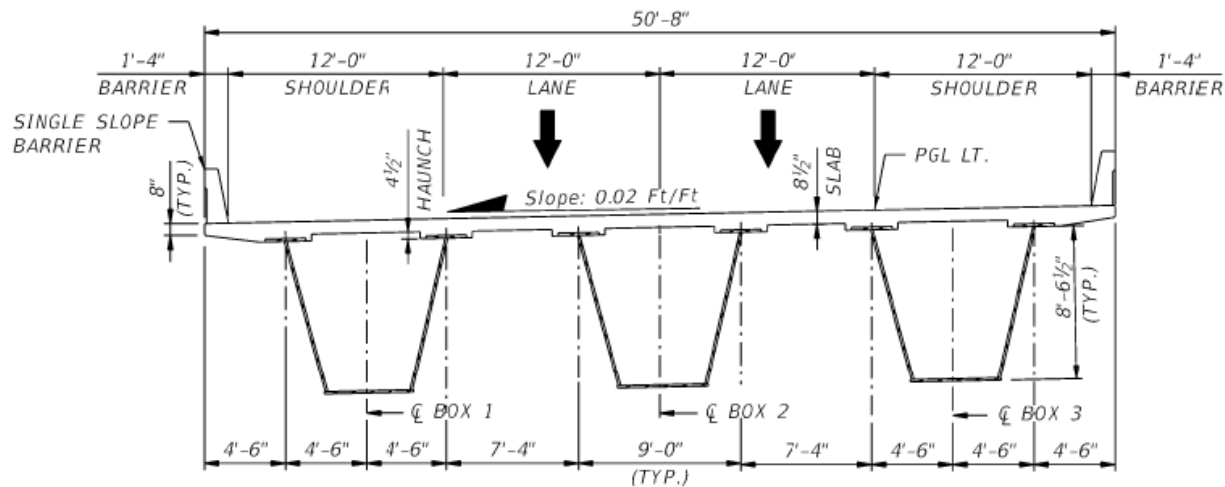


Figure 3-1: Bridge #14 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

3.2 Bridge #15 - SR 408 Eastbound Over Avalon Park Boulevard

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over Avalon Park Boulevard. This single span bridge has an approximate required overall length of 230 feet.

The proposed bridge is 50'-8" wide, with two 12-foot wide lanes and 12-foot wide shoulders. The recommended superstructure type for this bridge is steel plate girders. For bridge typical section, plan and elevation, see Figure 3-2 and Appendix A. 5, respectively.

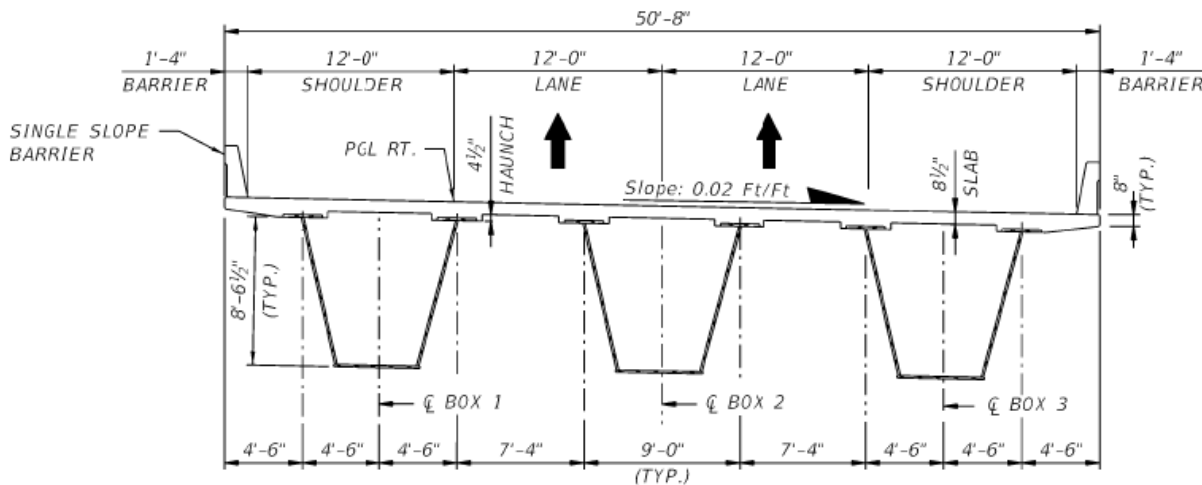


Figure 3-2: Bridge #15 Typical Section

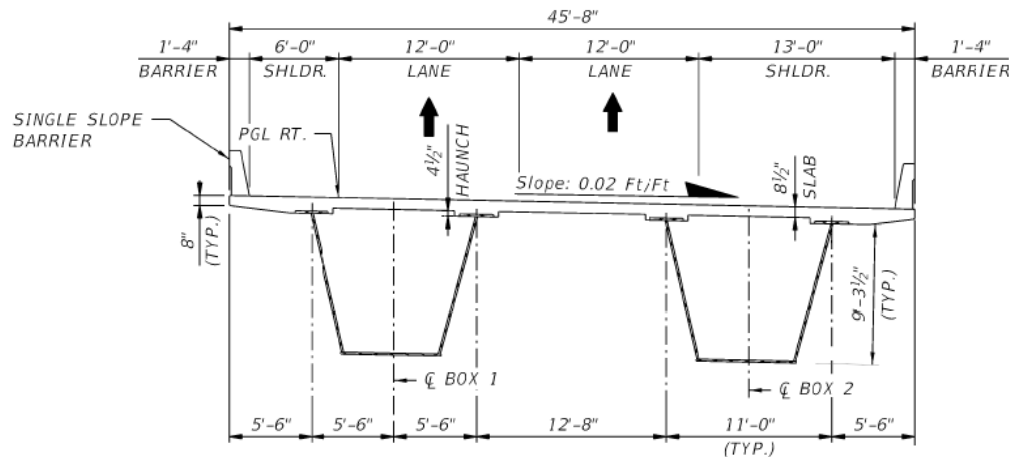
Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

3.3 Bridge #16 - SR 408 Westbound Over Econlockhatchee River

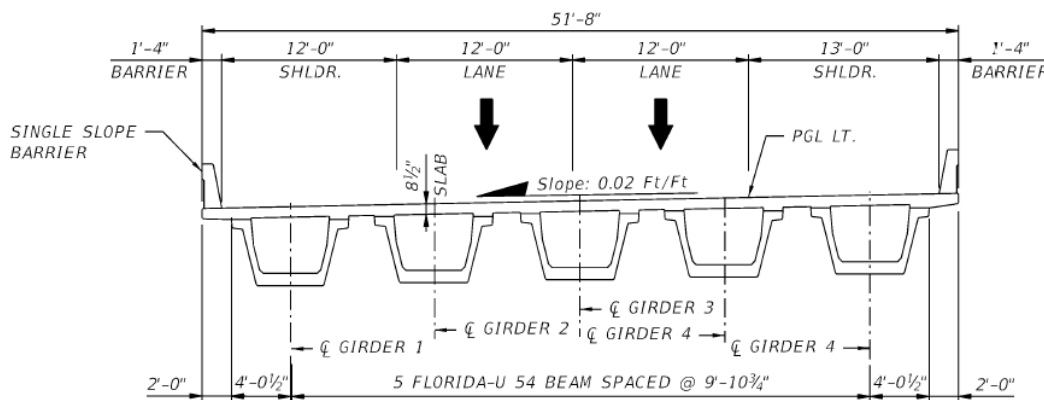
This bridge is a two-lane structure carrying westbound mainline SR 408 traffic over the Econlockhatchee River. The bridge has an approximate required overall length of 3,808 feet and has 30 spans. The last span is skewed at end bent 2, but the remaining spans are straight. The first two spans are designed to span over the intersection of Perdido Drive and Old Cheney Highway and the remaining spans are designed to go over the wetlands of the Econlockhatchee River. To minimize wetland impacts, the recommended span type over the Econlockhatchee River facilitates the top down construction methodology wherein a following span in a sequence of spans is constructed from a previously constructed span. This will eliminate temporary impacts associated with falsework and multiple access points required for the construction of longer span bridges. Steel tub girder is the beam type recommended to facilitate construction of the first two spans over the intersection of Perdido Drive and Old Cheney Highway and concrete U girders has been selected to facilitate construction of the remaining 28 spans over the Econlockhatchee River.

The proposed bridge width varies from 44'-8" to 64'-0", with two 12-foot wide lanes, a 12-foot wide right shoulder and a 13-foot wide left shoulder. From begin span 28 to end span 30, the right lane varies from 12-feet to 24-feet. The left shoulder is 6-foot wide in

span 1, and transitions to 13 feet in span 2. The anticipated span length of the first two spans is 250 feet. The remaining span lengths are significantly shorter with spans 3 thru 28 at approximately 120 feet and spans 29 and 30 at 100 feet and 88 feet, respectively. No survey of the river is available at this point but, based on state maps, the river alignment runs near parallel to the proposed bridge alignment between spans 12 thru 15. Clear spanning the estimated location of the river crossing would require a span in excess of 300 feet. In order to maintain top down construction methods with the proposed typical span type, it is likely that piers 12, 13 & 14 will need to be constructed within the river bed. Therefore, mitigation for minor hydraulic impacts to the river are anticipated at these locations. For bridge typical section, plan and elevation, see Figure 3-3 & 3-4 and Appendix A.6, respectively.

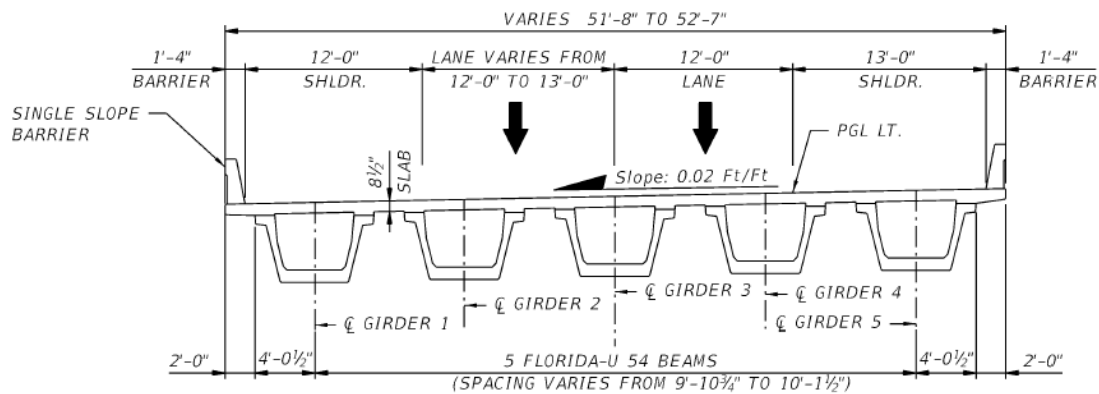


Bridge #16 Typical Section (Spans 1 & 2)

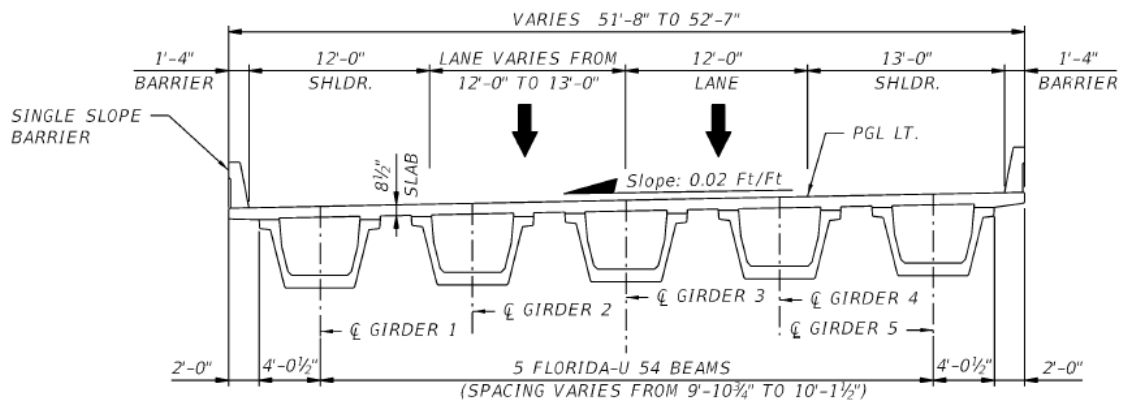


Bridge #16 - Spans 3 thru 27

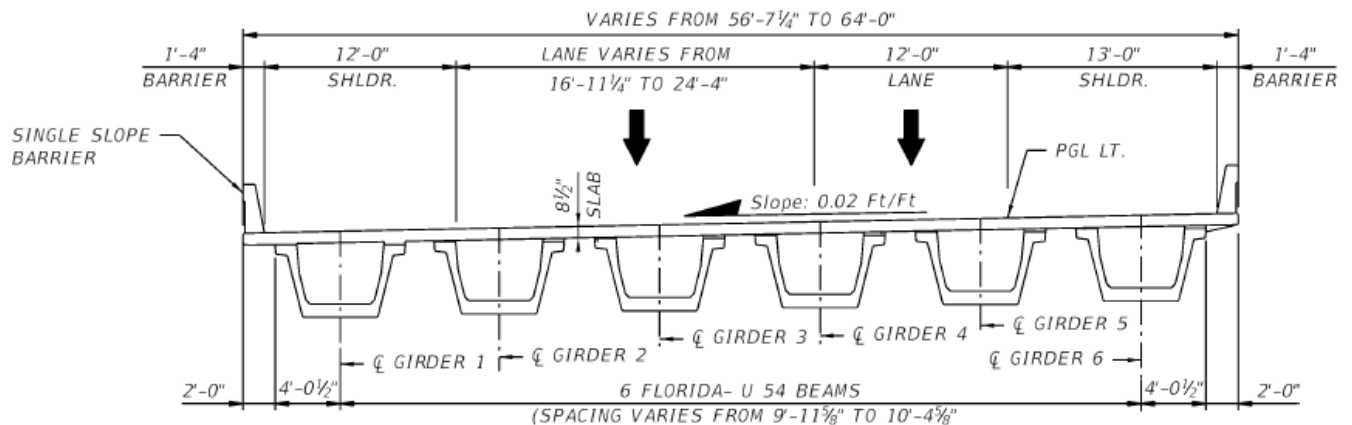
Figure 3-3 Bridge #16 Typical Section (Spans 1 thru 27)



Bridge #16 - Span 28



Bridge #16 - Span 29



Bridge #16 - Span 30

Figure 3-4 Bridge #16 Typical Section (Spans 28 thru 30)

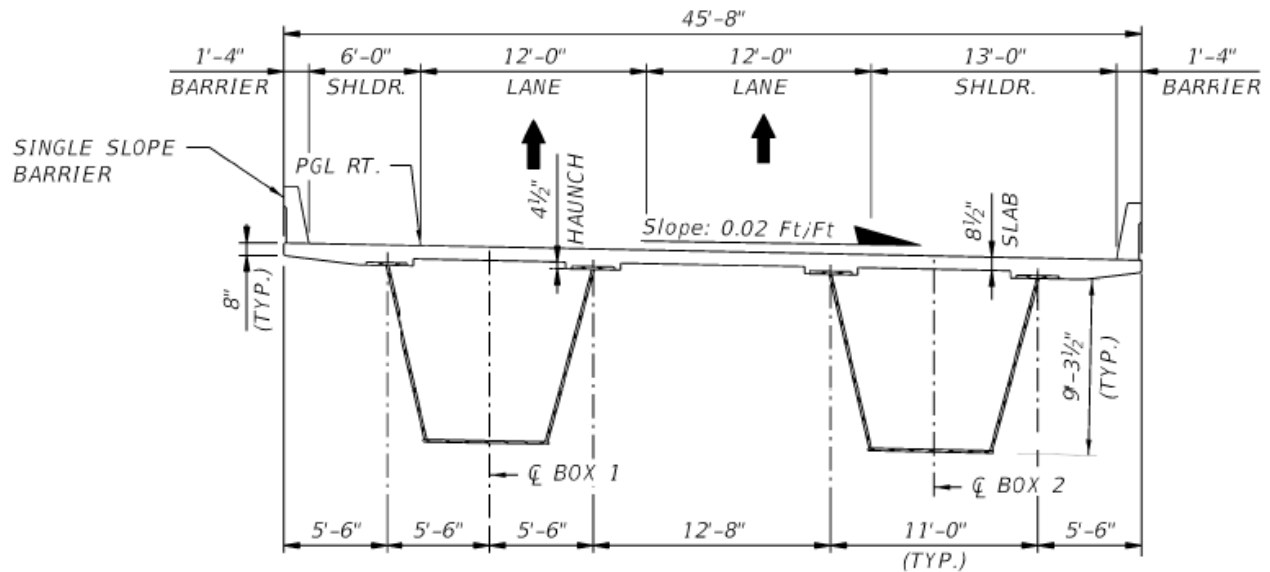
With the exception of pier 1, end bents and intermediate piers are anticipated to be pile bents. Pier 1, located adjacent to Old Cheney Highway, requires the use of a hammerhead style pier cantilevering over a portion of Old Cheney Highway. Due to the close proximity of residences at the begin bridge location, steel H piles or steel pipe piles are recommended at end bent 1 and pier 1. Remaining piers are not in close proximity to residences or businesses and, therefore, the use of 24" square prestressed concrete piles are recommended.

3.4 Bridge #17 - SR 408 Eastbound Over Econlockhatchee River

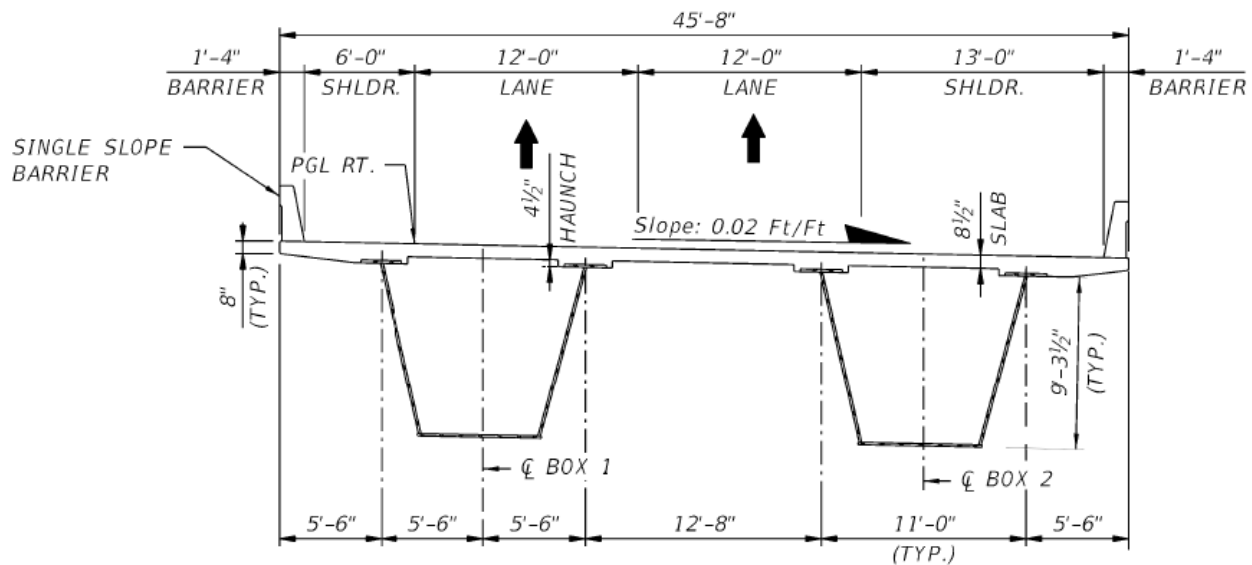
This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over Econlockhatchee River. The bridge has an approximate required overall length of 3,835 feet and has 30 spans. The last span is skewed at end bent 2, but the remaining spans are straight. The first two spans are designed to span over the intersection of Perdido Drive and Old Cheney Highway and the remaining spans are designed to go over the wetlands of the Econlockhatchee River. To minimize wetland impacts, the recommended span type over the Econlockhatchee River facilitates the top down construction methodology wherein a following span in a sequence of spans is constructed from a previously constructed span. This will eliminate temporary impacts associated with falsework and multiple access points required for the construction of longer span bridges. Steel tub girder is the beam type recommended to facilitate construction of the first two spans over the intersection of Perdido Drive and Old Cheney Highway and concrete U girders has been selected to facilitate construction of the remaining 28 spans over the Econlockhatchee River.

The proposed bridge width varies from 45'-8" to 52'-8", with two 12-foot wide lanes, a 13-foot wide right shoulder and a 6-foot wide left shoulder. The width of the right lane in the last span varies from 12 feet to about 19 feet. The anticipated span length of the first two spans is 250 feet. The remaining span lengths are significantly shorter with spans 3 thru 28 at approximately 120 feet and spans 29 and 30 at 100 feet and 115 feet, respectively. No survey of the river is available at this point but, based on state maps, the river alignment runs near parallel to the proposed bridge alignment between spans 12 thru 15. Clear spanning the estimated location of the river crossing would require a span in excess of 300 feet. In order to maintain top down construction methods with the proposed typical span type, it is likely that piers 12, 13 & 14 will need to be constructed within the river bed. Therefore, mitigation for minor hydraulic impacts to the river are anticipated at these locations.

For bridge typical section, plan and elevation, see Figure 3-5 & 3-6 and Appendix A.6, respectively.



Bridge #17 Typical Section (Spans 1 & 2)



Bridge #17 - Spans 3 thru 29

Figure 3-5 Bridge #17 Typical Section (Spans 1 thru 29)

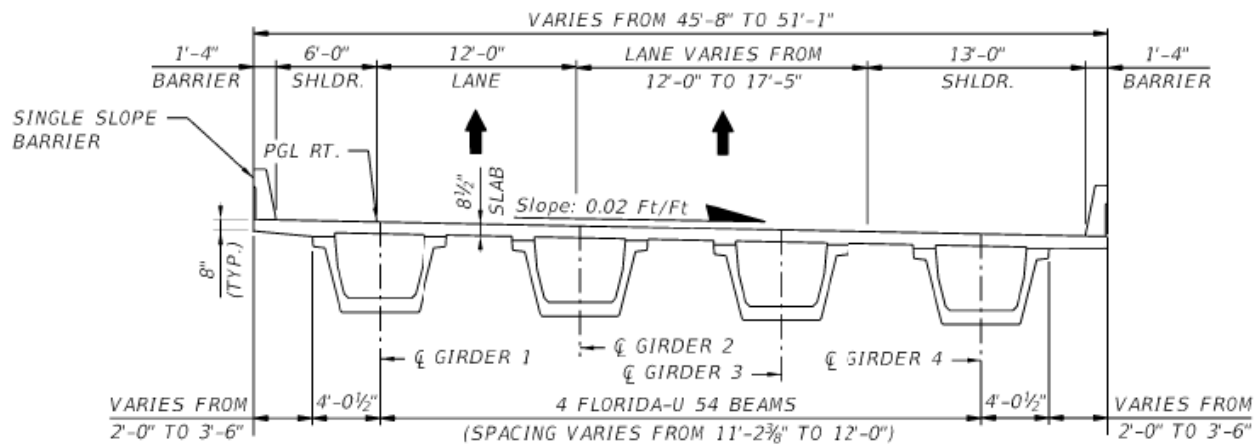


Figure 3-6: Bridge #17 Typical Section (Span 30)

Both end bents and intermediate piers, except for pier 1, are anticipated to be pile bents. Pier 1, located adjacent to Old Cheney Highway, requires the use of a hammerhead style pier cantilevering over a portion of Old Cheney Highway. Due to the close proximity of residences at the begin bridge location, steel H piles or steel pipe piles are recommended at end bent 1 and pier 1. Since the remaining piers are not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended.

3.5 Bridge #18 - SR 408 Westbound On Ramp Over Lockwood Drive

This bridge is a single lane ramp structure carrying traffic from southbound Chuluota Road (CR 419) to westbound SR 408. This single span skewed bridge has an approximate required overall length of 91 feet.

The proposed bridge is 29'-8" wide with a 15-foot wide lane and 6-foot wide shoulders. The recommended superstructure type for this bridge is 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 3-7.

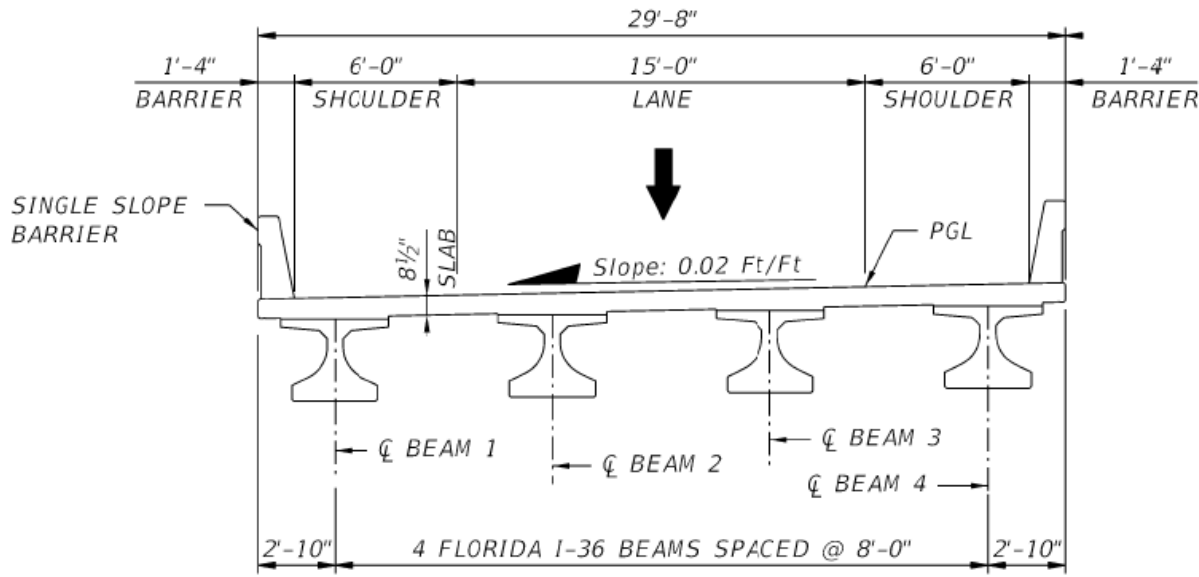


Figure 3-7: Bridge #18 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

3.6 Bridge #19 - SR 408 Westbound Over Lockwood Drive

This bridge is a two-lane structure carrying westbound mainline SR 408 traffic over Lockwood Drive. This single span skewed bridge has an approximate required overall length of 96 feet.

The proposed bridge is 44'-8" wide, with 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 3-8.

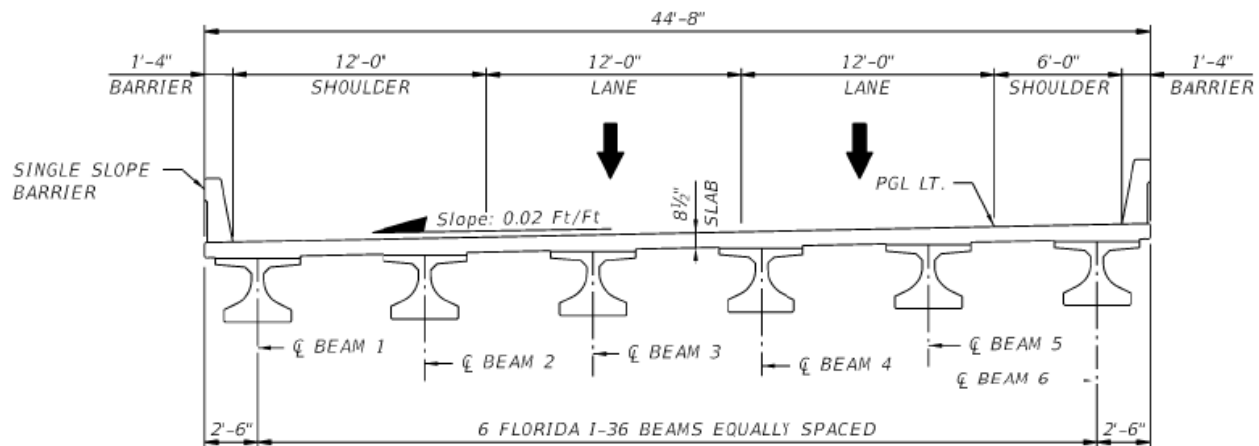


Figure 3-8: Bridge #19 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

3.7 Bridge #20 - SR 408 Eastbound Over Lockwood Drive

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over Lockwood Drive. This single span skewed bridge has an approximate required overall length of 98 feet.

The proposed bridge is 44'-8" wide, with 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 3-9.

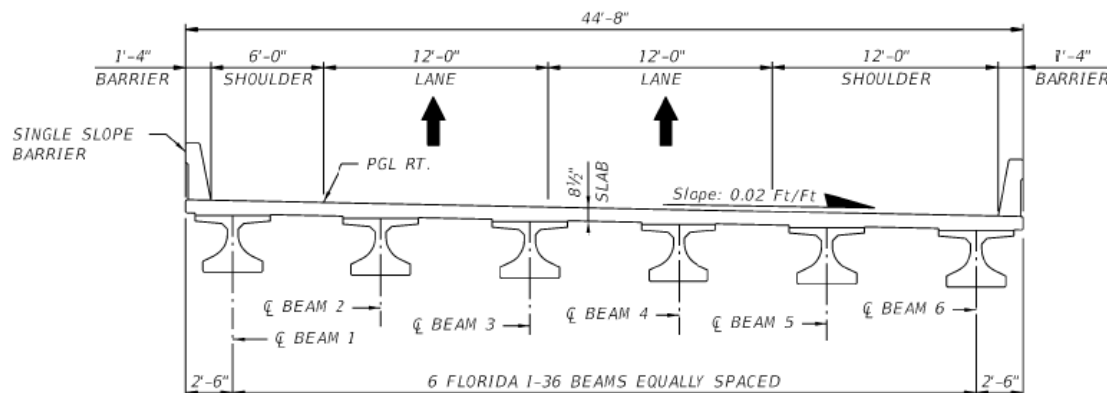


Figure 3-9: Bridge #20 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

3.8 Bridge #21 - SR 408 Eastbound Off Ramp Over Lockwood Drive

This bridge is a single lane ramp structure carrying traffic from eastbound SR 408 to northbound Chuluota Road (CR 419). This single span skewed bridge has an approximate required overall length of 169 feet.

The proposed bridge is 29'-8" wide, with a 15-foot wide lane and 6-foot wide shoulders. The recommended superstructure type for this bridge is 72" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 3-10.

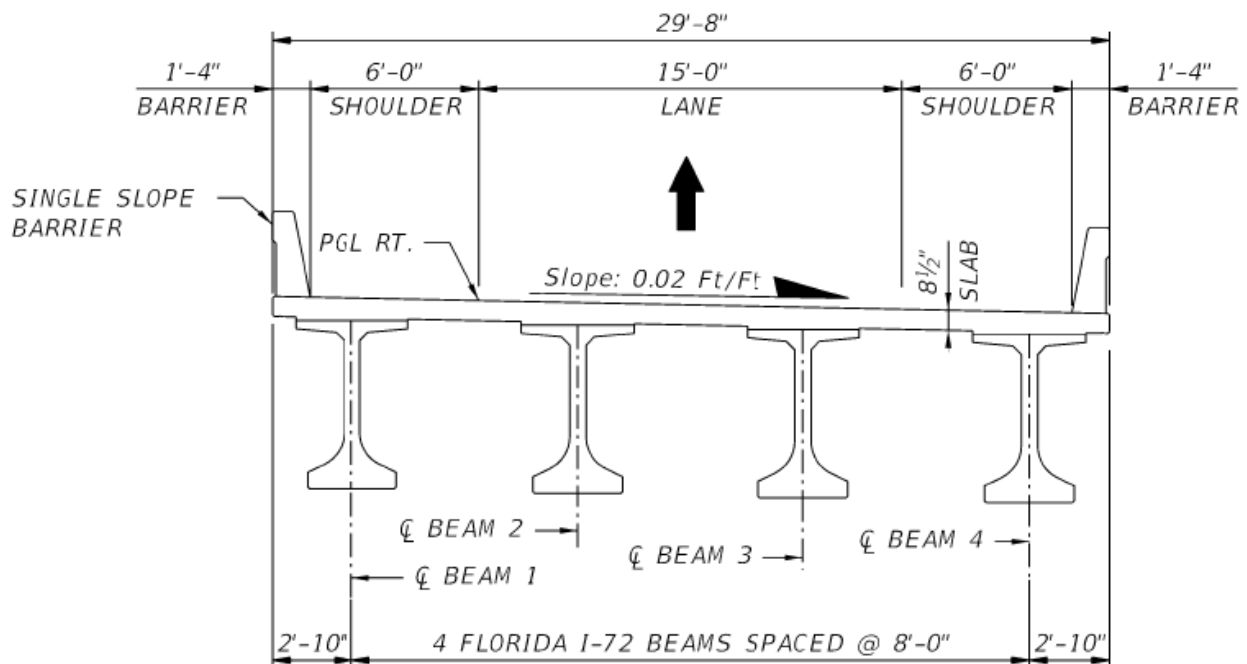


Figure 3-10: Bridge #21 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

Note that although Bridges #20 and #21 are independent structures, they share a gore area at the beginning of their spans.

4.0 SEGMENT 3 BRIDGES

Segment 3 extends from Chuluota Road (CR 419) to the eastern project terminus at SR 50. This segment is industrial and exhibits lower traffic demands than Segments 1 and 2. A total of 12 new bridges are proposed within this segment (Bridge Nos. 24 thru 33). With the exception of Bridge Nos. 26 and 27, all of the bridges are single span bridges composed of prestressed concrete Florida I beam type superstructures founded on pile end bents. Bridge Nos. 26 and 27 are two span bridges over a tributary of the Econolockhatchee River and are recommended to be constructed of prestressed concrete Florida I beams as well.

Possible foundation types for the bridges in this segment include 18-inch and 24-inch square prestressed concrete piles, steel H-piles, steel pipe piles, and drilled shafts. Selection of the foundation system should give significant consideration for systems that reduce the potential for vibration and noise impacts at locations within a 1,000-foot radius of residential and/or commercial structures. Therefore prestressed concrete piles would be less desirable than the low displacement piling such as steel H-piles and steel pipe piles for bridges within close proximity of existing structures. Low displacement piles require lower impact hammer energy levels and thus create lower noise and vibration levels during installation. Large non-redundant drilled shaft foundations, if feasible, would also have lower noise and vibration levels, and will also have the potential to reduce the area of impact at ground level.

4.1 Bridge #22 - SR 408 Westbound Over SR 408 On/Off Ramps Chuluota Road (CR 419)

This bridge is a two-lane structure carrying westbound mainline SR 408 traffic over the on and off-ramps associated with Chuluota Road (CR 419). This single span bridge has an approximate required overall length of 121 feet.

The proposed bridge is 44'-8" wide, with 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 45" deep prestressed concrete Florida I beams. For bridge typical section, plan and elevation, see Figure 4-1 and Appendix A.7, respectively.

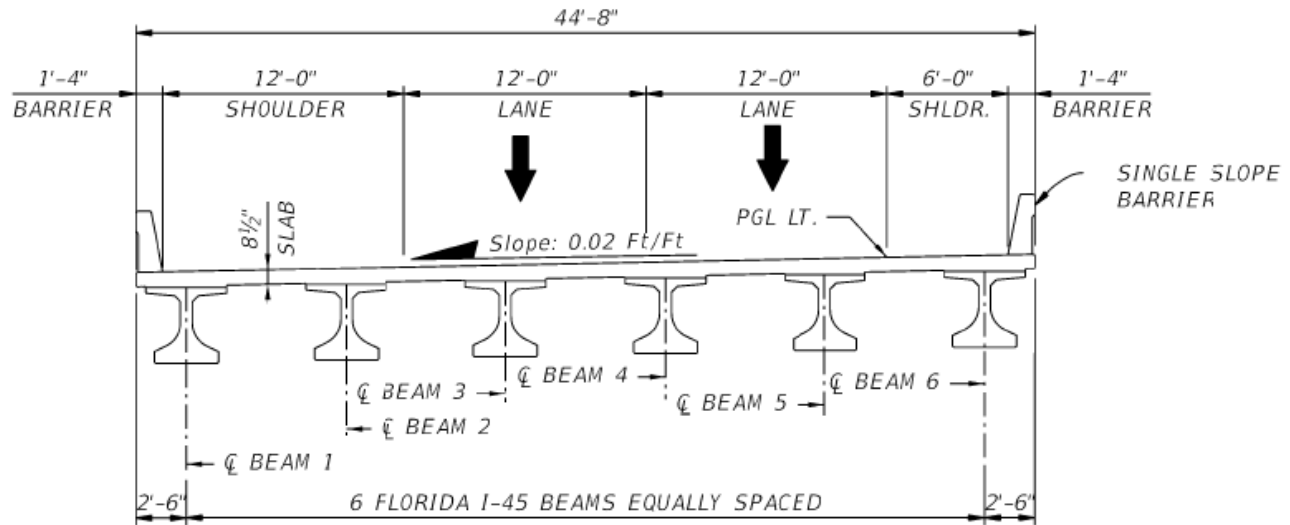


Figure 4-1: Bridge #22 Typical Section

Since this bridge is not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended at each end bent and intermediate pier locations.

4.2 Bridge #23 - SR 408 Eastbound Over SR 408 On/Off Ramps Chuluota Road (CR 419)

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over the on and off-ramps associated with Chuluota Road (CR 419). This single span bridge has an approximate required overall length of 122 feet.

The proposed bridge is 44'-8" wide, with 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 45" deep prestressed concrete Florida I beams. For bridge typical section, plan and elevation, see Figure 4-2 and Appendix A.7, respectively.

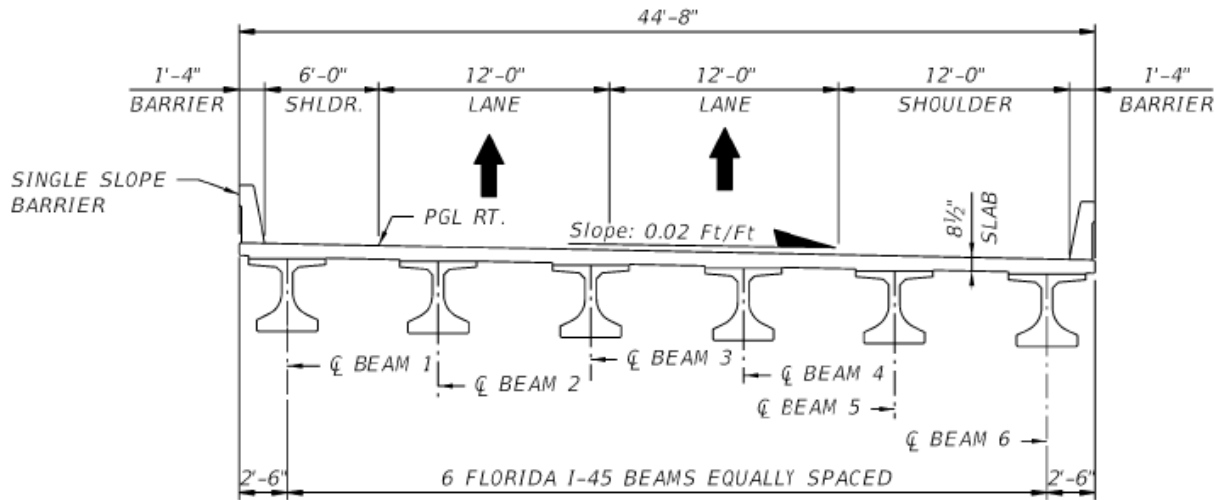


Figure 4-2: Bridge #23 Typical Section

Since this bridge is not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended at each end bent and intermediate pier locations.

4.3 Bridge #24 - SR 408 Westbound Over Hamilton Drive

This bridge is a two-lane structure carrying westbound mainline SR 408 traffic over Hamilton Drive. This single span skewed bridge has an approximate required overall length of 106 feet.

The proposed bridge is 44'-8" wide with 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 4-3.

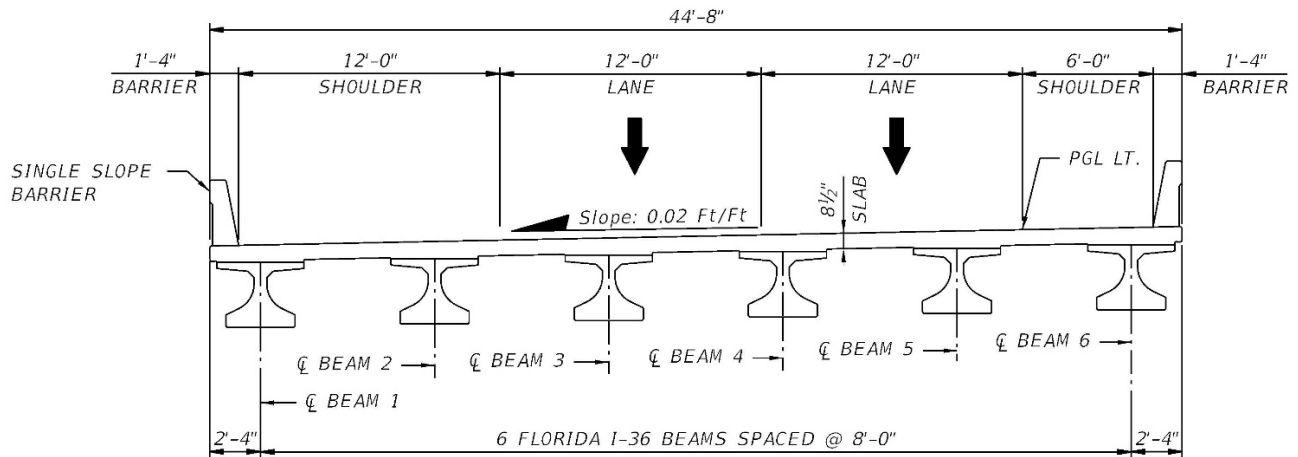


Figure 4-3: Bridge #24 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

4.4 Bridge #25 - SR 408 Eastbound Over Hamilton Drive

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over Hamilton Drive. This single span skewed bridge has an approximate required overall length of 106 feet.

The proposed bridge has an average bridge width of 56'-4" with a 12-foot wide left lane, a lane with a minimum width of 21'-2", a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 4-4.

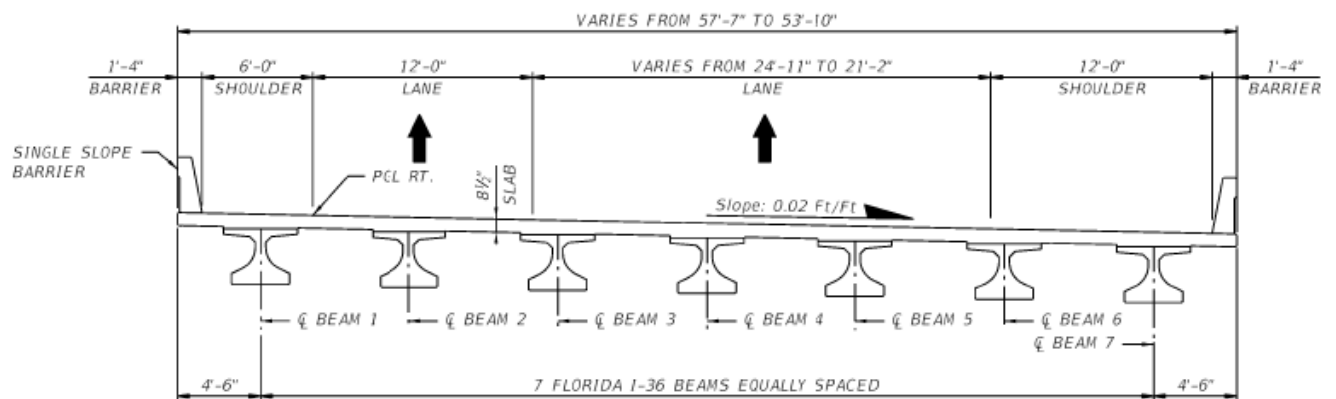


Figure 4-4: Bridge #25 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

4.5 Bridge #26 - SR 408 Westbound Over Econlockhatchee River Tributary

This bridge is a two-lane structure carrying westbound mainline SR 408 traffic over a tributary of the Econlockhatchee River. The bridge is skewed with two equal spans and has an approximate required overall length of 305 feet. The intermediate pier will be constructed within the tributary flood plain which will impact hydraulics. The hydraulic impacts due to the obstruction of a single pile bent can be mitigated by re-channelization and regrading work near the end bents.

The proposed bridge is 45'-8" wide with 12-foot wide lanes, a 6-foot wide right shoulder and a 13-foot wide left shoulder. The recommended superstructure type for this bridge is 72" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 4-5.

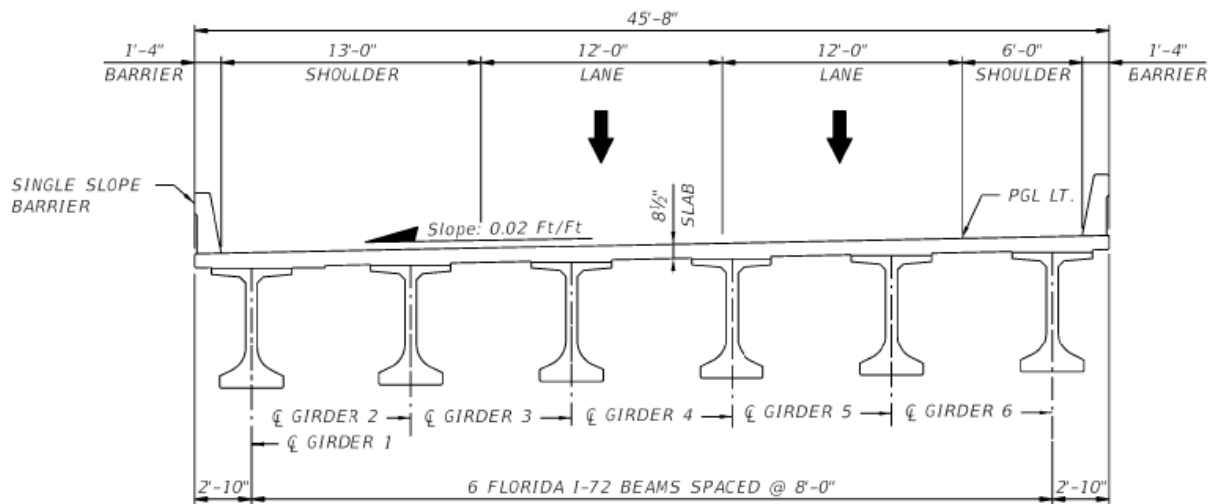


Figure 4-5: Bridge #26 Typical Section

Since this bridge is not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended at each end bent and intermediate bent location.

4.6 Bridge #27 - SR 408 Eastbound Over Econlockhatchee River Tributary

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over a tributary of the Econlockhatchee River. The bridge is skewed with two equal spans and

has an approximate required overall length of 300 feet. The intermediate pier will be constructed within the tributary flood plain which will impact hydraulics. The hydraulic impacts due to the obstruction of a single pile bent can be mitigated by re-channelization and regrading work near the end bents.

The proposed bridge is 51'-8" wide with 12-foot wide lanes, a 12-foot wide right shoulder and a 13-foot wide left shoulder. The recommended superstructure type for this bridge is 72" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 4-6.

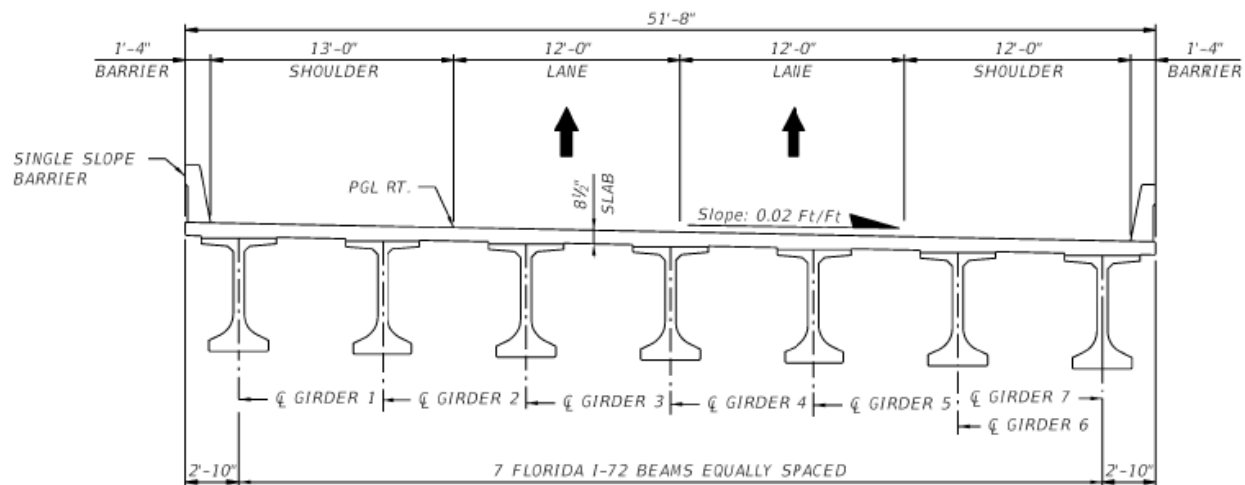


Figure 4-6: Bridge #27 Typical Section

Since this bridge is not in close proximity to residences or businesses, 24" square prestressed concrete piles are recommended at each end bent and intermediate bent location.

4.7 Bridge #28 - SR 408 Westbound Over Seminole Trail

This bridge is a two-lane structure carrying westbound mainline SR 408 traffic over Seminole Trail. This single span bridge has an approximate required overall length of 81 feet.

The proposed bridge is 44'-8" wide with 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 4-7.

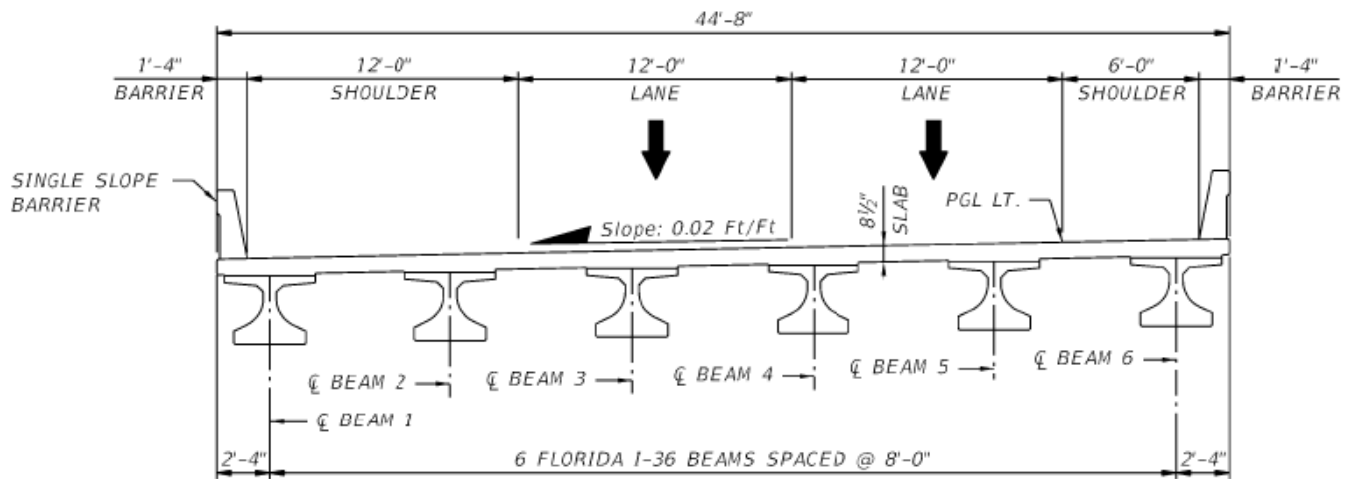


Figure 4-7: Bridge #28 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

4.8 Bridge #29 - SR 408 Eastbound Over Seminole Trail

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over Seminole Trail. This single span bridge has an approximate required overall length of 81 feet.

The proposed bridge is 44'-8" wide with 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 4-8.

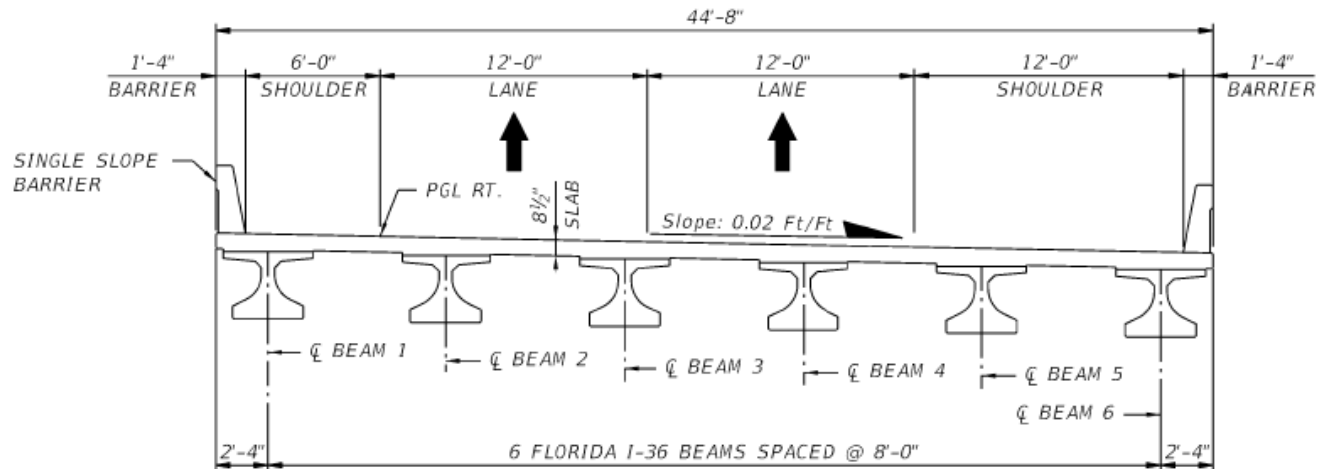


Figure 4-8: Bridge #29 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

4.9 Bridge #30 - SR 408 Westbound Over N. 5th Street

This bridge is a two-lane structure carrying westbound mainline SR 408 traffic over N. 5th Street. This single span bridge has an approximate required overall length of 70 feet.

The proposed bridge is 44'-8" wide with 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 4-9.

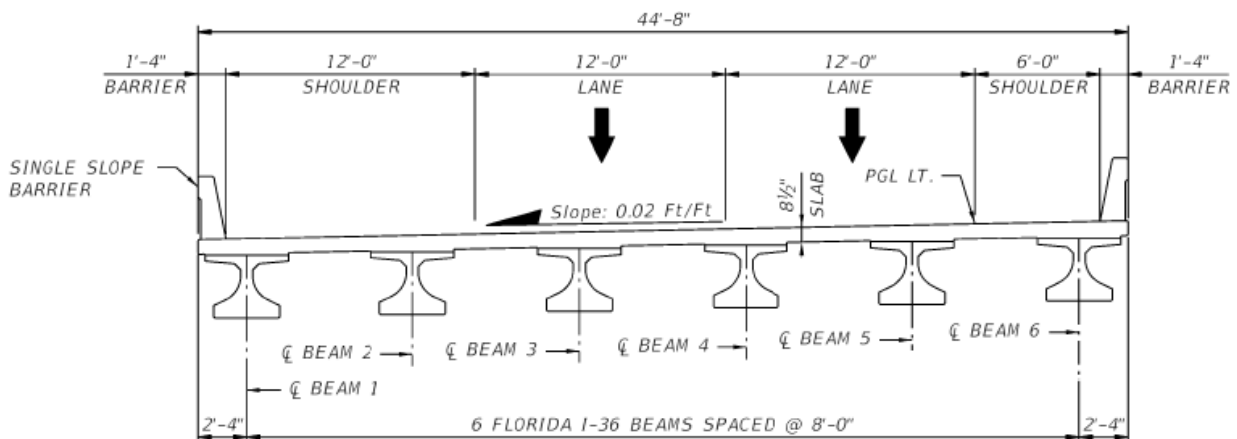


Figure 4-9: Bridge #30 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

4.10 Bridge #31 - SR 408 Eastbound Over N. 5th Street

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over N. 5th Street. This single span bridge has an approximate required overall length of 70 feet.

The proposed bridge is 44'-8" wide with two 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 36" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 4-10.

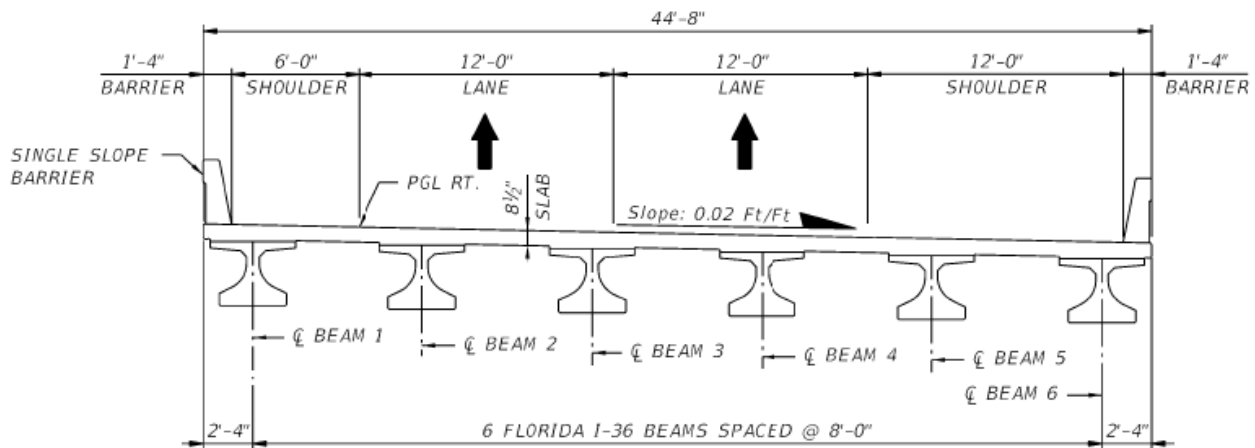


Figure 4-10: Bridge #31 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

4.11 Bridge #32 - SR 408 Westbound Over North County Road 13

This bridge is a three-lane structure carrying westbound mainline SR 408 traffic over North County Road 13. This single span skewed bridge has an approximate required overall length of 128 feet.

The proposed bridge has an average width of 59'-4" with two 12-foot wide lanes, a third lane with a minimum width of 12 feet, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 54" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 4-11.

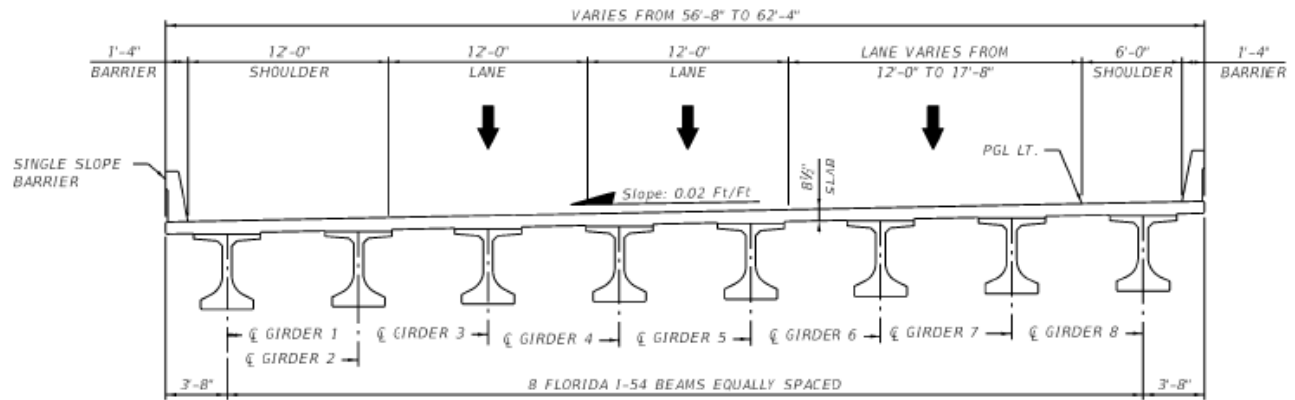


Figure 4-11: Bridge #32 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

4.12 Bridge #33 - SR 408 Eastbound Over North County Road 13

This bridge is a two-lane structure carrying eastbound mainline SR 408 traffic over North County Road 13. This single span skewed bridge has an approximate required overall length of 128 feet.

The proposed bridge is 44'-8" wide with 12-foot wide lanes, a 12-foot wide right shoulder and a 6-foot wide left shoulder. The recommended superstructure type for this bridge is 54" deep prestressed concrete Florida I beams. For bridge typical section, see Figure 4-12.

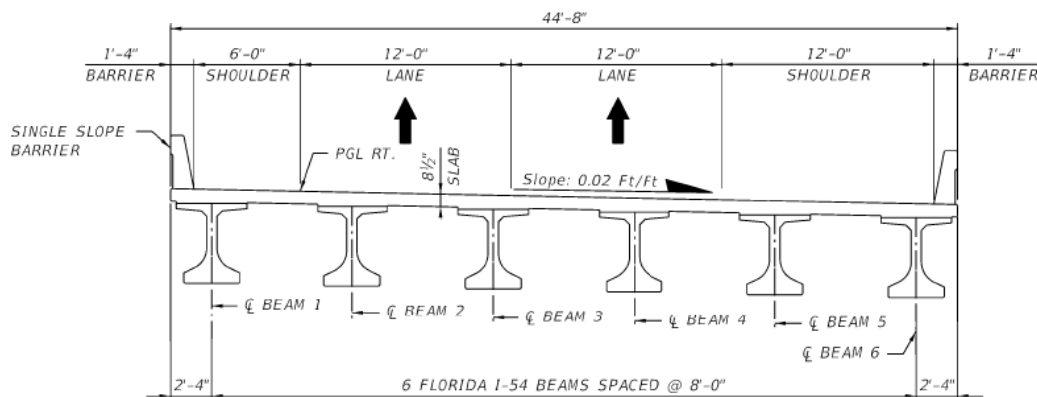


Figure 4-12: Bridge #33 Typical Section

Since this bridge is in close proximity to residences, steel H piles or steel pipe piles are recommended at each end bent.

5.0 STRUCTURES SUMMARY AND COST ESTIMATE

The cost estimate for bridge structures is presented herein. Table 1 summarizes the cost for each segment and the total project cost estimate for bridge structures. Details of the cost estimate of each segment are presented in Tables 2 thru 4.

Table 1: Bridge Cost Estimate Summary

Segment	Cost
1	\$ 19,703,804
2	\$ 72,881,926
3	\$ 9,350,120
Project Total Bridge Cost	\$ 101,935,850

Table 2: Bridge Cost Estimate Segment 1 (Note: Bridge lengths and superstructure depths have been rounded up for estimation purposes and may not match the Plan Sheets and Typical Sections)

BRIDGE COST ESTIMATE - SEGMENT 1														
Bridge No.	Bridge Location/Description	Possible Superstructure				Possible Substructure		Total Superstructure Depth (ft)	No. of Spans	Bridge Length (ft)	Average Bridge Width (ft)	Deck Area (sf)	\$/SF	Estimated Cost
		Anticipated Type	Min. CL Radius (ft)	Max Span Length (ft)	Approximate Depth (ft)	Anticipated Type	Approximate Depth below Superstructure							
1A	Woodbury Rd over SR 408	Prestressed Concrete Florida I Beams	N/A	113	4.92	Multicolumn, Pile Bents	0	4.92	2	209	102.50	21,423	120	\$2,570,700
1	SR 408 EB On Ramp Over SR 408 EB Off Ramp	Curved Steel Plate Girders	1,390	250	9.25	Multicolumn, Pile Bents	0	9.25	3	470	35.67	16,763	182	\$3,050,927
2	SR 408 EB Over SR 408 EB On/Off Ramps	Steel Plate Girders	N/A	207	8.88	Pile Bents	0	8.88	1	207	76.00	15,732	172	\$2,705,904
3	SR 408 WB Over SR 408 EB On/Off Ramps	Steel Plate Girders	N/A	211	8.88	Pile Bents	0	8.88	1	211	50.67	10,691	172	\$1,838,916
4	SR 408 WB Off Ramp Over SR 408 EB On/Off Ramps	Steel Plate Girders	N/A	197	8.88	Pile Bents	0	8.88	1	197	29.67	5,845	172	\$1,005,338
5	SR 408 WB Off Ramp Over SR 408 WB On Ramp	Prestressed Concrete Florida I Beams	3,820	174	8.21	Straddle, Pile Bents	1.5	9.71	2	347	38.67	13,417	125	\$1,677,167
6	SR 408 WB Over Bridgeway Blvd	Steel Plate Girders	7,699	229	9.88	Pile Bents	0	9.88	1	229	64.17	14,694	172	\$2,527,397
7	SR 408 EB Over Bridgeway Blvd	Steel Plate Girders	7,579	237	9.88	Pile Bents	0	9.88	1	237	48.17	11,416	172	\$1,963,466
8	SR 408 WB Over Hancock Lone Palm Rd	Prestressed Concrete Florida I Beams	N/A	71	4.17	Pile Bents	0	4.17	1	71	54.17	3,846	120	\$461,500
9	SR 408 EB Over Hancock Lone Palm Rd	Prestressed Concrete Florida I Beams	N/A	72	4.17	Pile Bents	0	4.17	1	72	48.17	3,468	120	\$416,160
10	SR 408 WB Over Fricke Ave	Prestressed Concrete Florida I Beams	N/A	42	1.67	Pile Bents	0	1.67	1	42	51.08	2,146	120	\$257,460
11	SR 408 EB Over Fricke Ave	Prestressed Concrete Florida I Beams	N/A	42	1.67	Pile Bents	0	1.67	1	42	44.67	1,876	120	\$225,120
12	SR 408 WB Over Pel St	Prestressed Concrete Florida I Beams	N/A	73	4.17	Pile Bents	0	4.17	1	73	69.92	5,104	120	\$612,470
13	SR 408 EB Over Pel St	Prestressed Concrete Florida I Beams	N/A	73	4.17	Pile Bents	0	4.17	1	73	44.67	3,261	120	\$391,280
Total Estimated Bridge Cost - Segment 1 = \$19,703,804														
Total Bridge Area (SF) - Segment 1 = 129,681														
Average Cost/SF - Segment 1 = \$151.94														

Table 3: Bridge Cost Estimate Segment 2 (Note: Bridge lengths and superstructure depths have been rounded up for estimation purposes and may not match the Plan Sheets and Typical Sections)

BRIDGE COST ESTIMATE - SEGMENT 2														
Bridge No.	Bridge Location/Description	Possible Superstructure				Possible Substructure		Total Superstructure Depth (ft)	No. of Spans	Bridge Length (ft)	Average Bridge Width (ft)	Deck Area (sf)	\$/SF	Estimated Cost
		Anticipated Type	Min. CL Radius (ft)	Max Span Length (ft)	Approximate Depth (ft)	Anticipated Type	Approximate Depth below Superstructure							
14	SR 408 WB Over Avalon Park Blvd	Steel Plate Girders	N/A	230	9.63	Pile Bents	0	9.63	1	230	50.67	11,653	172	\$2,004,373
15	SR 408 EB Over Avalon Park Blvd	Steel Plate Girders	N/A	230	9.63	Pile Bents	0	9.63	1	230	50.67	11,653	172	\$2,004,373
16	SR 408 WB Over Econlockhatchee River	Steel Plate Girders & Prestressed Concrete Florida I Beams	N/A	250	10.38	Hammerhead, Pile Bents	4	14.38	30	3,808	51.55	196,301	180	\$35,334,130
17	SR 408 EB Over Econlockhatchee River	Steel Plate Girders & Prestressed Concrete Florida I Beams	N/A	250	10.38	Hammerhead, Pile Bents	4	14.38	30	3,835	45.74	175,409	180	\$31,573,610
18	SR 408 WB On Ramp Over Lockwood Dr	Prestressed Concrete Florida I Beams	N/A	91	4.17	Pile Bents	0	4.17	1	91	29.67	2,700	120	\$323,960
19	SR 408 WB Over Lockwood Dr	Prestressed Concrete Florida I Beams	N/A	96	4.17	Pile Bents	0	4.17	1	96	44.67	4,288	120	\$514,560
20	SR 408 EB Over Lockwood Dr	Prestressed Concrete Florida I Beams	N/A	98	4.17	Pile Bents	0	4.17	1	98	44.67	4,377	120	\$525,280
21	SR 408 EB Off Ramp Over Lockwood Dr	Prestressed Concrete Florida I Beams	N/A	169	7.21	Pile Bents	0	7.21	1	169	29.67	5,014	120	\$601,640
Total Estimated Bridge Cost - Segment 2 = \$72,881,926														
Total Bridge Area (SF) - Segment 2 = 411,395														
Average Cost/SF - Segment 2 = \$177														

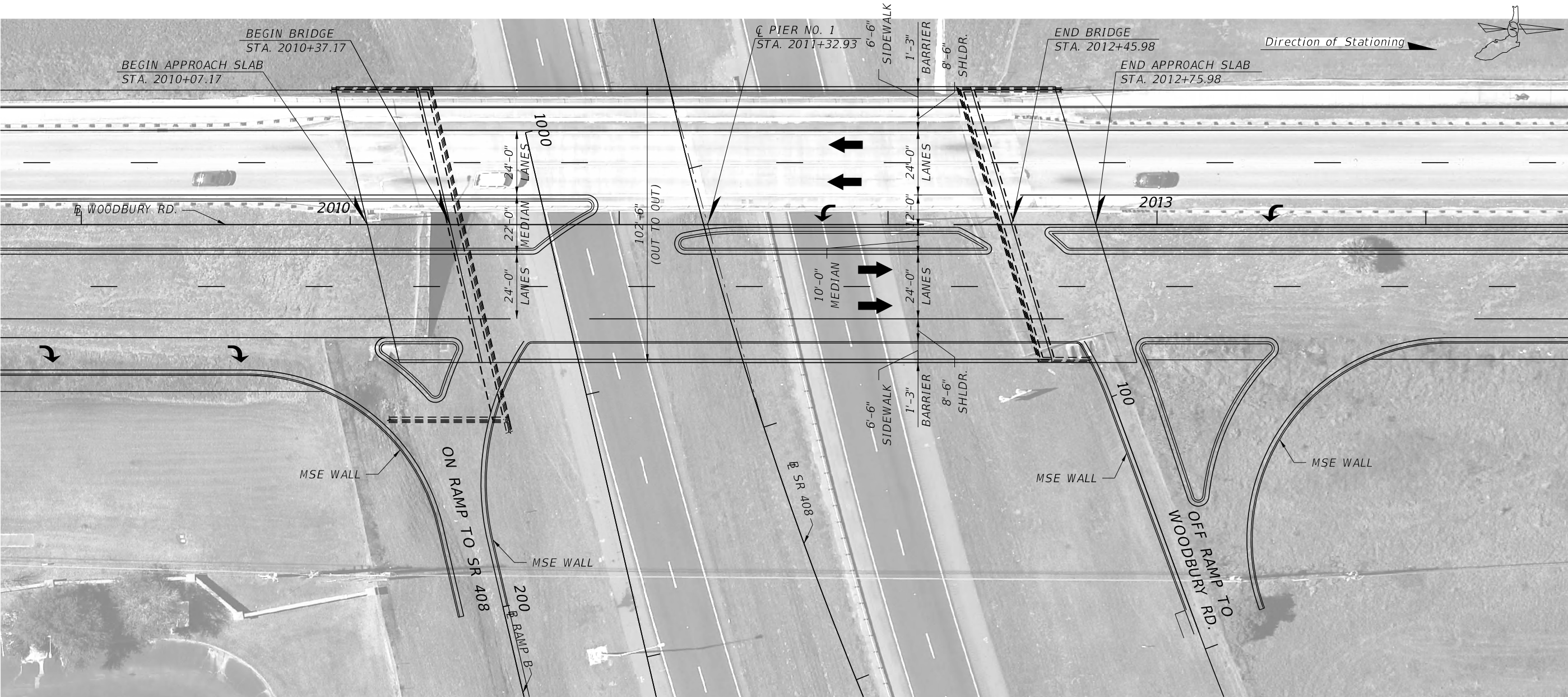
Table 4: Bridge Cost Estimate Segment 3 (Note: Bridge lengths and superstructure depths have been rounded up for estimation purposes and may not match the Plan Sheets and Typical Sections)

BRIDGE COST ESTIMATE - SEGMENT 3														
Bridge No.	Bridge Location/Description	Possible Superstructure				Possible Substructure		Total Superstructure Depth (ft)	No. of Spans	Bridge Length (ft)	Average Bridge Width (ft)	Deck Area (sf)	\$/SF	Estimated Cost
		Anticipated Type	Min. CL Radius (ft)	Max Span Length (ft)	Approximate Depth (ft)	Anticipated Type	Approximate Depth below Superstructure							
22	SR 408 WB Over SR 408 On/Off Ramps Chuluota Rd (CR 419)	Prestressed Concrete Florida I Beams	N/A	121	4.92	Pile Bents	0	4.92	1	121	44.67	5,405	120	\$648,560
23	SR 408 EB Over SR 408 On/Off Ramps Chuluota Rd (CR 419)	Prestressed Concrete Florida I Beams	N/A	122	4.92	Pile Bents	0	4.92	1	122	44.67	5,449	120	\$653,920
24	SR 408 WB Over Hamilton Dr	Prestressed Concrete Florida I Beams	N/A	106	4.17	Pile Bents	0	4.17	1	106	44.67	4,735	120	\$568,160
25	SR 408 EB Over Hamilton Dr	Prestressed Concrete Florida I Beams	N/A	106	4.17	Pile Bents	0	4.17	1	106	56.33	5,971	120	\$716,560
26	SR 408 WB Over Econlockhatchee River Tributary	Prestressed Concrete Florida I Beams	N/A	152	7.21	Pile Bents	0	7.21	2	305	45.67	13,928	120	\$1,671,400
27	SR 408 EB Over Econlockhatchee River Tributary	Prestressed Concrete Florida I Beams	N/A	150	7.21	Pile Bents	0	7.21	2	300	51.67	15,500	120	\$1,860,000
28	SR 408 WB Over Seminole Trail	Prestressed Concrete Florida I Beams	N/A	81	4.17	Pile Bents	0	4.17	1	81	44.67	3,618	120	\$434,160
29	SR 408 EB Over Seminole Trail	Prestressed Concrete Florida I Beams	N/A	81	4.17	Pile Bents	0	4.17	1	81	44.67	3,618	120	\$434,160
30	SR 408 WB Over N. 5th St	Prestressed Concrete Florida I Beams	N/A	70	4.17	Pile Bents	0	4.17	1	70	44.67	3,127	120	\$375,200
31	SR 408 EB Over N. 5th St	Prestressed Concrete Florida I Beams	N/A	70	4.17	Pile Bents	0	4.17	1	70	44.67	3,127	120	\$375,200
32	SR 408 WB Over North County Rd 13	Prestressed Concrete Florida I Beams	N/A	128	5.67	Pile Bents	0	5.67	1	128	59.50	7,616	120	\$913,920
33	SR 408 EB Over North County Rd 13	Prestressed Concrete Florida I Beams	N/A	128	5.67	Pile Bents	0	5.67	1	128	45.50	5,824	120	\$698,880
Total Estimated Bridge Cost - Segment 3 =													\$9,350,120	
Total Bridge Area (SF) - Segment 3 =													77,918	
Average Cost/SF - Segment 3 =													\$120	

APPENDIX A: Bridge Plans

APPENDIX A.1

Bridge No. 1A - Plan Layout



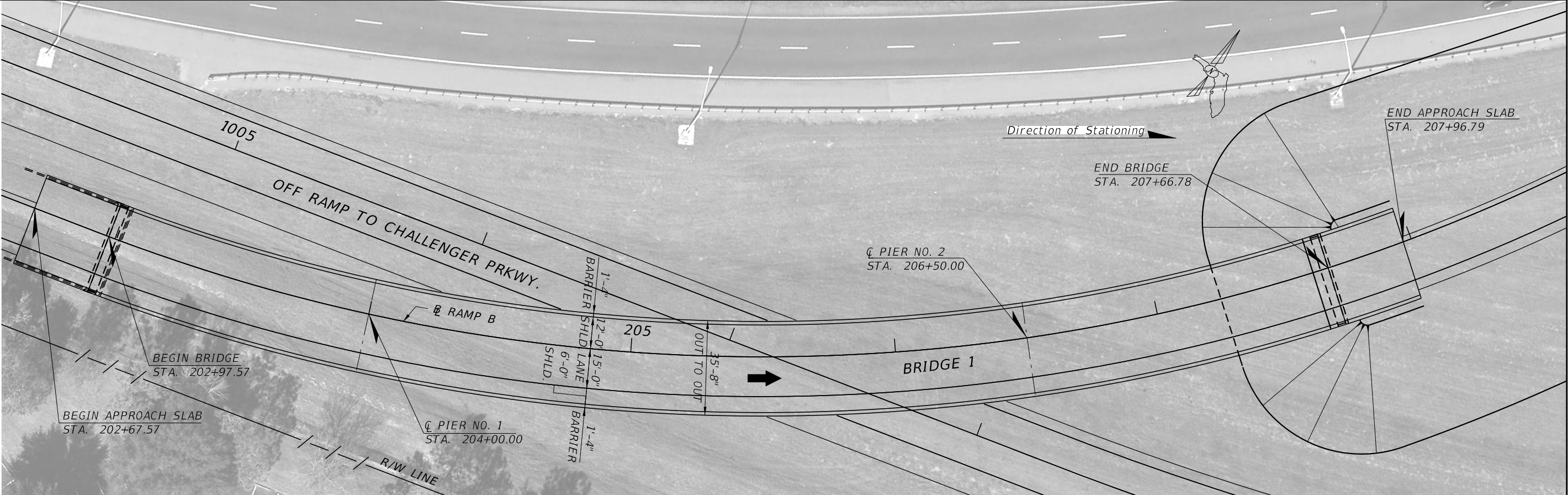
PLAN

BRIDGE 1A

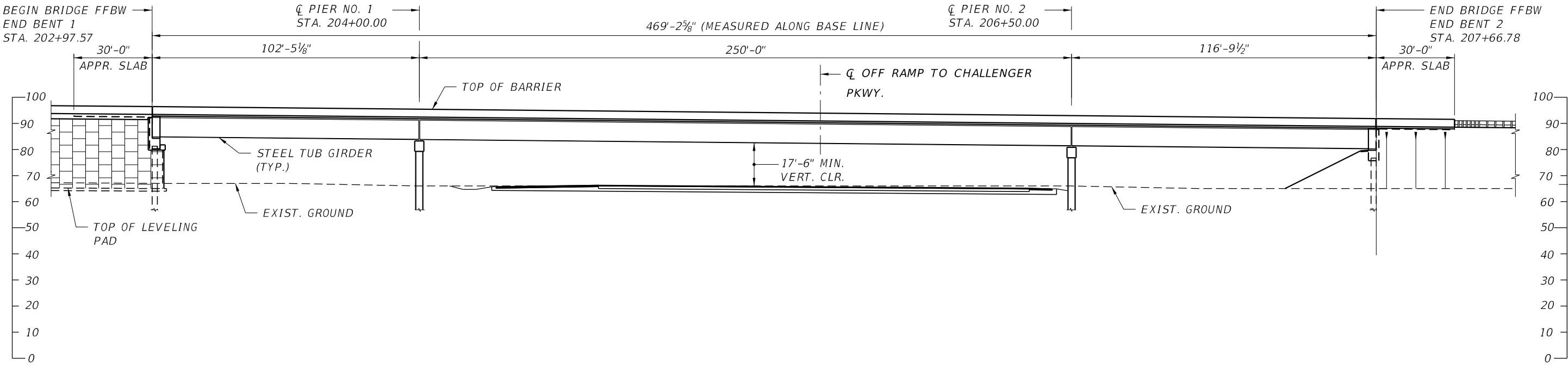
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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					408	ORANGE			

APPENDIX A.2

Bridge No. 1 - Plan and Elevation



PLAN



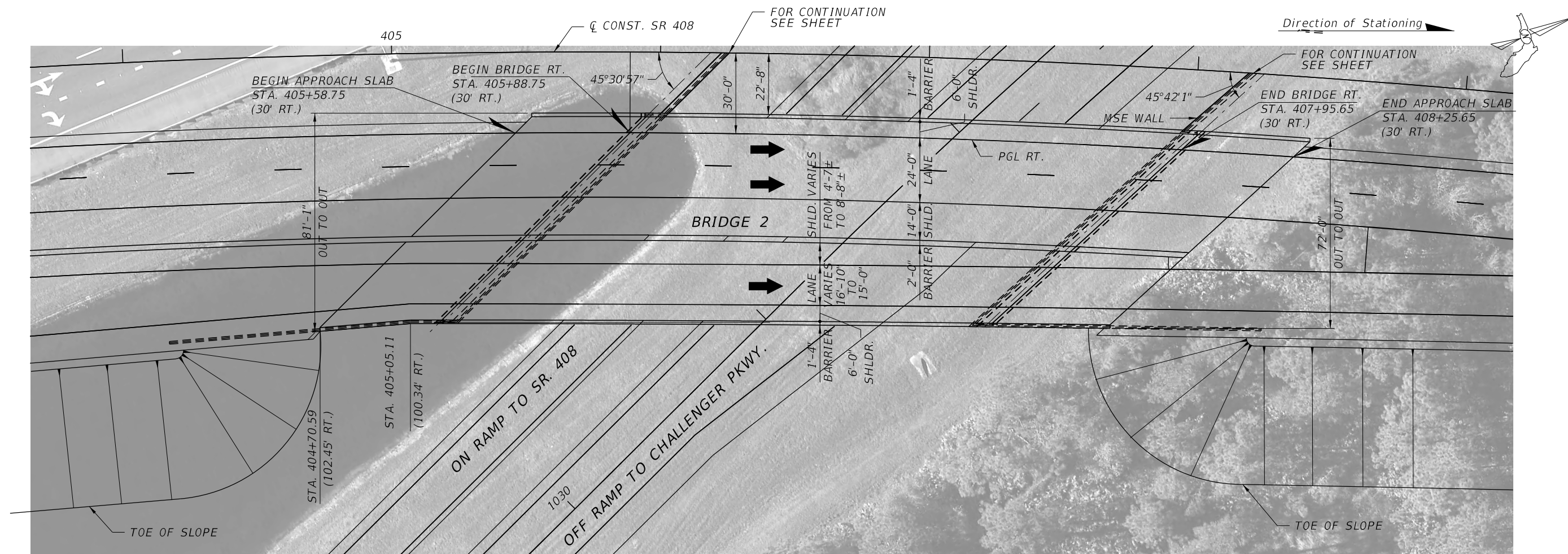
ELEVATION

BRIDGE NO. 1

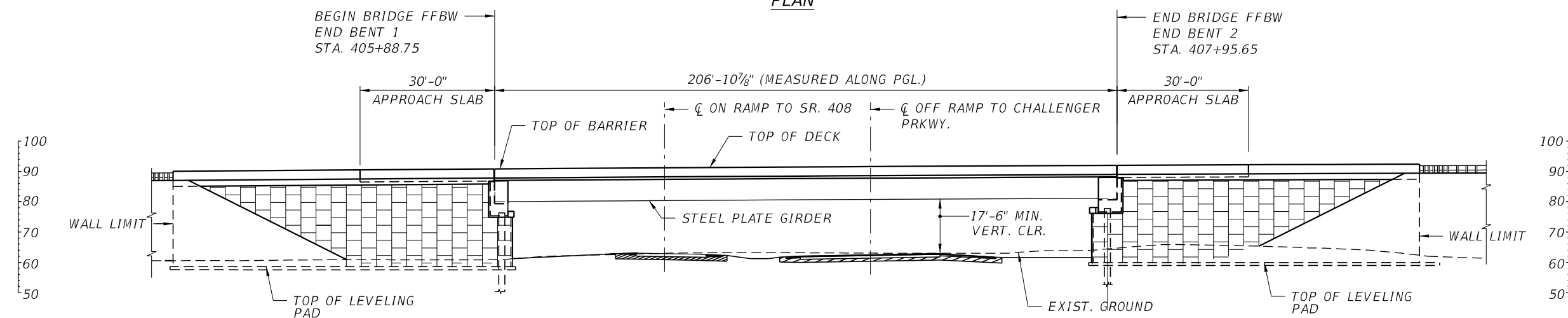
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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					408	ORANGE			

APPENDIX A.3

Bridge No. 2 - Plan and Elevation



PLAN



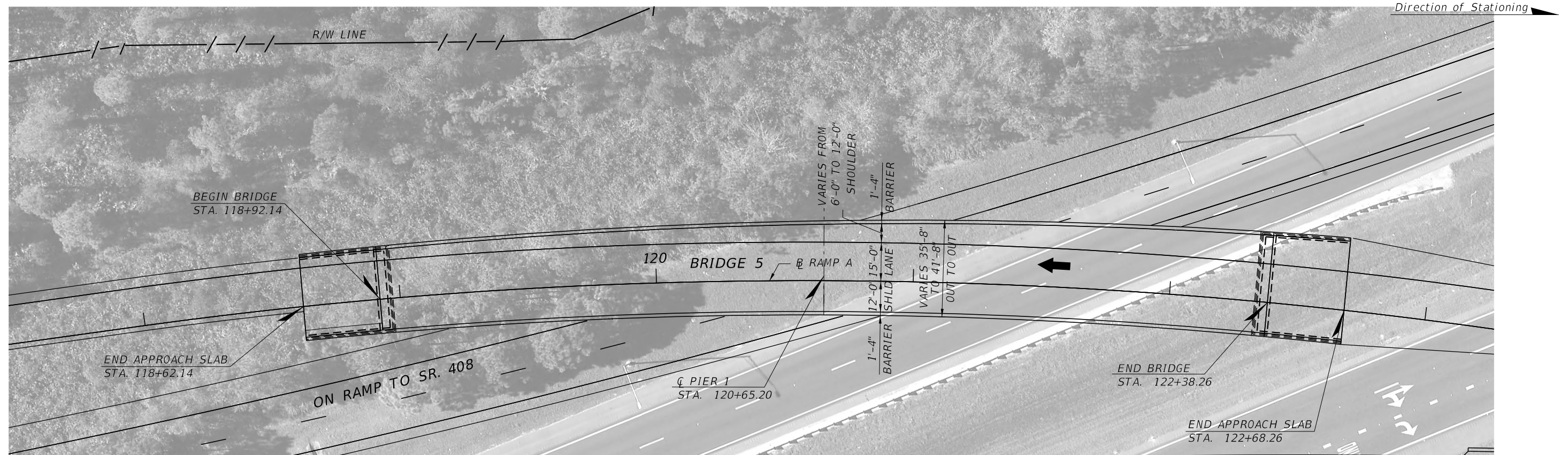
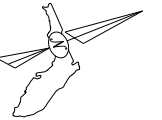
ELEVATION
(BRIDGE 2 SHOWN, BRIDGE 3 SIMILAR)

BRIDGE NO. 2

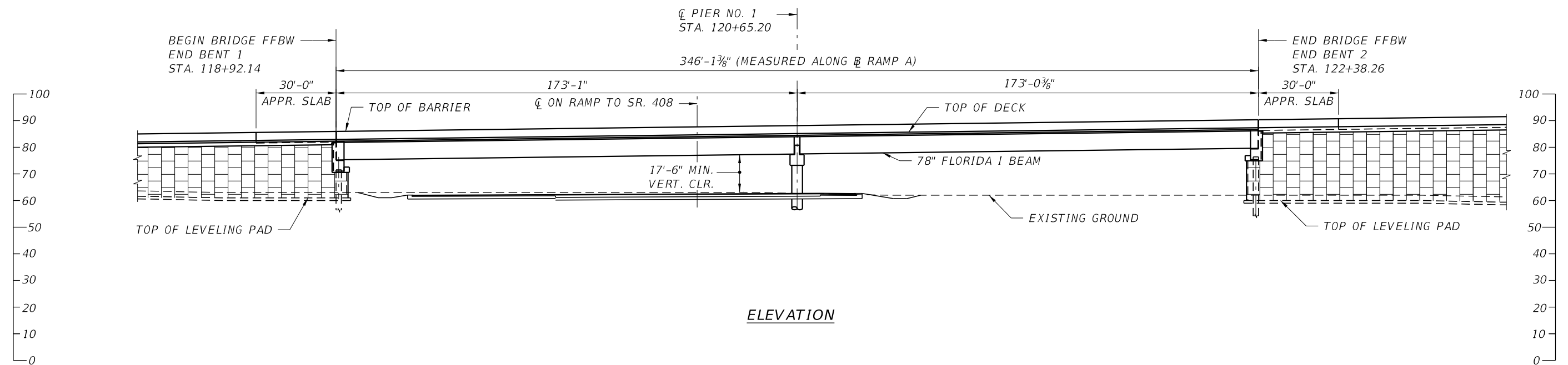
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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					408	ORANGE			

APPENDIX A.4

Bridge No. 5 - Plan and Elevation



PLAN



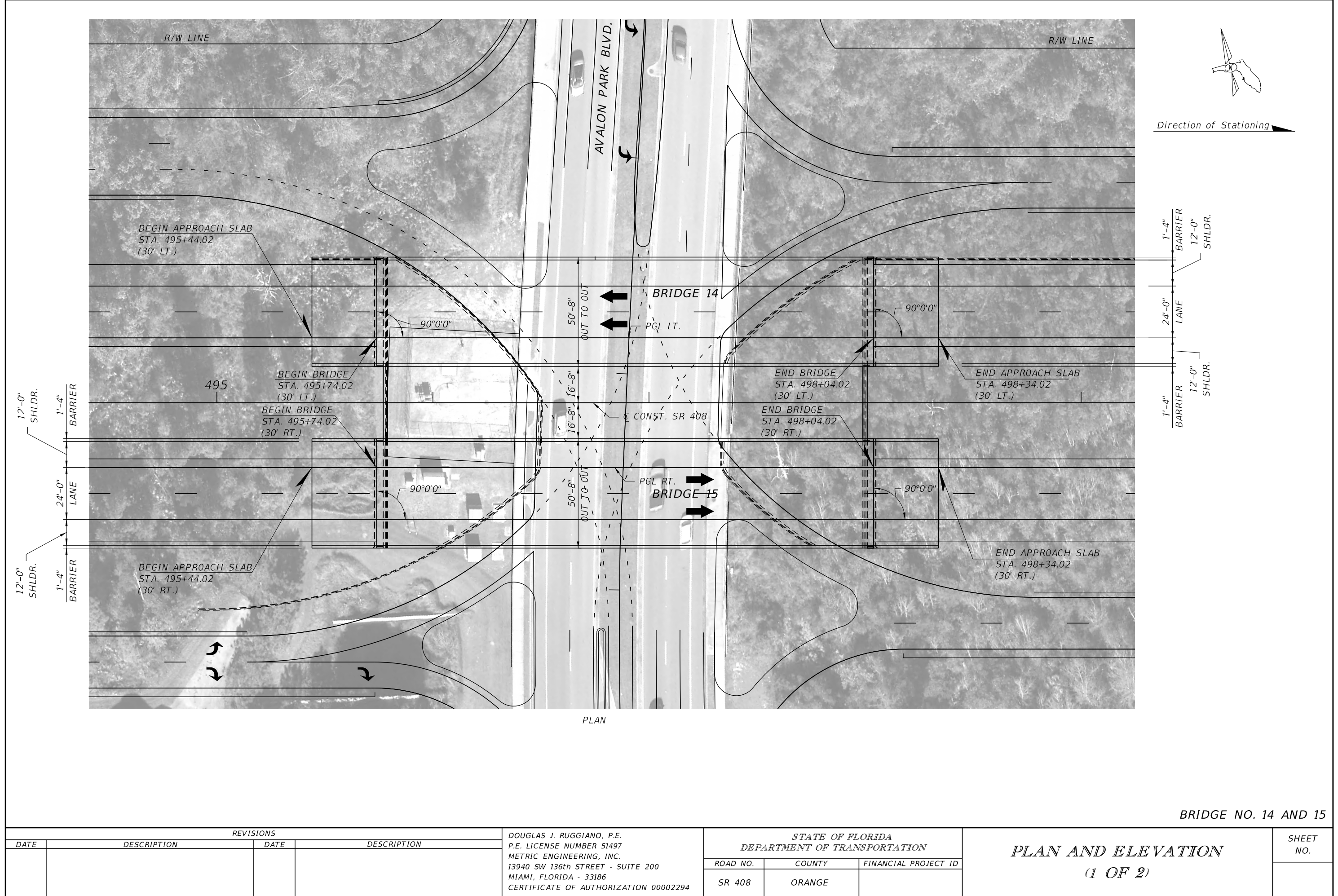
ELEVATION

BRIDGE NO. 5

REVISIONS				DOUGLAS J. RUGGIANO, P.E. P.E. LICENSE NUMBER 51497 METRIC ENGINEERING, INC. 13940 SW 136th STREET - SUITE 200 MIAMI, FLORIDA - 33186 CERTIFICATE OF AUTHORIZATION 00002294	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PLAN AND ELEVATION (1 OF 2)	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					408	ORANGE			

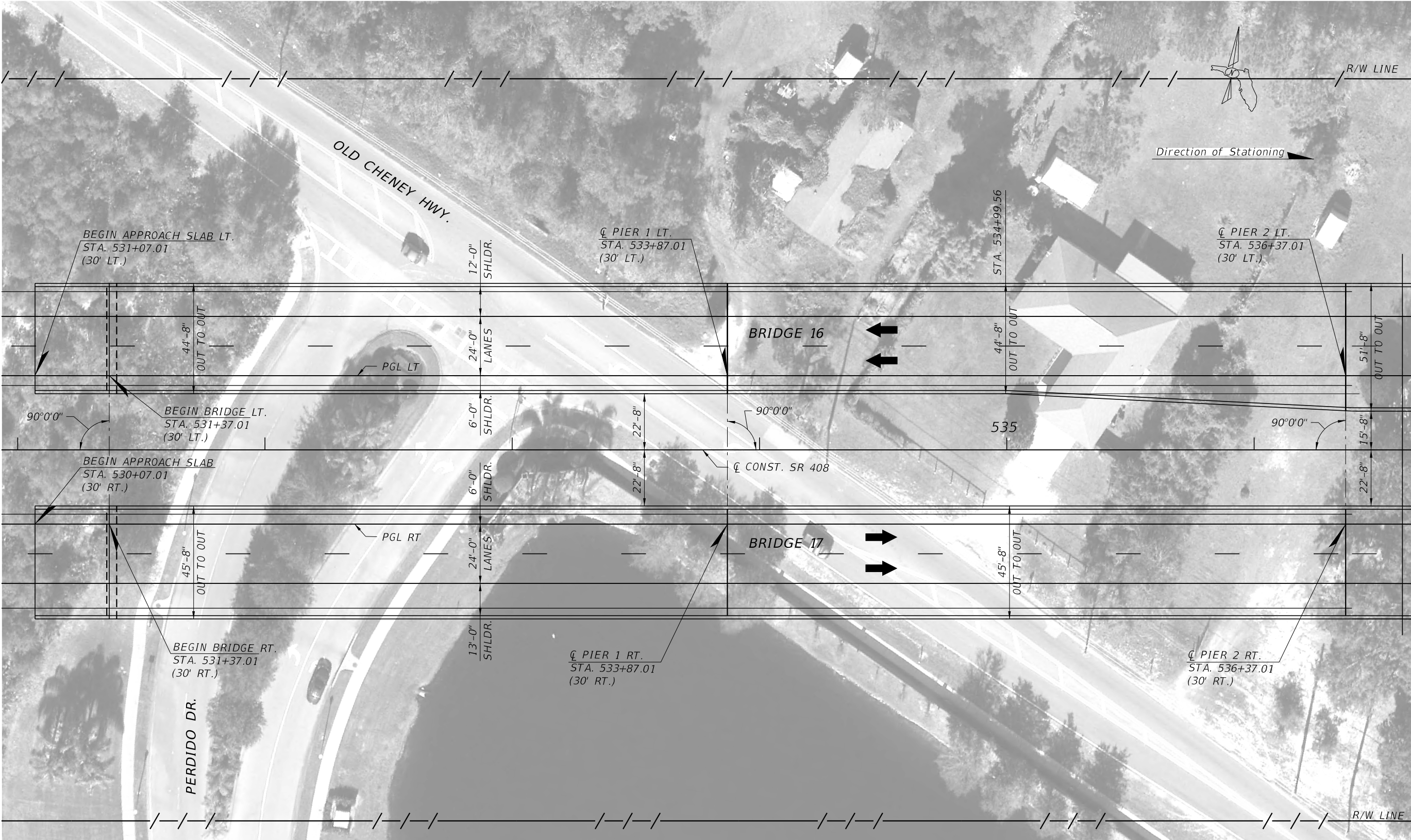
APPENDIX A.5

Bridge No. 14 & 15 - Plan and Elevation



APPENDIX A.6

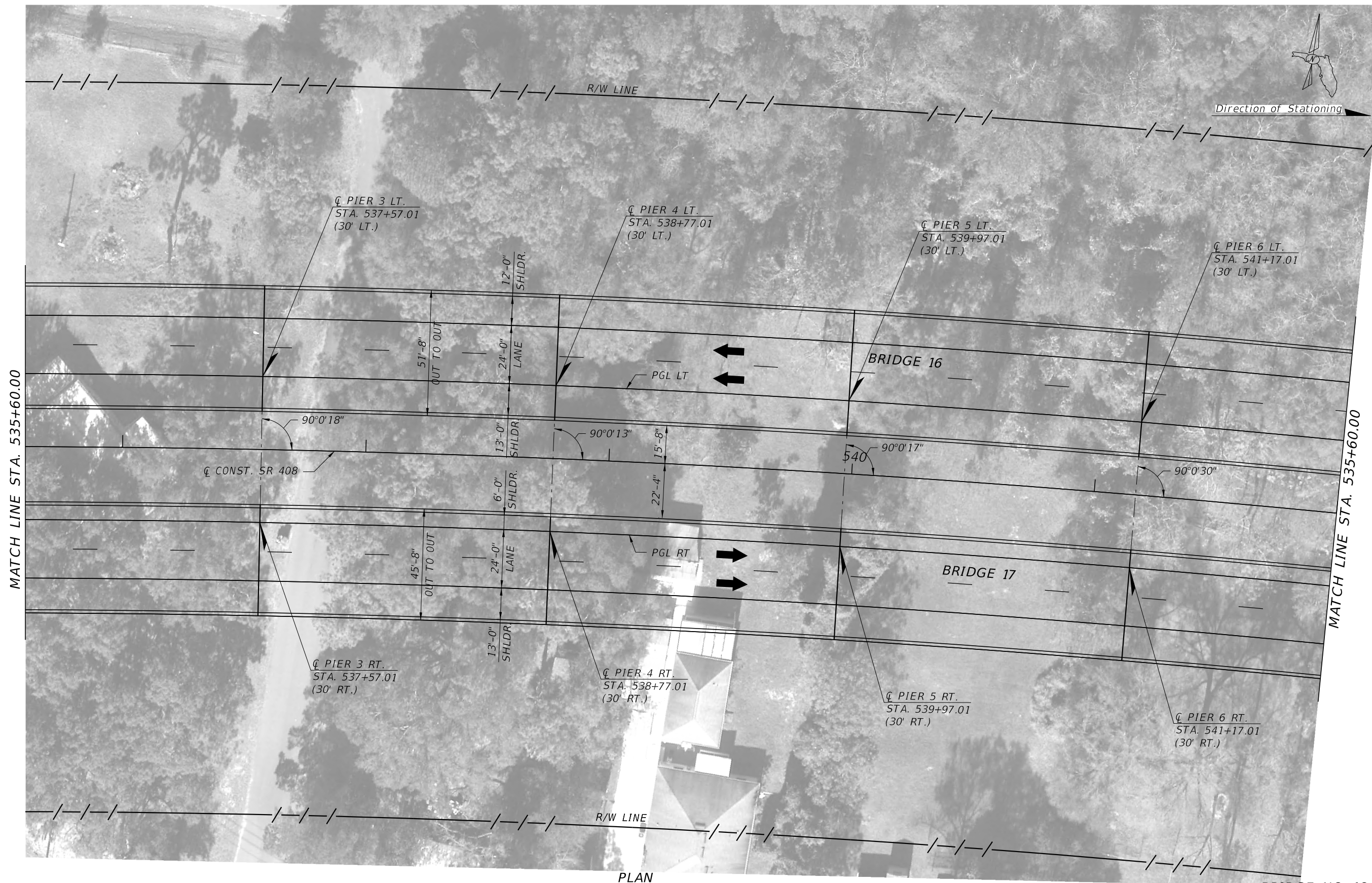
Bridge No. 16 & 17 - Plan Layout



PLAN

BRIDGE NO. 16 and 17

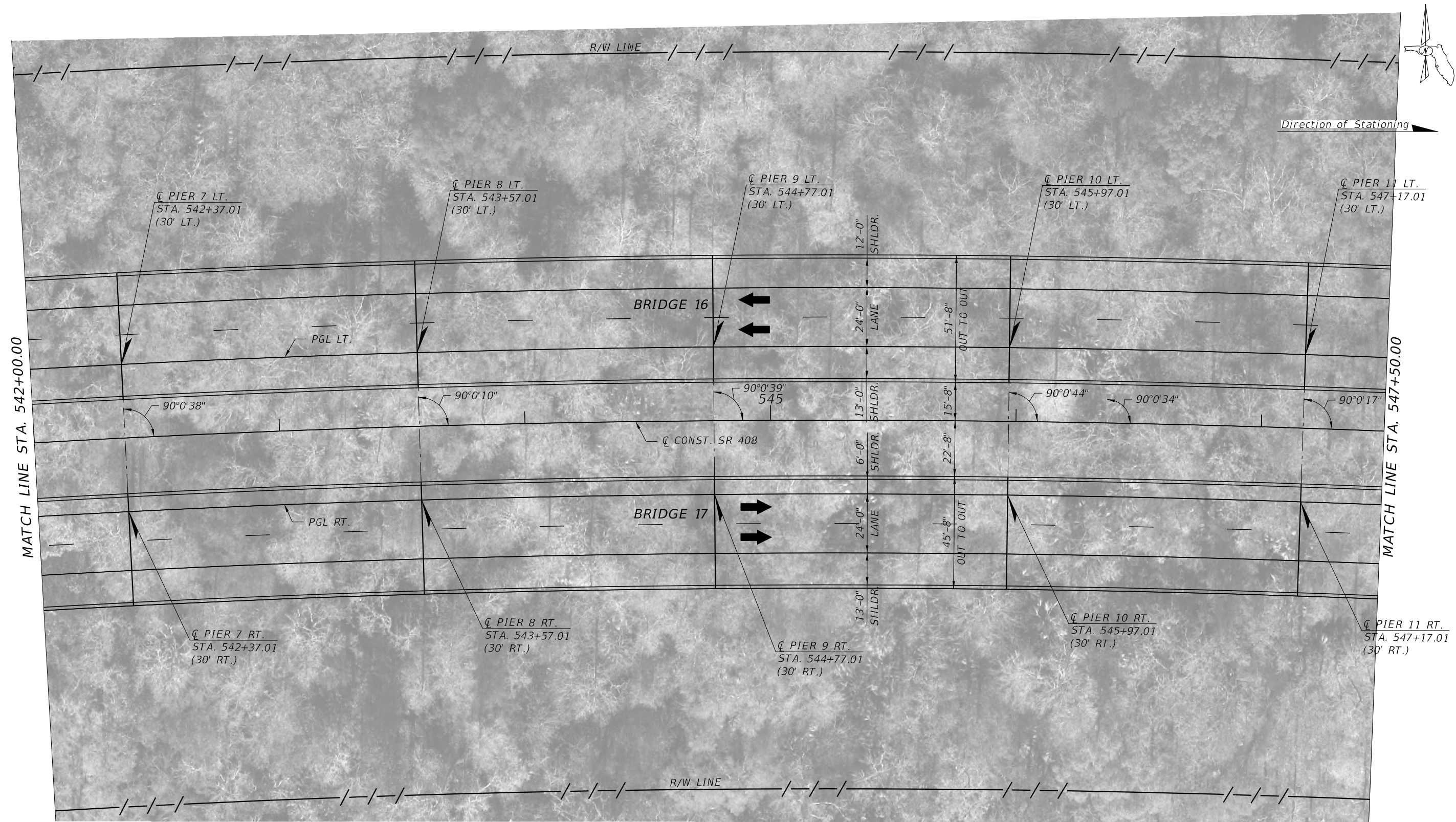
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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 408	ORANGE			



PLAN

BRIDGE NO. 16 AND 17

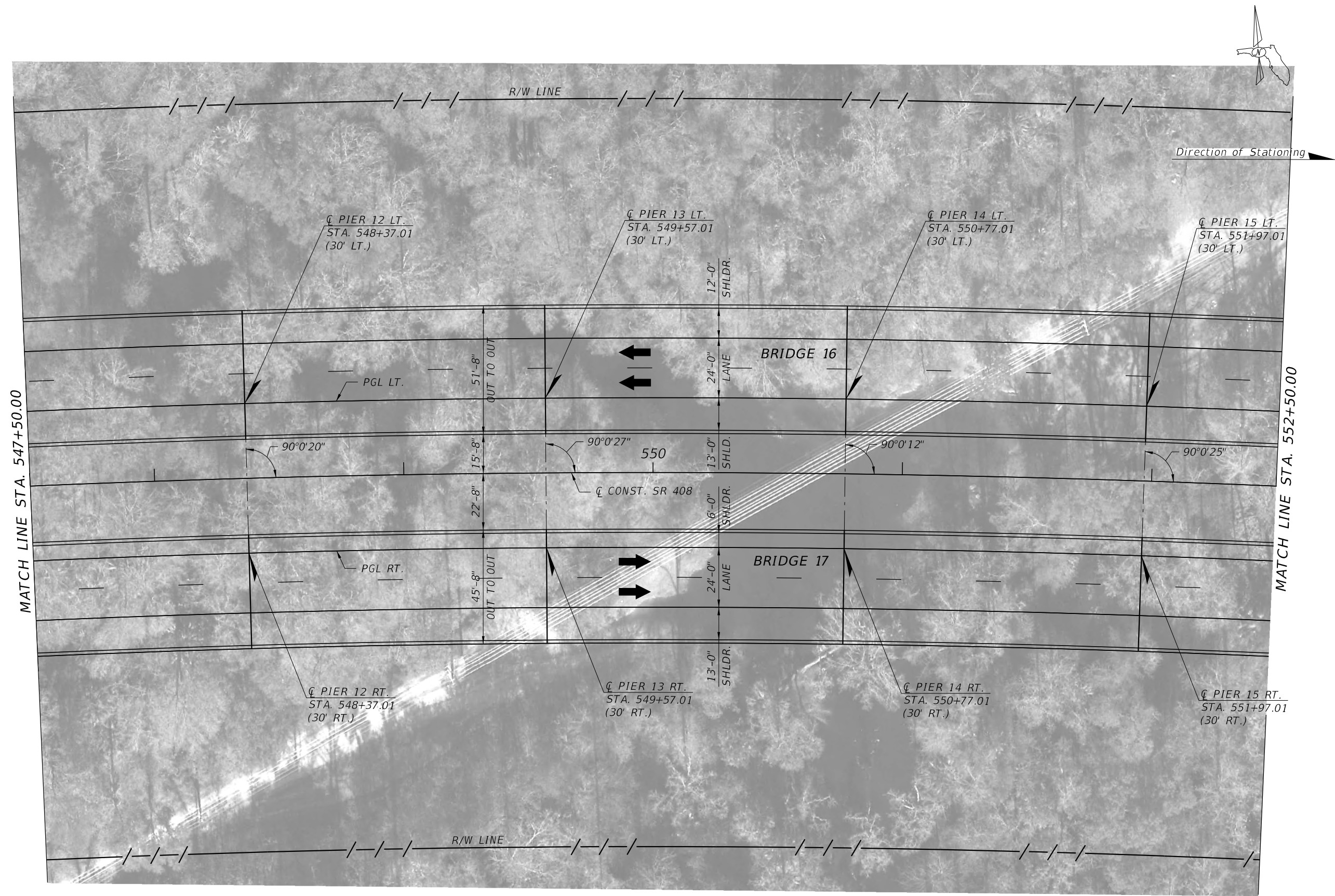
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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 408	ORANGE			



PLAN

BRIDGE NO. 16 AND 17

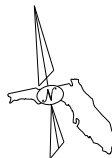
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DATE	DESCRIPTION	DATE	DESCRIPTION						
					ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 408	ORANGE			



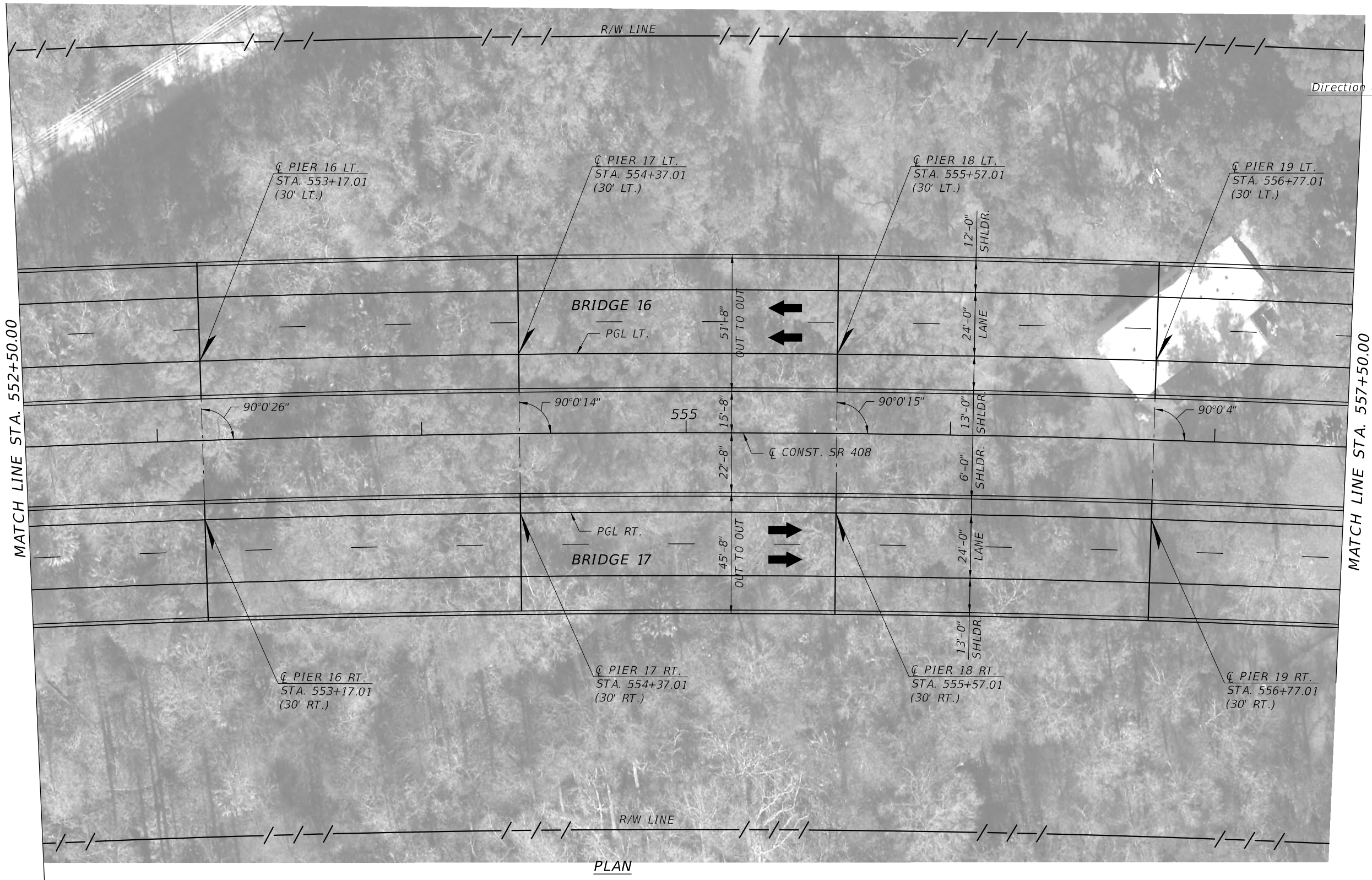
PLAN

BRIDGE NO. 16 AND 17

REVISIONS				DOUGLAS J. RUGGIANO, P.E. P.E. LICENSE NUMBER 51497 METRIC ENGINEERING, INC. 13940 SW 136th STREET - SUITE 200 MIAMI, FLORIDA - 33186 CERTIFICATE OF AUTHORIZATION 00002294	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PLAN AND ELEVATION (4 OF 10)	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 408	ORANGE			



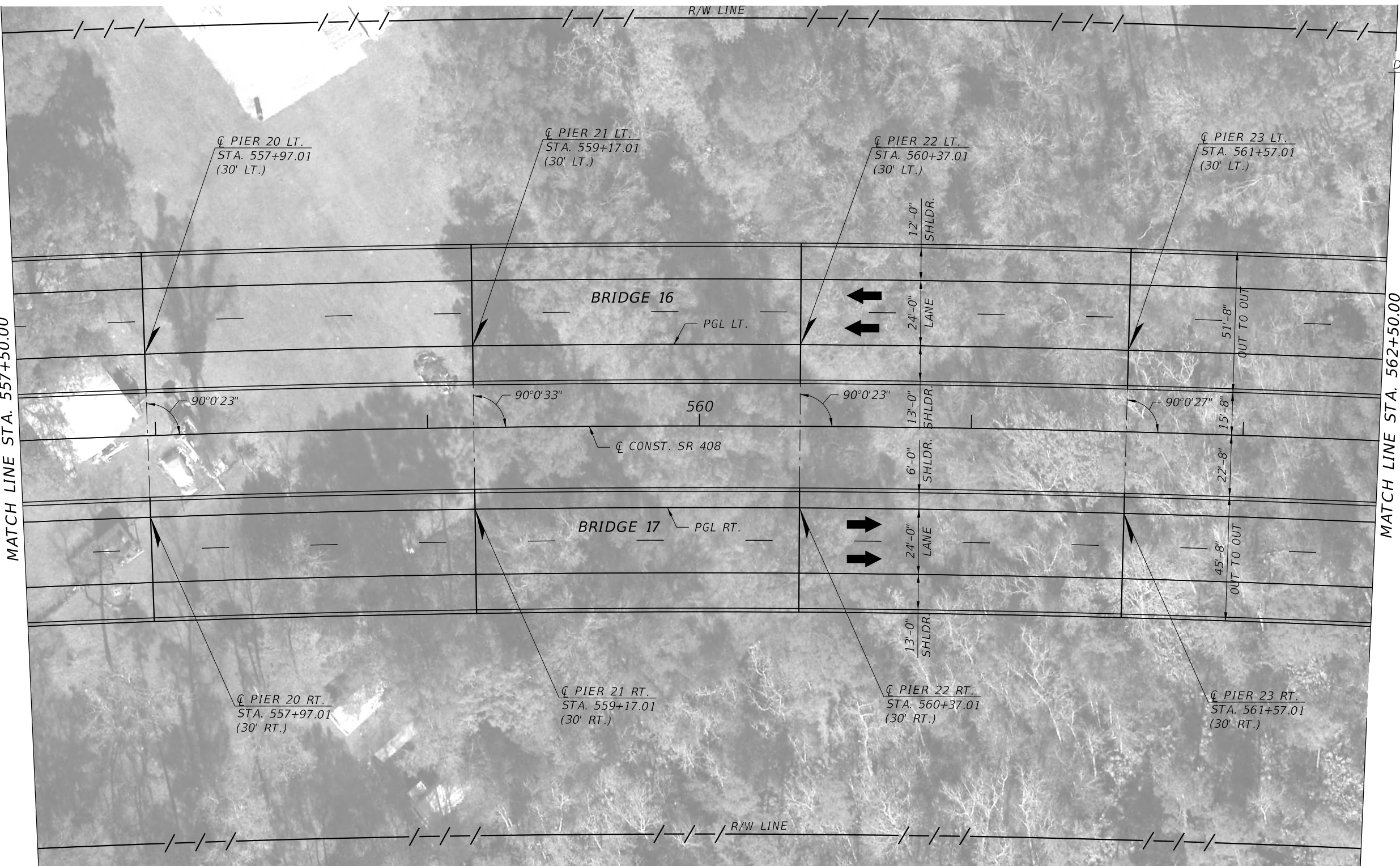
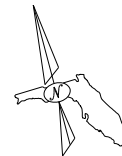
Direction of Stationing



PLAN

BRIDGE NO. 16 AND 17

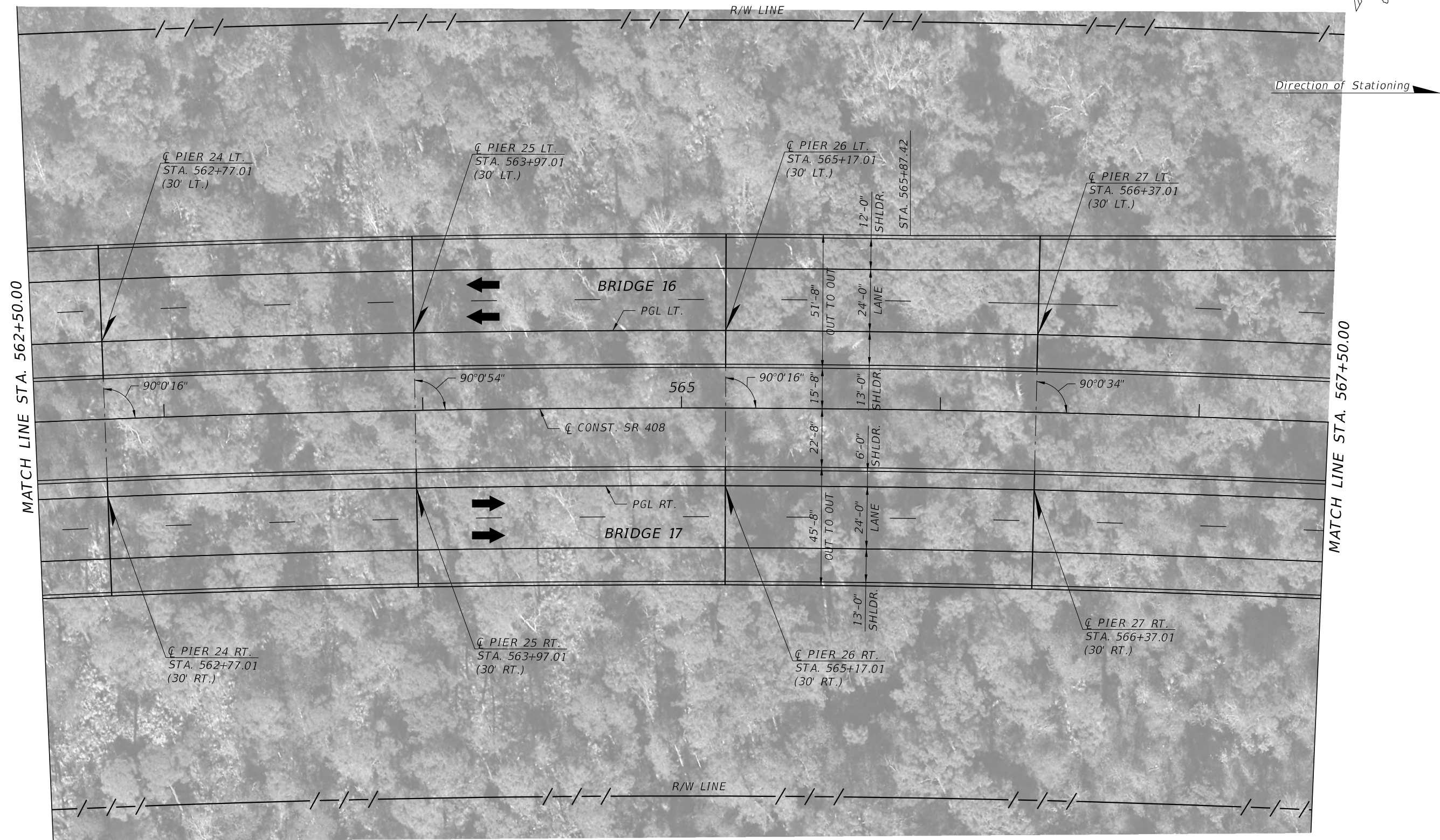
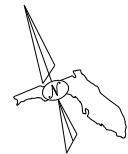
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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 408	ORANGE			



PLAN

BRIDGE NO. 16 AND 17

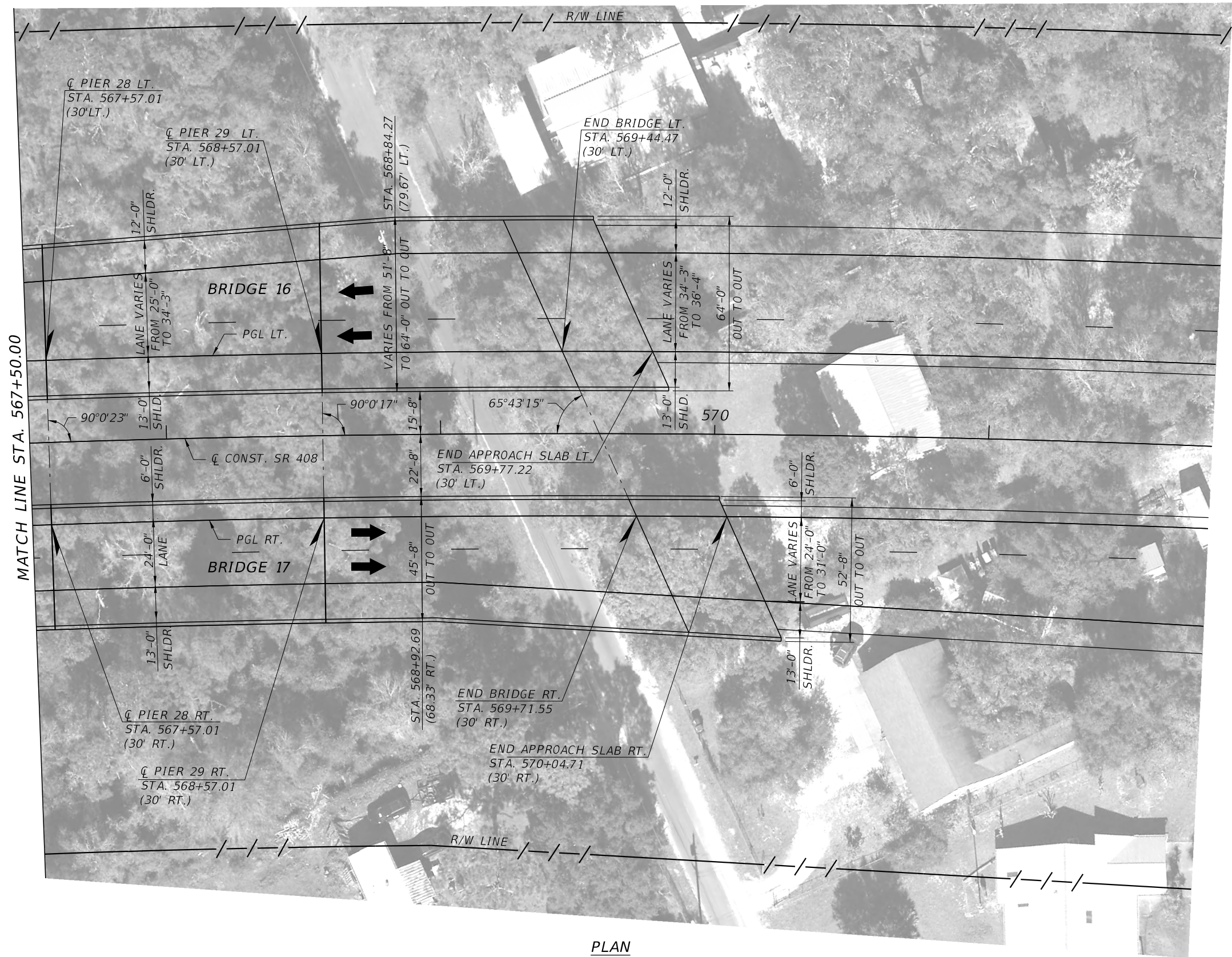
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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 408	ORANGE			



PLAN

BRIDGE NO. 16 AND 17

REVISIONS				DOUGLAS J. RUGGIANO, P.E. P.E. LICENSE NUMBER 51497 METRIC ENGINEERING, INC. 13940 SW 136th STREET - SUITE 200 MIAMI, FLORIDA - 33186 CERTIFICATE OF AUTHORIZATION 00002294	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PLAN AND ELEVATION (7 OF 10)	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 408	ORANGE			



Direction of Stationing

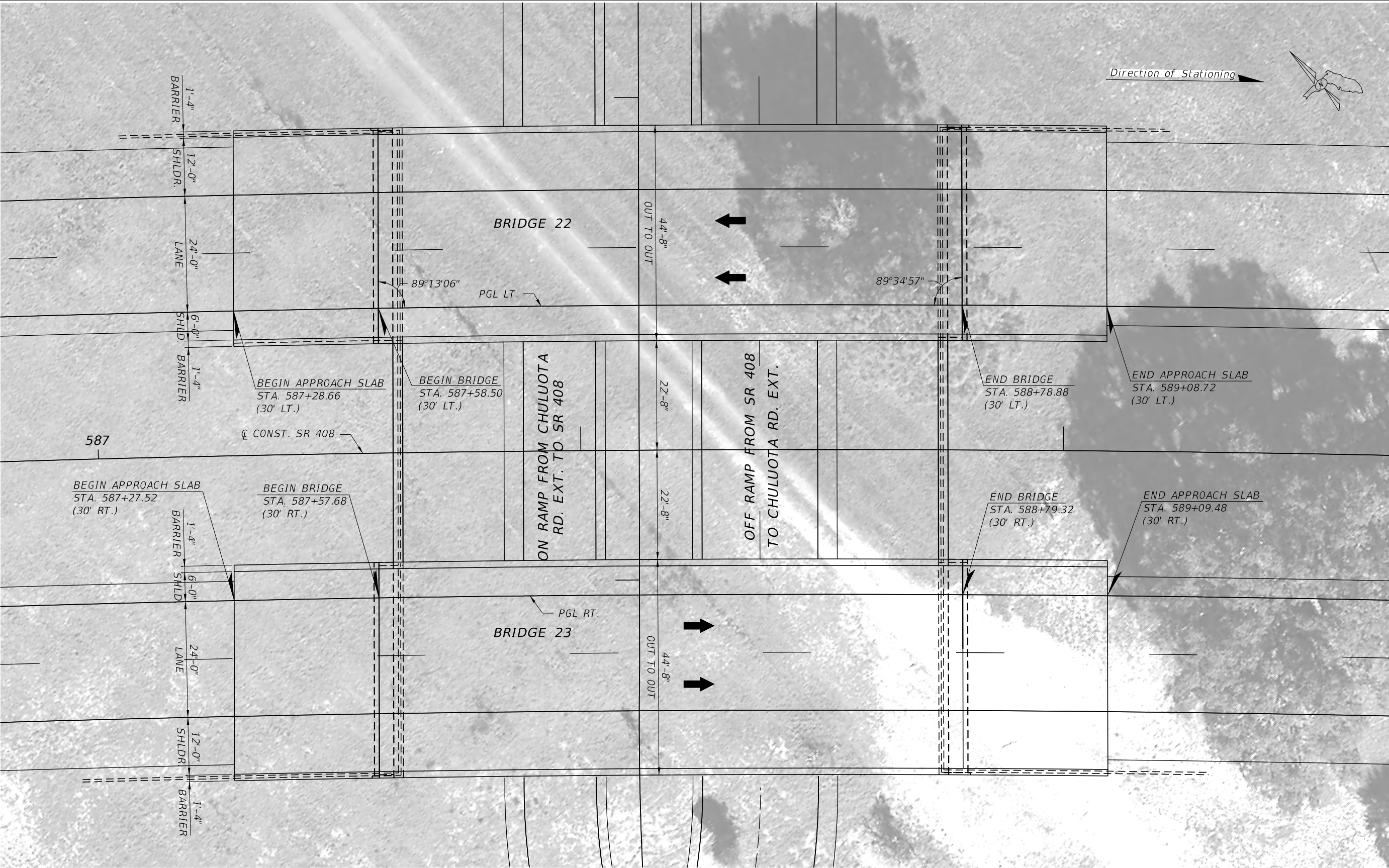
PLAN

BRIDGE NO. 16 AND 17

REVISIONS				DOUGLAS J. RUGGIANO, P.E. P.E. LICENSE NUMBER 51497 METRIC ENGINEERING, INC. 13940 SW 136th STREET - SUITE 200 MIAMI, FLORIDA - 33186 CERTIFICATE OF AUTHORIZATION 00002294	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PLAN AND ELEVATION (8 OF 10)	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 408	ORANGE			

APPENDIX A.7

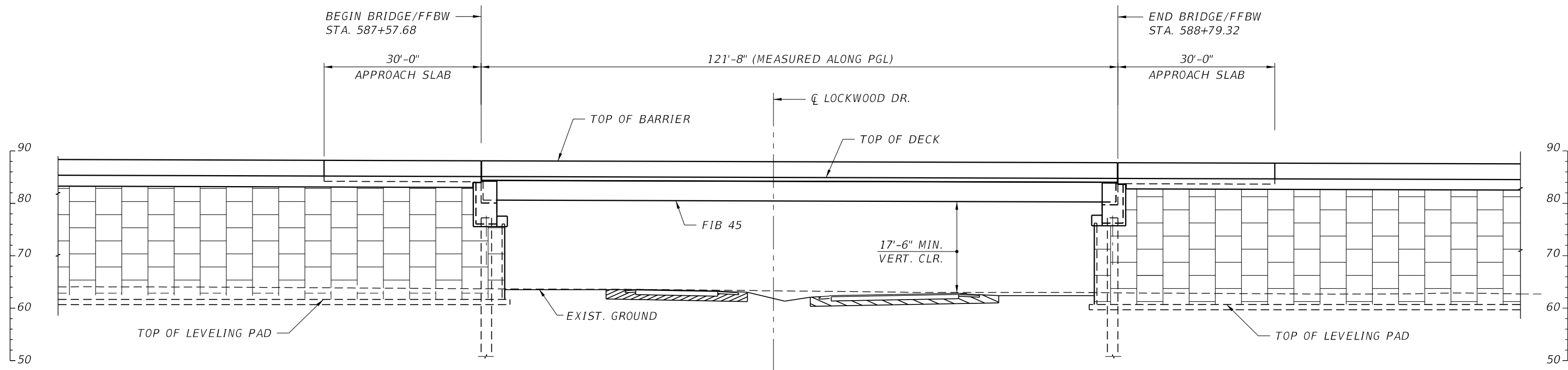
Bridge No. 22 & 23 - Plan and Elevation



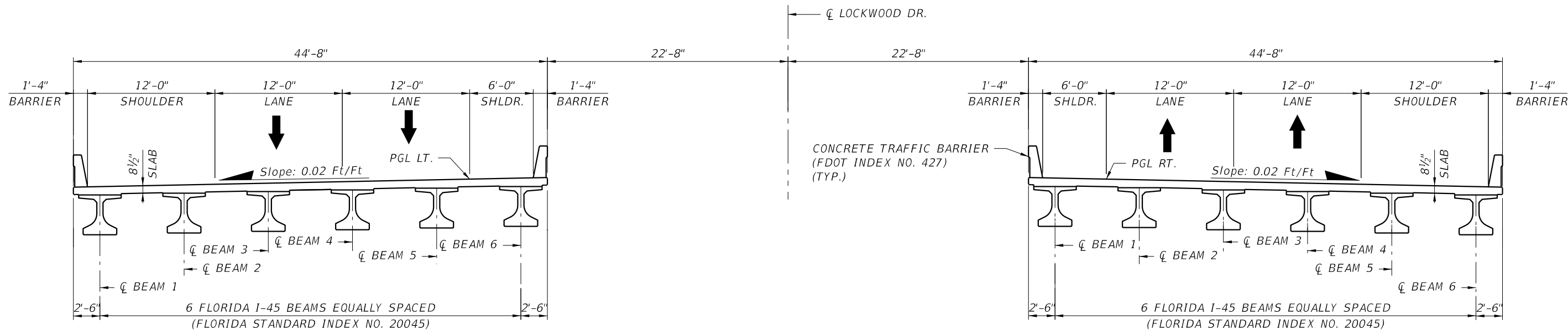
PLAN

BRIDGE NO. 22 AND 23

REVISIONS				DOUGLAS J. RUGGIANO, P.E. P.E. LICENSE NUMBER 51497 METRIC ENGINEERING, INC. 13940 SW 136th STREET - SUITE 200 MIAMI, FLORIDA - 33186 CERTIFICATE OF AUTHORIZATION 00002294	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PLAN AND ELEVATION (1 OF 2)	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 408	ORANGE			



ELEVATION
(BRIDGE 23 SHOWN, BRIDGE 22 SIMILAR)



**WESTBOUND
BRIDGE 22**

TYPICAL SECTION

**WESTBOUND
BRIDGE 23**

BRIDGE NO. 22 AND 23

REVISIONS				DOUGLAS J. RUGGIANO, P.E. P.E. LICENSE NUMBER 51497 METRIC ENGINEERING, INC. 13940 SW 136th STREET - SUITE 200 MIAMI, FLORIDA - 33186 CERTIFICATE OF AUTHORIZATION 00002294	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PLAN AND ELEVATION (2 OF 2)	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 408	ORANGE			