FINAL

Project Development & Environment Study

Hartwood Marsh Road

From US 27 to the Lake/Orange County Line

FOR

BY

Engineers & Planners

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EXECUTIVE SUMMARY

Lake County has conducted a Project Development and Environment (PD&E) Study that addresses the proposed roadway improvements to Hartwood Marsh Road in eastern Lake County, Florida. The project begins at US 27 in Lake County and extends eastward to the project terminus at the Orange County Line, a distance of approximately 4.65 miles.

The objective of this PD&E Study was to document the environmental and engineering analysis used by Lake County to reach a decision on the type, location and conceptual design of the required improvements to Hartwood Marsh Road. The proposed improvements are required to accommodate future traffic demand safely and efficiently. These proposed improvements consist of widening Hartwood Marsh Road to a four-lane divided urban roadway through the entire project limits.

The driving force for expanding the roadway is the projected growth in West Orange County and South Lake County and the resulting traffic that is expected from this development. Even with the expansion of SR 50 to a six-lane roadway, additional east-west capacity will be needed to adequately serve the projected increase in traffic volumes.

Preferred Alternative

The preferred roadway alignment generally follows the existing roadway corridor until Regency Hills. The alignment then curves into the Tarmac facility and exits at the northeast corner of the property where the road meets the existing Hartwood Marsh Roadway corridor. The project terminates at the Orange County line. The right-of-way needs for this alignment are described in the following paragraphs.

Between US 27 and Danbury Mill Boulevard, there is an existing 100 foot right-of-way width which is sufficient to accommodate the urban typical section. From Danbury Mill Boulevard to Hancock Road and holding the northern right-of-way line to avoid impact to the Kings Ridge subdivision, approximately 20 feet of right-of-way would be required on the south side of the road from the currently undeveloped properties to form a total right-of-way width of 100 feet.

From Hancock Road to the southwest corner of the Tarmac facility, the southern right-of-way line of Regency Hills is held, resulting in approximately 70 feet of right-of-way on the north side of the road. For this particular section, County records do not indicate any existing right-of-way north of the section line. The road alignment then shifts into the Tarmac facility at the southwest corner of the property and exits at the northeast corner of the property. The total right-of-way width is 120 feet through the facility.

The Tarmac facility will eventually be discontinuing operation at its current location and will be moving to an unmined area directly east of the north-south portion of Hartwood Marsh Road. The existing mined site will be reconstructed as a housing development where the realigned Hartwood Marsh Road would serve as the main road through the development. Old Hartwood Marsh Road at the point where the proposed alignment curves to the northeast, would have to be realigned to intersect the new roadway in order to maintain access to the Flat Lake area. A cul-de-sac would be constructed on old Hartwood Marsh Road, north of Flat Lake Road. The remaining portion of Hartwood Marsh Road north of the cul-de-sac would be used strictly for vehicles accessing the mine.

In the northeast corner, in order to maintain access to the existing mining operation and to also provide access to the new mining site, the existing 2-lane Hartwood Marsh Road would have to be realigned to intersect with the new alignment. The 2-lane road would terminate at the current entrance to the mining operation.

From the northeast corner of the Tarmac property to approximately Lover's Lane, the south right-of-way line is held, requiring 30 feet of property to the north for a total right-of-way width of 120 feet. From Lover's Lane to the Orange County line, the alignment must transition to match the existing roadway at the county line. The proposed Orange County right-of-way width for Marsh Road is 120 feet; however, the Lake County right-of-way width is shown as 100 feet from the eastern property line of Avalon Estates to the county line.

From the eastern limits of Avalon Estates to the county line, existing Hartwood Marsh Road shifts outside the existing right-of-way. Because the proposed centerline needs to match the existing road on the Orange County side, a shift of the road to the south is necessary. As a result, a narrow sliver of right-of-way is required from the Avalon Estates subdivision to the south. To minimize impact to the functioning orange grove along the southern edge of pavement, the required right-of-way can be reduced by 10 feet to a total of 50 feet south of the centerline of the road. The right-of-way need is reduced to a width between 23 and 53 feet. On the north side of the road there is a large metal storage building close to the road. By reducing the right of-way to 50 feet, from the centerline, the offset to the building is maximized. Approximately 0 to 28 feet of right-of-way would be required on the north side of the road from the mid-section line to the county line. Both Sadler Court and Flynn Court do not have dedicated road right-of-way. Some property acquisition may be necessary to provide transitions to the existing dirt roads.

Hancock Road Sub-Alternative

A sub-alternative to both Alignment 1 and 2 was considered. This alternative includes extending Hancock Road to US 27 and was considered in the traffic analysis to determine if the extension of Hancock Road reduced the required lanes on Hartwood Marsh Road between US 27 and Hancock Road. The traffic analysis demonstrated that extending Hancock Road did not reduce the required number of travel lanes on Hartwood Marsh Road, west of Hancock Road. The proposed alignment of the South Hancock Extension begins at the southern terminus at Hartwood Marsh Road and extends to the south to connect to US 27 at Lake Louis Road. It is assumed that the South Hancock Road extension will be constructed as two lanes of a future four- lane typical section.

It should be noted that this alternative was only evaluated from a traffic perspective. Environmental, geotechnical, archeological, cultural data would require further investigation, should the County deem this alternative feasible.

PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing with TEI Engineers & Planners, Inc., a Florida corporation, authorized to operate as an engineering business, EB#6185, by the State of Florida Department of Professional Regulation, Board of Engineers, and that I have prepared or approved the evaluation, findings, opinions, conclusions, or technical advice hereby reported for the Hartwood Marsh Road PD&E Study for Lake County.

I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

SIGNATURE: _____

NAME: John C. Moore, Jr., P.E.

FIRM: TEI Engineers & Planners

P.E. No.: 42664

DATE: 6/30/04

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1.0 Summary

1.1 Commitments

This Project Development and Environment (PD&E) Study addresses the proposed roadway improvements that are required for the expansion of the Hartwood Marsh Road corridor in Lake County, Florida. The project begins at US 27 in Lake County and extends eastward to the project terminus at the Orange County Line, a distance of approximately 4.65 miles. The project location is shown in Figure 1-1. The existing posted speed limit is 40 miles per hour throughout the corridor.

In Lake County, Hartwood Marsh Road has been classified as a transitioning facility and is situated on the outskirts of the City of Clermont. Continued population and employment growth in Clermont has generated a steady increase in travel demand. Hartwood Marsh Road serves employment based commuter trips, as well as service related and recreational trip purposes. Hartwood Marsh Road is an important link in the highway network, particularly from the standpoint of providing an alternative to SR 50. The corridor traverses a variety of land uses and serves diverse surface transportation needs. The land uses include industrial, commercial/business, residential and agricultural/undeveloped.

Five typical sections comprise this segment of Hartwood Marsh Road. Two sections include a 5-foot paved sidewalk near the intersection with U.S. 27. In general, the travelway has a natural shoulder for the project length. Stormwater runoff from the sections is collected in roadside ditches that discharge into stormwater treatment facilities or surrounding surface waters.

The driving force for expanding the roadway is to serve the existing development and projected growth in the Clermont area of Lake County. Numerous commercial and residential developments are being planned in addition to the construction that is currently underway. This development is anticipated to generate a significant amount of additional traffic along SR 50, some of which will be diverted to Hartwood Marsh Road.

There are no commitments at this time for the Hartwood Marsh Road project corridor.

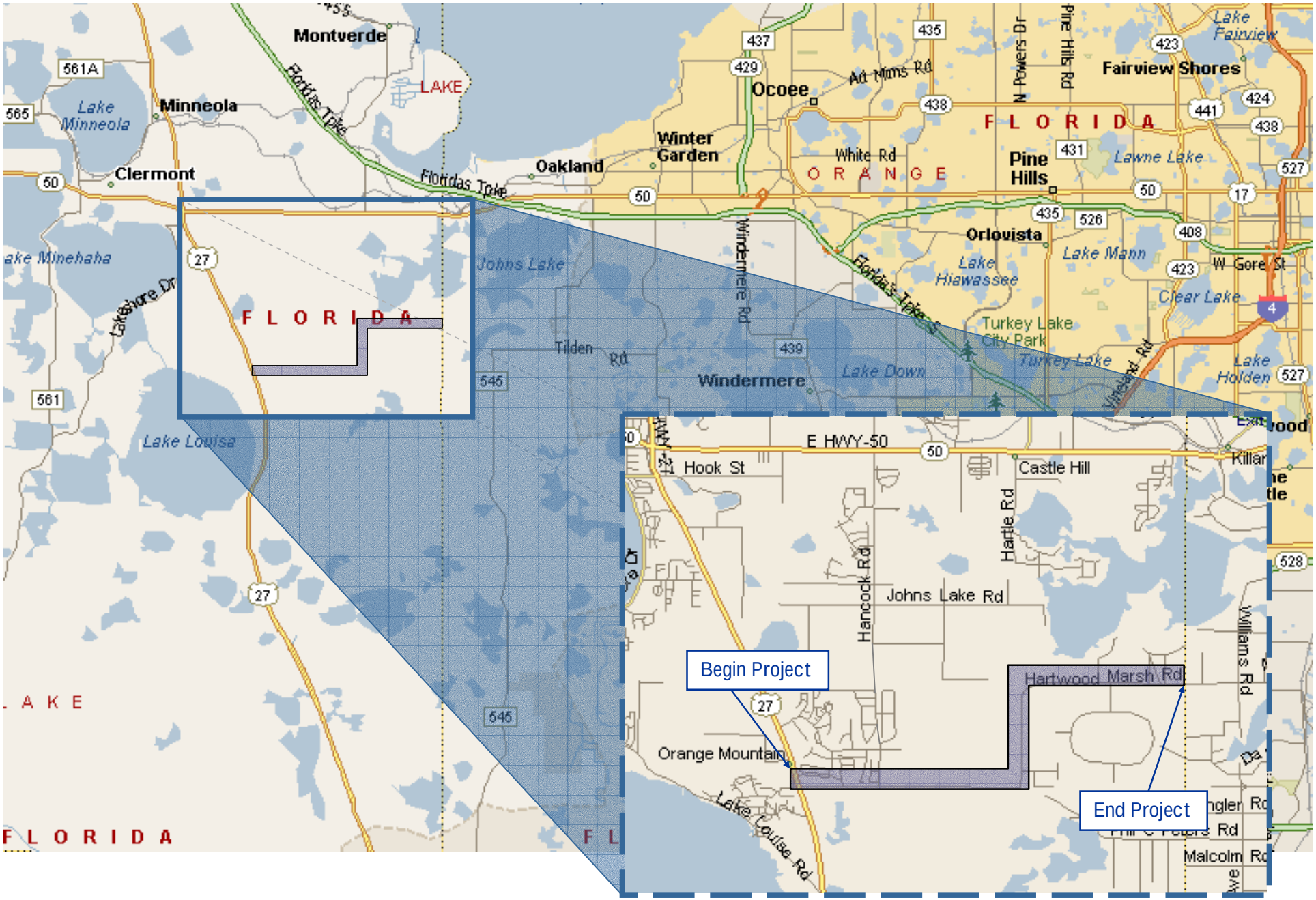
1.2 Recommendations

This section summarizes the design recommendations for the preferred build alternative. Detailed analysis of the engineering and environmental issues associated with the preferred alternative is presented in Section 9 of this Preliminary Engineering Report.

The Hartwood Marsh Road corridor evaluated as one segment, as the entire study segment is similar in engineering and environmental characteristics.

1.2.1 Study Alternatives

Several alternatives were developed and evaluated for this project, including the No-Build and two Build alternatives (see Section 8 of this report). The Build Alternatives considered included the Build 1 scenario which consists of the 4-laning of Hartwood Marsh Road and the Build 2 scenario consists of 4-laning Hartwood Marsh Road and the extension of South Hancock Road to the south to intersect with US 27 and Lake Louisa Road.



TEI Engineers & Planners	Figure No: 1-1	Project Location Map Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line

1.2.2 Alternatives Evaluation

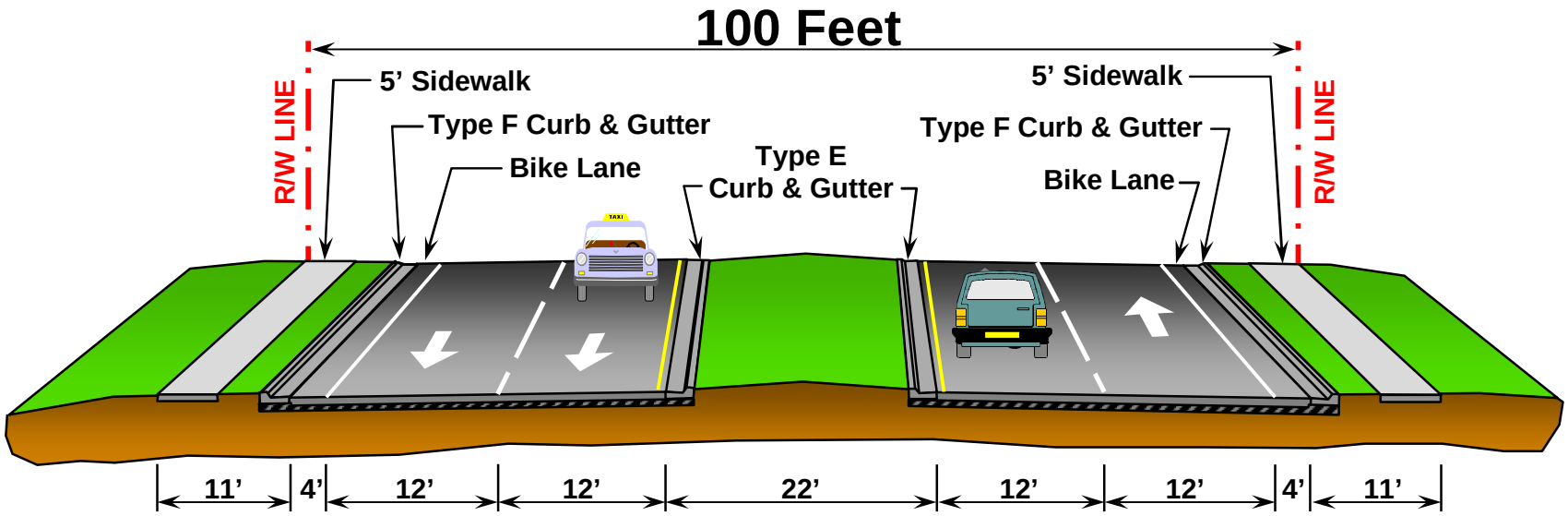
As discussed in Section 7 of this report, the only corridor considered for this transportation improvement was the existing Hartwood Marsh Road corridor. The alternative that was selected from this initial comparative analysis was further refined and the costs and impacts associated with the recommended improvements are included in Chapter 9 of this report.

1.2.3 Recommended Typical Section

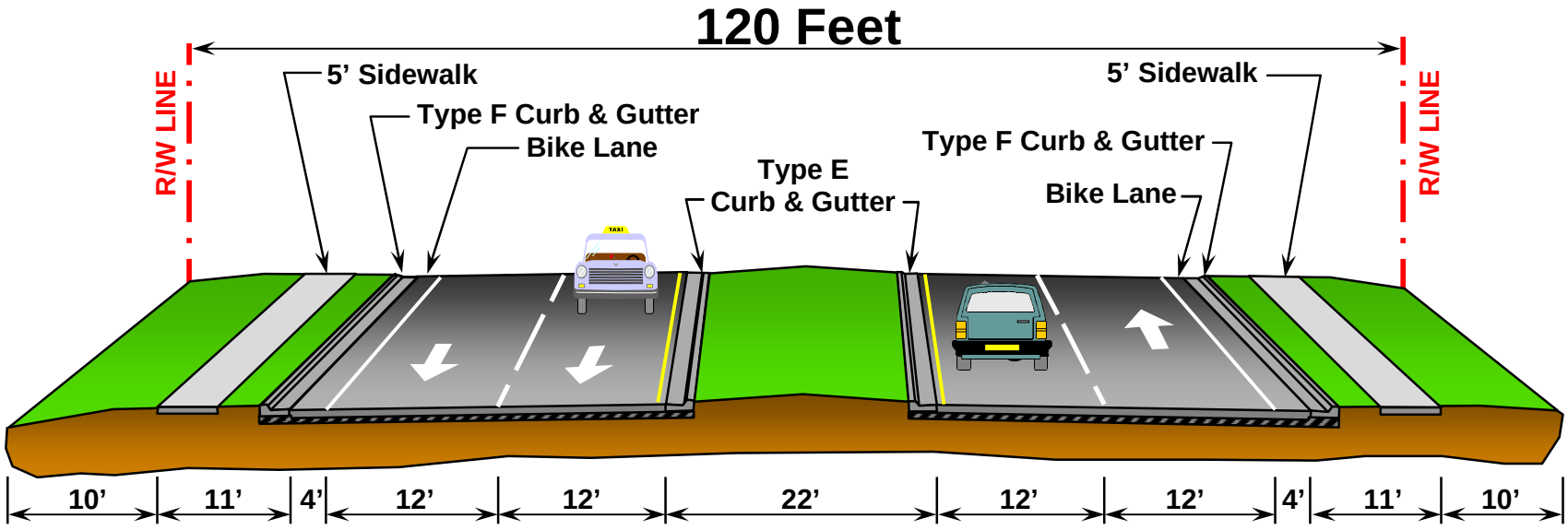
The proposed roadway is intended to be an urban corridor. In general the urban typical section is a four-lane section with two twelve-foot travel lanes in each direction. A four-foot bicycle lane, two-foot Type F curb and gutter and five-foot sidewalks are provided along both sides of the roadway. The proposed median is 22 feet in width with Type E curb and gutter. Storm water runoff is collected in curb inlets and pipe to retention ponds. The proposed right-of-way varies between 100 and 120 feet. An additional typical section is also included, showing a 10-foot multi-purpose trail on one side of the roadway. This typical section is included as an option, should the County decide to build a trail in this area. Figure 1-2 illustrates the urban typical sections.

1.2.4 Recommended Roadway Alignment

The preferred roadway alignment generally follows the existing roadway corridor until Regency Hills. The alignment then curves into the Tarmac facility and exits at the northeast corner of the property where the road meets the existing Hartwood Marsh Roadway corridor. The project terminates at the Orange County line.



Sta 10+00.00 (U.S. 27) to Sta 46+56.03 (Hancock Road)
Sta 200+63.56 to Sta 227+01.99 (County Line)



Sta 46+56.03 (Hancock Road) to Sta 200+63.56

Design Speed = 45 mph

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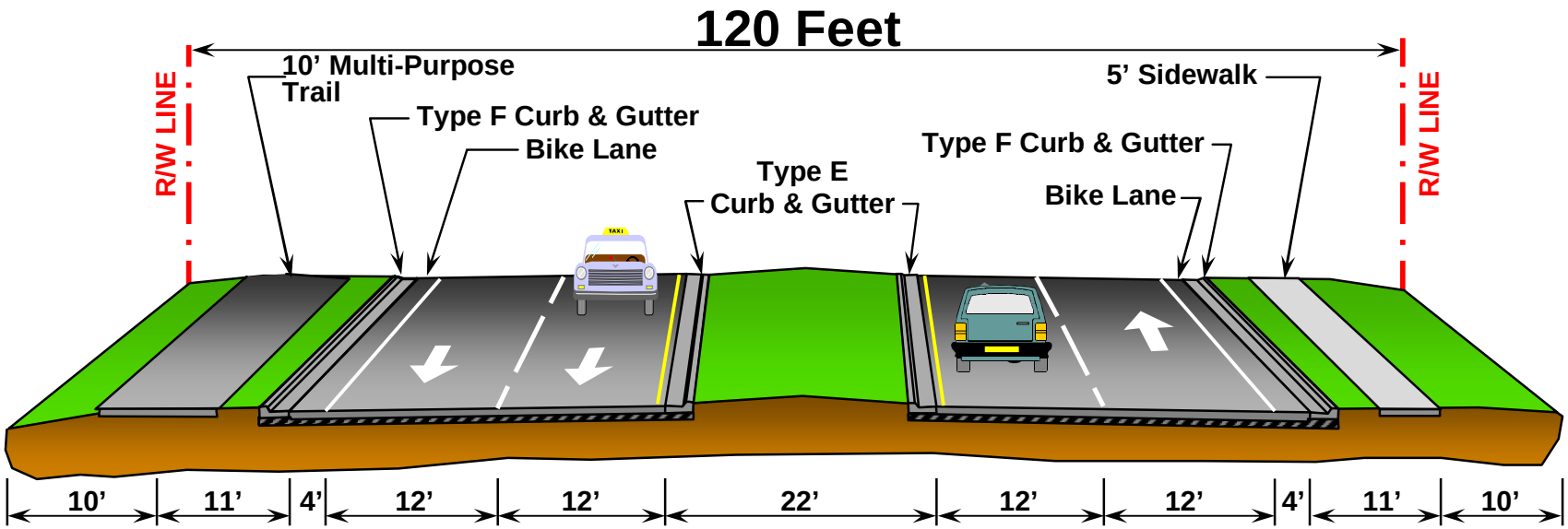
Figure No: 1-2a

Recommended Typical Sections
Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line



Optional Typical Section for Hartwood Marsh Road
With a Ten-Foot Multi-Purpose Trail on One Side
Sta 46+56.03 (Hancock Road) to Sta 200+63.56

Design Speed = 45 mph

2.0 Introduction

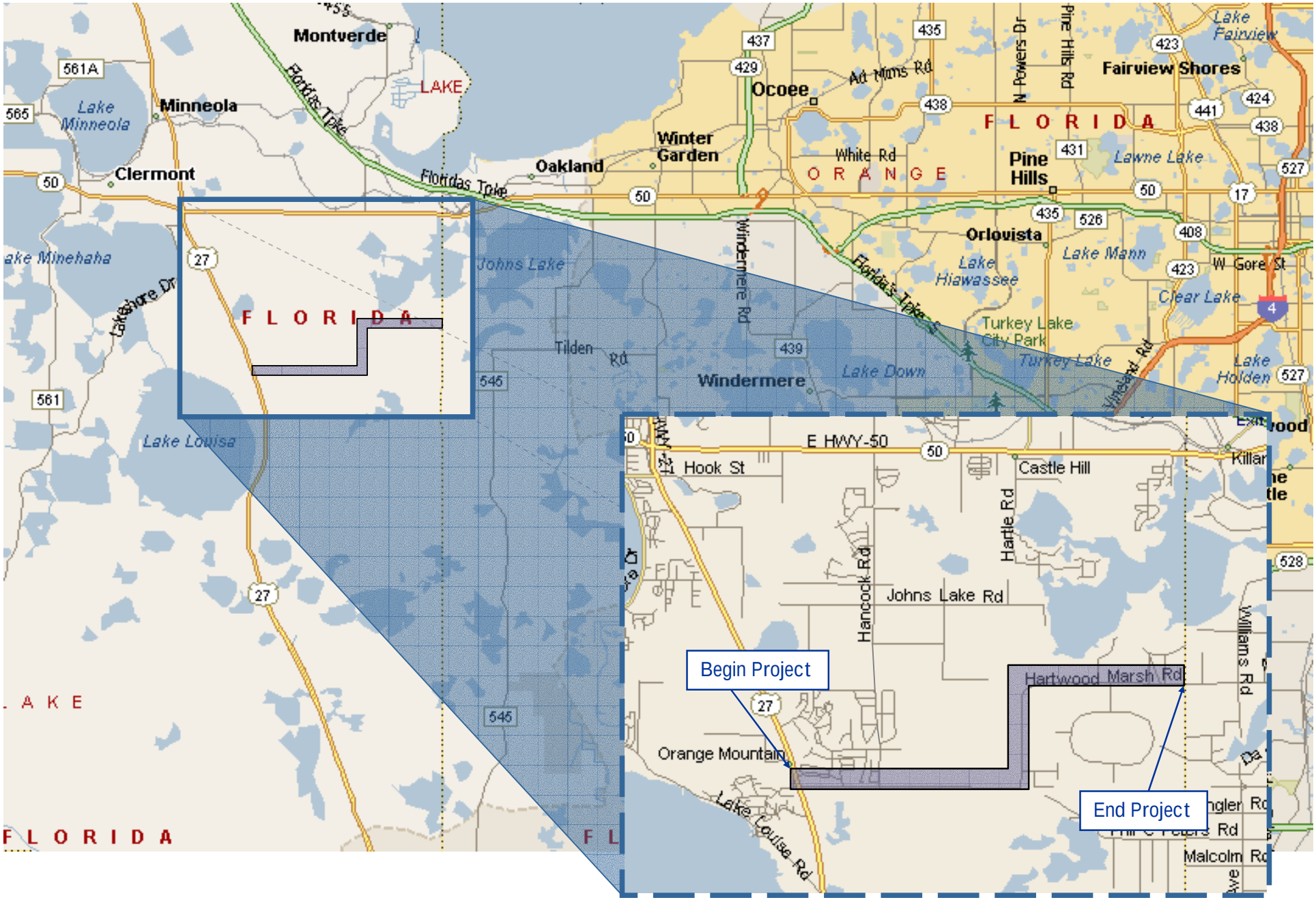
2.1 Purpose

The purpose of this Preliminary Engineering Report is to document the findings of the engineering evaluation for the proposed improvements to the Hartwood Marsh Road transportation corridor in South Lake County, Florida. This report presents the engineering data and analysis needed to define the proposed project improvements. It documents the existing physical features of the roadway and the existing environmental characteristics of the project corridor. This report also defines the need for improvement, including the analysis of existing and projected traffic conditions that establish the requirements for the proposed project improvements. The results of the analysis of the viable alternatives are documented, including the presentation of an alternatives evaluation matrix that provides the framework for comparing the relative strengths and weaknesses of the individual alignment alternatives developed for this study. From this evaluation matrix, an alternative was then identified for which a preliminary design analysis and conceptual plans were prepared, and the social, economic and environmental impacts were evaluated.

This report will serve as the document of record to move this project forward and to support the subsequent engineering decisions as the project advances through design and construction phases. This PD&E study was conducted in accordance with Florida Department of Transportation and Federal Highway Administration requirements.

2.2 Project Description

The proposed action involves the expansion of the existing Hartwood Marsh Road transportation corridor through south Lake County, Florida. The project begins at US 27 in Lake County and extends eastward to the project terminus at the Lake/Orange County Line, a distance of approximately 4.65 miles. The project location map is shown in Figure 2-1.



TEI Engineers & Planners	Figure No: 2-1	Project Location Map Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line

3.0 Need for Improvement

3.1 Need for Improvement

The need for improvement to this facility is based on several factors. The first of these factors is to provide for additional capacity to meet the projected increase in traffic volumes in the area. A traffic memorandum was developed in conjunction with this project, *Draft Design Traffic Report Technical Memorandum for Hartwood Marsh Road, From US 27 to Orange County* Line, dated January 2004. This memorandum identifies and documents the need for additional lanes along Hartwood Marsh Road through the project area. The second factor is the need to improve safety on Hartwood Marsh Road. With the anticipated traffic growth in the area, the number of accidents can be expected to increase if no improvements are made to the roadway system. In addition, improvements to Hartwood Marsh Road will provide for pedestrian and bicycle facilities, which will further enhance the safety of pedestrians and bicyclists on the roadway. Third, improvements to Hartwood Marsh Road will help meet the social/economic demand of the area. Finally, the proposed improvements are consistent with the Lake County Comprehensive Plan. This section of the report presents the findings relative to each of these areas and a review of the recommendations presented by the local comprehensive planning efforts.

3.2 Deficiencies

3.2.1 Capacity

A No-Build Alternative analysis was conducted for the Hartwood Marsh Road corridor to document the need for additional capacity/geometric improvements. The No-Build Alternative is defined to be the existing Hartwood Marsh Road facility as it exists today with all other planned and programmed improvements assumed to be in place.

No-Build projected Year 2028 Annual Average Daily Traffic (AADT) volumes on Hartwood Marsh Road from west of US 27 to the Orange County Line range from 12,200 vehicles per day (vpd) west of US 27 to 28,000 vpd east of US 27 and 17,700 vpd west of the County Line. These projected volumes do not include the extension of South Hancock from Hartwood Marsh Road to US 27.

In the No Build Design Year 2028, all of the roadway segments along Hartwood Marsh Road between US 27 and the Orange County Line are projected to operate below the minimum acceptable Level of Service (LOS) D, with the exception of the segment west of US 27. In addition to these roadway deficiencies, the signalized intersection of US 27 at Hartwood Marsh Road can be expected operate below the minimum acceptable LOS D.

3.3 Safety

Crash data was available for the study corridor, for the period between July 1999 through June 2002. During this three-year period, 54 collisions were recorded along the project corridor. These crashes resulted in no fatalities, 45 injuries, and an approximate economic loss of $330,000.

A good measure of identifying high crash locations is the safety ratio (also called A/C ratio), which is a comparison of the actual and critical crash rates. Segments with a safety ratio equal to or greater than 1.0 are considered high crash locations. Based on the crash records over the three year period analyzed, the safety ratio is greater than one in each of the three year period analyzed

for the study area. With the anticipated traffic growth in the area, the number of crashes can be expected to increase if no improvements are made to the roadway system. However, it should be noted that the majority (average of 78% over three year period) of the reported collisions occurred in the vicinity of the intersection of US 27 at Hartwood Marsh Road.

A review of Table 4-3 shows that a majority of the collisions at the critical intersections are angle type, which in this case, are the results of traffic congestion and the lack of exclusive turn lanes in some locations. The proposed expansion of the Hartwood Marsh Road facility will better accommodate the projected number of trips and would likely have a positive impact on reducing the number of crashes in the corridor. As significant changes in the roadway and roadway cross sections are likely, it is difficult to draw a direct comparison between existing conditions and those that will occur if the corridor is improved.

3.4 Consistency with Transportation Plans

The proposed improvements to Hartwood Marsh Road, from US 27 to the Lake County Line from two lanes to four lanes are consistent with the following transportation plan:

- Southwest Orange and Southeast Lake Counties Transportation Alternatives Study (SOCTAS) identifies the need to widen Hartwood Marsh Road from US 27 to the County Line

3.5 Social/Economic Demands

The Future Land Use Maps for Lake County shows that land use along the Hartwood Marsh Road corridor will remain predominately rural with urban expansion. As the area continues to grow, an acceptable level of service must be provided on Hartwood Marsh Road for police, fire and other emergency services. Access, via roadways with acceptable levels of service, to businesses, schools, churches and other community centers must be maintained in the future. The quality of service provided by Hartwood Marsh Road has a social and economic impact on the people who live and work in South Lake County and West Orange County.

4.0 Existing Conditions

4.1 Existing Roadway Characteristics

Hartwood Marsh Road begins east of US 27 in Lake County, Florida and extends eastward to the Orange County Line. The study area for this project extends the whole length of the roadway.

4.1.1 Functional Classification

FDOT assigns classifications to roadways according to the nature and character of their uses. However, Hartwood Marsh Road is not a state facility and is therefore not classified. Lake County has assigned Hartwood Marsh Road as a major collector.

4.1.2 Typical Section

Five typical Sections comprise this segment of Hartwood Marsh Road. Two sections include a 5-foot paved sidewalk near the intersection with U.S. 27. In general, the travelway has a natural shoulder for the project length. Stormwater runoff from the sections is collected in roadside ditches that discharge into stormwater treatment facilities or surrounding surface waters.

The existing typical sections are illustrated in Figures 4-1 through 4-5. The figures and the accompanying descriptions are generalized; there are slight deviations throughout. Typical Section 1 exists at the intersection of US 27 with Hartwood Marsh Road and again at the west driveway for Publix on Hartwood Marsh Road. Typical Section 2 exists in Lake County from the west Publix driveway to Danbury Mill Boulevard. Typical Section 3 exists from Danbury Mill Boulevard towards South Hancock road for 1065 feet. Typical Section 4 exists from typical Section 3 to South Hancock Road. Typical Section 5 exists from South Hancock Road to the Lake/Orange County line.

4.1.2.1 Typical Section 1

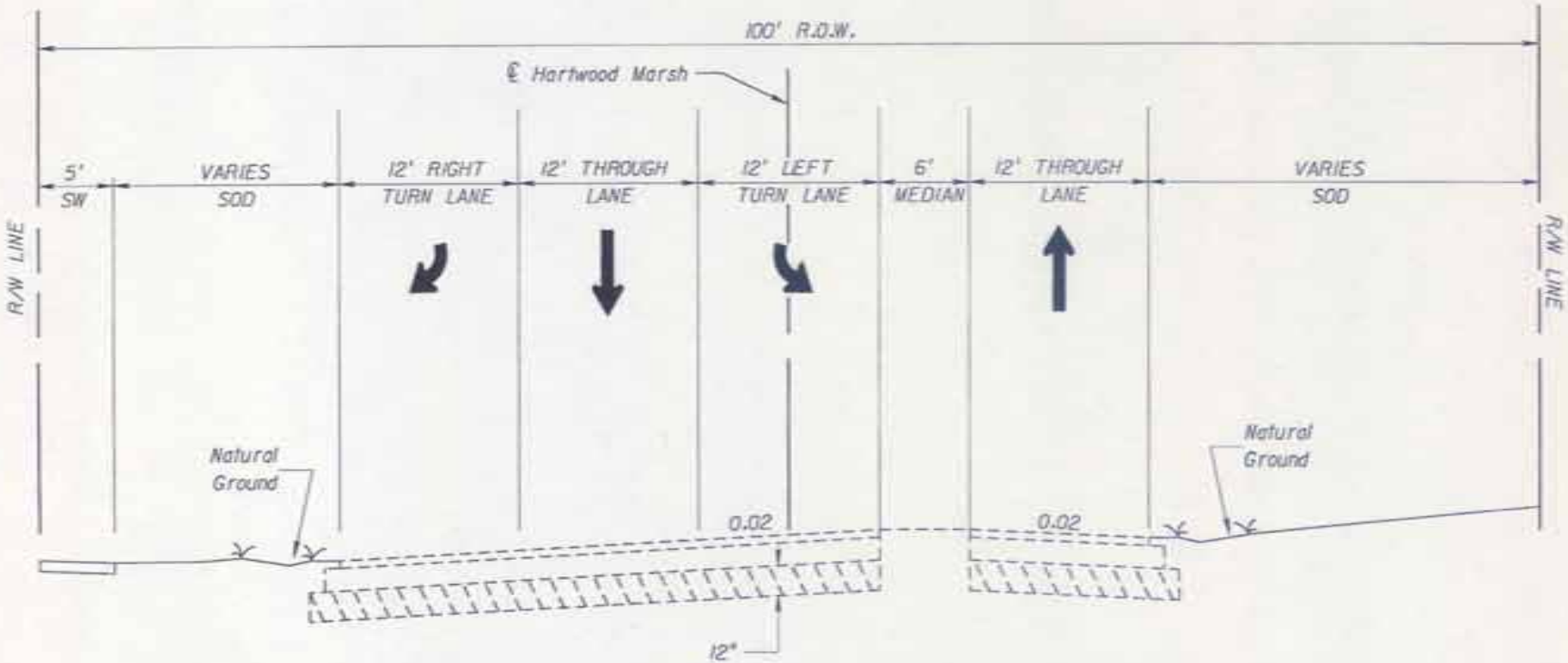
At the intersection of U.S. 27 and Hartwood Marsh Road there is a rural divided facility with two through lanes 12 feet wide separated by a 6-foot concrete median. Additionally, there are two dedicated 12-foot left and right turn lanes from Hartwood Marsh to U.S. 27. At the west driveway to Publix the cross section includes two turn lanes of 12-foot width turning north and south of Hartwood Marsh Road in addition to the two 12-foot through lanes. Figure 4-1 illustrates Typical Section 1.

4.1.2.2 Typical Section 2

Hartwood Marsh Road is a rural undivided facility with two 12-foot through lanes and an alternating 12-foot turn lane that permits a turning movement north and south of Hartwood Marsh Road. Figure 4-2 illustrates Typical Section 2.

4.1.2.3 Typical Section 3

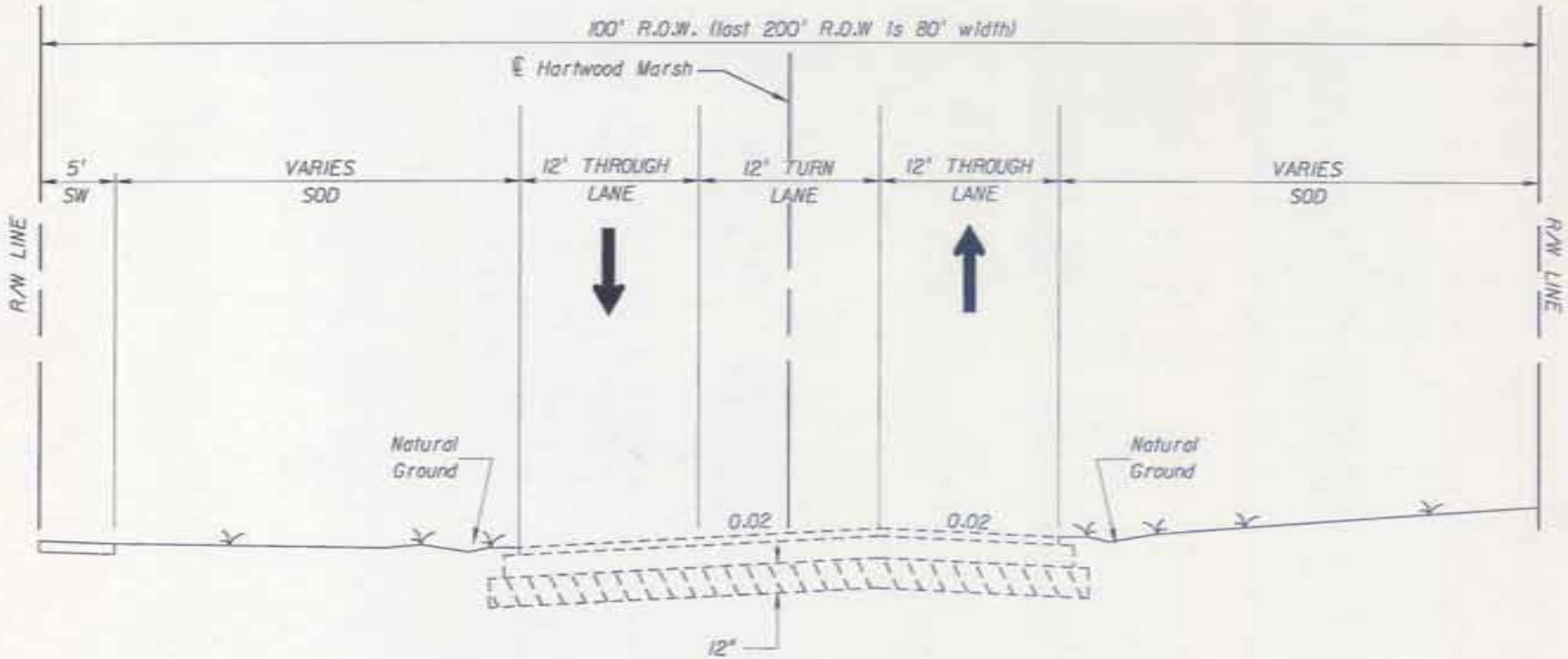
Harwood Marsh road continues as a rural undivided facility with two 11.5-foot through lanes. Figure 4-3 illustrates Typical Section 3.



TYPICAL SECTION I

Intersection of U.S. 27 to
West Driveway for Publix

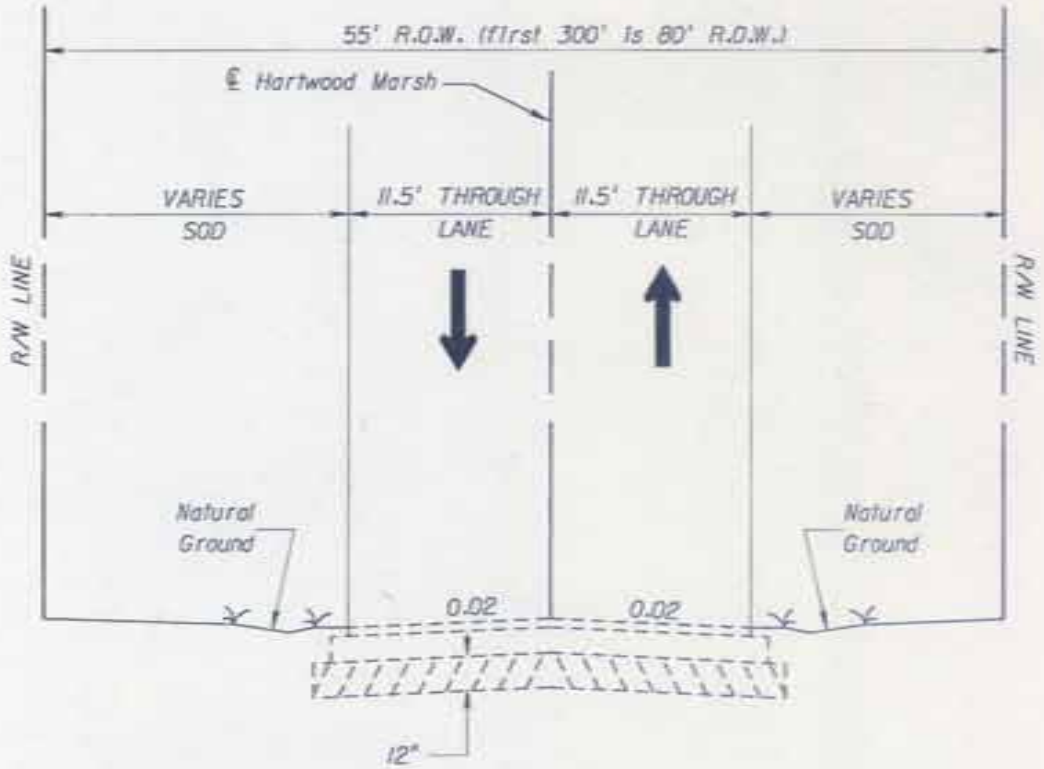
TEI Engineers & Planners	Figure No. 4-1	Page No.	EXISTING TYPICAL SECTION Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line



TYPICAL SECTION 2

Between Publix West Driveway and Danbury Mill Blvd.

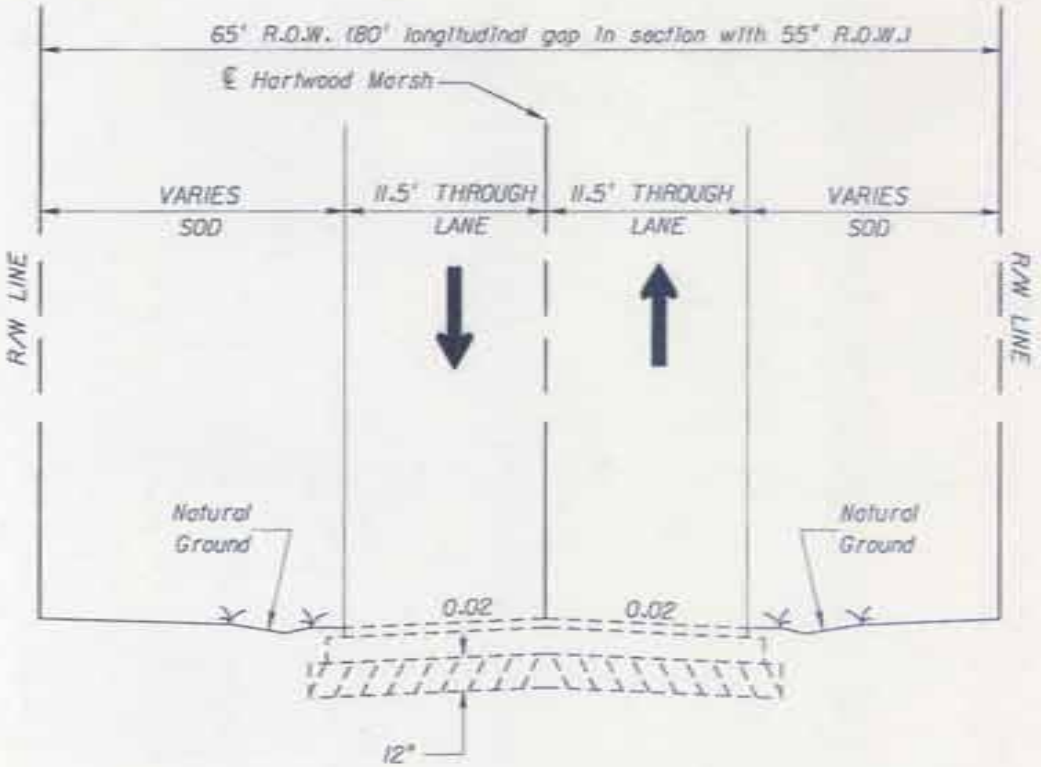
TEI Engineers & Planners	Figure No. 4-2	Page No.	EXISTING TYPICAL SECTION Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line



TYPICAL SECTION 3

Danbury Mill Blvd. towards S. Hancock Road for 1065'

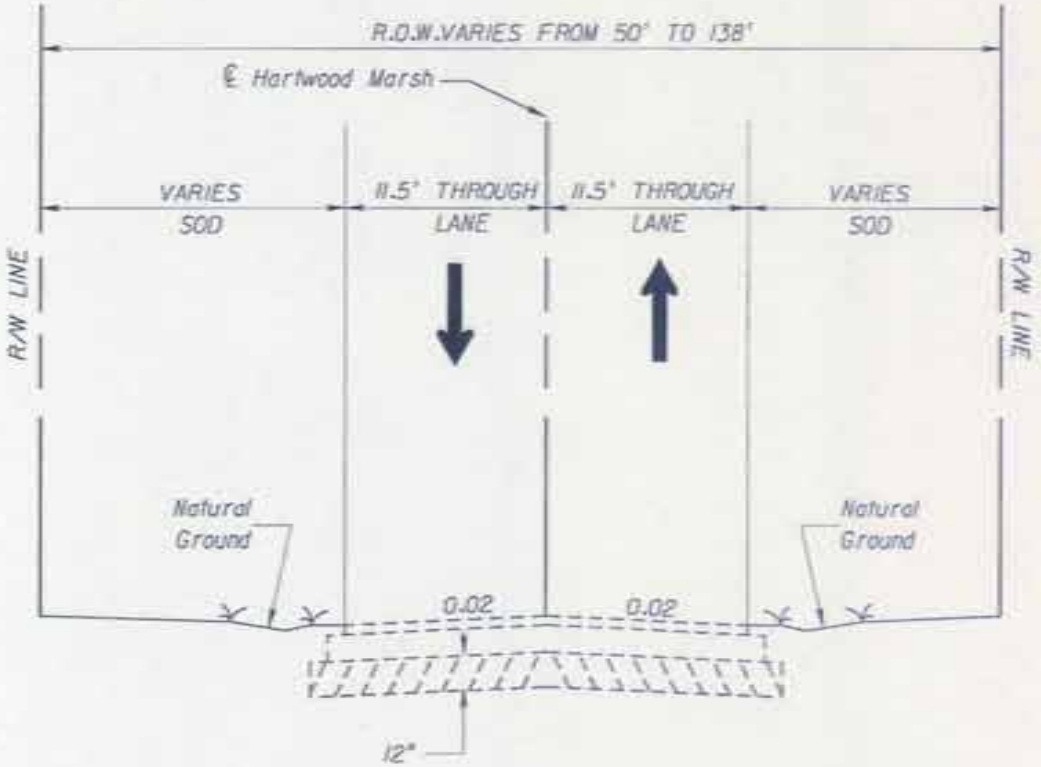
	Figure No.	Page No.	EXISTING TYPICAL SECTION
TEI Engineers & Planners	4-3		Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line



TYPICAL SECTION 4

1065 east of Danbury Mill Blvd to South Hancock Road'

TEi Engineers & Planners	Figure No. 4-4	Page No.	EXISTING TYPICAL SECTION Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line



TYPICAL SECTION 5

S. Hancock Road to the Lake/Orange County Line

TEI Engineers & Planners	Figure No. 4-5	Page No.	EXISTING TYPICAL SECTION Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line

4.1.2.4 Typical Section 4

Harwood Marsh road continues as a rural undivided facility with two 11.5-foot through lanes. Figure 4-4 illustrates Typical Section 4.

4.1.2.5 Typical Section 5

Harwood Marsh road continues as a rural undivided facility with two 11.5-foot through lanes. Figure 4-5 illustrates Typical Section 5.

4.1.3 Pedestrian and Bicycle Facilities

Pedestrian and bicycle facilities currently exist in the first two sections of the project on the north side of the right-of-way and appears to be an artifact of the development in this area.

4.1.3.1 Sidewalks

A 5-foot sidewalk exists on the north side of Hartwood Marsh Road from the intersection with U.S. 27 to Danbury Mill Boulevard.

4.1.3.2 Bicycle Lanes

Bicycle facilities are non-existent on Hartwood Marsh Road from the intersection with U.S. 27 to the Lake/Orange County line.

4.1.4 Right-of-way

Southeastern Surveying developed existing right-of-way maps. Table 4-1 summarizes the existing right-of-way information for the segments of Hartwood Marsh Road.

Table 4-1
Existing Right-of-Way

Segment Description	Right-of-Way Width
East of US 27 to Danbury Mill Boulevard	100'(1)
From Danbury Mill Boulevard to 1065' east	55'(2)
From 1065' east of Danbury Mill Blvd. to South Hancock Road	65'(3)
East of South Hancock Road to the Lake/Orange County line	Variable from 50' to 138'(4)

1 Right of way is 80 feet for the last 200' before Danbury Mill Blvd.
2 Right of way is 80 feet for the first 300'
3 Right of way reduces to 55 feet for an 80' longitudinal section, part of the public land is dedicated public access and not right of way
4 see description in paragraph below

The variable right of way begins with a width of 138' but changes in a few hundred feet with two sections that does not meet at the center near the area that extends from South of Hartwood Pines Plat to North of the Regency Hills plat, phase 1. In this area, the right of way reduces down to 50' and then the centerline of the right of way makes a jog north with the start of Center Lake Properties (approximately 16'). The right of way width increases to approximately 83' and holds at least 80' until the first horizontal curve where it reduces again to 65' (approximately 1100' longitudinal distance). Where the Center Lake Properties exist on both sides the right of way, it

is again 80' wide through the next two horizontal curves until the end of their property. The right of way alignment again takes a jog of approximately 15' north and the width reduces to 73' until the end of Avalon Estates. The right of way again reduces down to 50' east to the county line.

4.1.5 Horizontal Alignment

The existing horizontal alignment of Hartwood Marsh Road runs generally in an east-west orientation. There are three existing horizontal curves along the alignment of Hartwood Marsh and are found near the middle of the project where the travelway runs north/south. The radius of the first curve is approximately 200 feet. The second and third horizontal curves occur at the northern edge of the project and their radii are approximately 382' and 636' respectively. Generally a design speed is set at 5-10 mph over the expected posted speed and the minimum for a rural section at 45 mph is 559 feet. For an urban section, the minimum radii at 45 mph with curb and gutter is 695 feet. Only one of the radii meets current Florida Department of Transportation (FDOT) design standards for a rural or urban roadway. The reverse curve shifts the east-west alignment by approximately 5400 feet north.

4.1.6 Vertical Alignment

The vertical alignment of Hartwood Marsh Road varies along the corridor with predominately rolling terrain. There are numerous sag and crest vertical curves with the largest grade of approximately 3½% and lowest grade of 0.5%. Both of the extremes are well within the guidelines set by the Florida Department of Transportation Design and Criteria Process Manual. Without a complete survey of the vertical alignment, it was impossible to further determine if the existing vertical curves met with design regulations for sight distances or comfort of ride. It was observed during field visits that several of the crest vertical curves lacked sufficient sight distance and believe the K values are lower than the current deign guidelines dictate.

4.1.7 Drainage

The project corridor lies within the City of Clermont from US 27 to Hancock Road and in unincorporated Lake County from Hancock Road to the Orange County line. The project is within the jurisdiction of the St. Johns River Water Management District (SJRWMD) and lies with the Ocklawaha River Hydrologic Basin. A portion of the project from approximately the center of the Tarmac sand-mining site to the Orange County line falls within the Lake Apopka Hydrologic Basin.

There is no appreciable storm water conveyance system on Hartwood Marsh Road. The storm water runoff sheet flows off the edge of pavement and where the road elevation is higher than the ground between the edge of pavement and the right-of-way line, the runoff will flow into the grass area and infiltrates into the soil. In many sections of the road, the ground adjacent to the road is higher than the pavement and as a result the storm water flows along the edge of pavement as evidenced by the unraveling pavement and potholes.

The properties adjacent to the corridor contain many depressions such that there is not a significant amount of offsite runoff flowing toward the road. The land that is sloping toward the road is primarily undeveloped and consists of well-drained soils, which results in a small amount of runoff toward the road.

From US 27 to the first shopping center entrance, the storm water flows in shallow swales to the east side ditch on US 27. There is an 18-inch side drain under Hartwood Marsh Road. The storm

water flows south on US 27. The shopping plaza north and south of Hartwood Marsh, east of US 27 contain their own storm water management systems.

From the shopping center entrance to Hancock Road, storm water flows primarily along the edge of pavement to the low point of the road approximately 850 feet east of Danbury Mill Boulevard adjacent to the Kings Ridge subdivision retention pond. There are side drain pipes under Danbury Mill Boulevard and Hancock Road. From the low point of the road, the runoff sheet flows to the south to an unnamed lake located 700 feet south of the road.

From Hancock Road to approximately 1000 feet west of Flat Lake Road storm water runoff flows along the edge of pavement to a low point in the road mid-way between the limits of the basin. The runoff does not flow offsite. From 1000 feet west of Flat Lake Road to 550 feet north of Flat Lake Road, in the first curve, the storm water runoff sheet flows offsite to a depression south of the road.

From 500 feet north of Flat Lake Road to the end of the second curve, the runoff from the road flows either east or west to depressions located outside the corridor. At the beginning of the second curve there is a pipe culvert perpendicular to the eastern right-of-way line draining the roadway runoff to a depression. From the end of the second curve to an unnamed road to the south, just east of the Progress Energy easements, the road runoff flows offsite to the north to a depression under the power easement.

From the unnamed road to Eddy Drive storm water runoff flows in two directions. The north half of the pavement drains to a wetland on the north side of the road, east of the Progress Energy easement. The wetland flows into Johns Lake. Johns Lake flows into Lake Apopka. It appears in an effort to improve runoff from the roadway, the County installed a corrugated metal pipe located several feet from the north edge of pavement to the bottom of the side slope. The pipe is not buried and is in poor condition. The south side of the road drains to a depression partially in the Progress Energy easement south of the road. The County also installed a pipe on the south side of the road between the edge of pavement and the bottom of the side slope. There is no cross drain under Hartwood Marsh connecting the depression to the south to the wetland on the north side of the road.

From Eddy Road to an unnamed road 1330 feet east of Lovers Lane, storm water flows northward down Eddy Lane to a low-lying area 660 feet north of Hartwood Marsh, at the northern limits of an orange grove. The low-lying area does not connect to Johns Lake by any surface flow conveyance.

From the unnamed road to Flynn Court, Hartwood Marsh rod runoff flows in two directions. The south side of the road drains to a depression in an Orange Grove located south of Hartwood Marsh Road at Sadler court. The north half of the roadway flows to a low-lying area at the northeast corner of Hartwood Marsh Road and Sadler Court the intersection. Some of the runoff may flow northward on Sadler Court to a depression a the end of the street, 1320 feet north of Hartwood Marsh Road.

From Flynn Court to the Orange County line storm water flow northeastward toward depression east of the County line.

4.1.8 Geotechnical Data

Based on review of the 1974 Soil Survey for Lake County, Florida, as prepared by the United States Department of Agriculture Soil Conservation Service, the existing and proposed alignments of Hartwood Marsh Road are located in areas identified as "Astatula" soil series. The "Astatula" series consist of excessively drained sandy soils found on rolling uplands of the central ridge.

The variation of the "Astatula" series mapped within the project limits consist of the "Astatula sand, dark surface, 0 to 5 percent slopes", "Astatula sand, dark surface, 5 to 12 percent slopes", and the "Astatula sand, dark surface, 12 to 40 percent slopes" soil series.

The field exploration program within the Tarmac facility consisted of performing six Standard Penetration Tests (SPT) borings designated as Borings TH-1 through TH-6. The borings were advanced to depths ranging from 50 to 90 feet below the existing ground surface using the methodology outlined in ASTM D-1586. The soil samples were visually examined and laboratory tests were conducted on samples to aid in classification of the encountered soils.

The borings encountered very loose to medium dense fine sand with varying amounts of silt and/or clay (United Soil Classification SP, SP-SM, SP-SC and SC) to an approximate depth of 50 feet. Below this depth, the encountered soils consist of medium dense to very dense fine sand with silt (SP-SM), silty fine sand (SM), and silty clayey fine sand (SM/SC). This soil profile is outlined in general terms. Refer to the document *Subsurface Soil Exploration and Preliminary Geotechnical Engineering Evaluation Proposed Realignment of Hartwood Marsh Road through Tarmac Mine Facility*.

In conjunction with the SPT borings, piezometers were installed adjacent to each of the boring locations to allow for measurement of the relatively deep groundwater levels. The groundwater level was measured in the piezometers after stablization of the downhole water level. Groundwater was encountered at depths that ranged from 20 to 49.4 feet below the existing ground surface on the days the levels were measured.

Based on review of the "Potentiometric Surface of the Upper Floridan Aquifer in the St. Johns River Water Management District and Vicinity" map published by the United States Geological Survey dated September, 2002, the potentiometric elevation of the Upper Florida Aquifer is approximately +80 feet NGVD in the vicinity of the project limits indicating that this site is not in an area of potential artesian flow.

4.1.8.1 Embankment Construction

The majority of soil types along the corridor based on the Soil Survey for Lake County are primarily sandy soils (A-3, A-2-4) which would be classified as Select (S) by the Florida Department of Transportation (FDOT) and are suitable for the support of roadway embankments in accordance with Index 505 of the FDOT Design Standards. The soils in the borings in the Tarmac facility were found to be suitable for a roadway embankment.

4.1.8.2 Drainage Considerations

Pond borings will be performed at the proposed pond locations after review of the Draft submittal. The borings that were performed in the Tarmac facility encountered groundwater

levels 20.5 to 49.4 feet below the existing ground surface, which indicates that the area is suitable for dry retention ponds.

The Subsurface Soil Exploration and Preliminary Geotechnical Engineering Evaluation for Hartwood Marsh Road can be found in Appendix C.

4.1.9 Crash Data

Crash records for the study area were obtained from FDOT and Lake County for collisions occurring between July 1999 and June 2002. These were reviewed in an effort to identify roadway segments with potential safety deficiencies. A segment with a safety ratio greater than 1.0 is considered to be critical. As shown in Table 4-2, Summary of Safety Ratios, the study area has a ratio greater than 1.0 and is therefore, critical. However, it should be noted that the majority of collisions (78%) occurred in the vicinity of the US 27 at Hartwood Marsh Road intersection. Table 4-3 summarizes the types of collisions.

Table 4-2
Summary of Safety Ratios

Date	Actual Crash Rate	Critical Crash Rate	Safety Ratio
July 1999 - June 2000	4.26	1.94	2.19
July 2000 - June 2001	2.10	1.85	1.14
July 2001 - June 2002	4.30	1.73	2.48

Table 4-3
Collisions Summary

July 1999 – June 2000		July 2000 – June 2001		July 2001 – June 2002	
Accident Type	**Number of Occurrences**	**Accident Type**	**Number of Occurrences**	**Accident Type**	**Number of Occurrences**
Hartwood Marsh Road @ US 27					
Rear End	3	Rear End	0	Rear End	6
Overturned	3	**Overturned**	1	**Overturned**	0
Angle	1	Angle	3	Angle	11
Left-Turn	1	Left-Turn	2	Left-Turn	3
Other	3	Other	1	Other	4
Hartwood Marsh Road @ Danbury Mill Boulevard					
Rear End	0	Rear End	0	Rear End	0
Overturned	0	**Overturned**	0	**Overturned**	0
Angle	0	Angle	0	Angle	1
Left-Turn	0	Left-Turn	0	Left-Turn	0
Other	0	Other	0	Other	0
Hartwood Marsh Road @ South Hancock Road					
Rear End	0	Rear End	0	Rear End	0
Overturned	2	**Overturned**	1	**Overturned**	4
Angle	0	Angle	0	Angle	0
Left-Turn	0	Left-Turn	0	Left-Turn	0
Other	0	Other	2	Other	1
Hartwood Marsh Road @ Foxhole Road					
Rear End	0	Rear End	0	Rear End	0
Overturned	0	**Overturned**	0	**Overturned**	1
Angle	0	Angle	0	Angle	0
Left-Turn	0	Left-Turn	0	Left-Turn	0
Other	0	Other	0	Other	0

4.1.10 Intersections and Signalization

The only signalized intersection along Hartwood Marsh Road is US 27 at Hartwood Marsh Road.

4.1.11 Lighting

Lighting is not provided along the Hartwood Marsh Road corridor, with the exception of the intersection of Hartwood Marsh Road at US 27.

4.1.12 Utilities

In addition to serving vehicular traffic, pedestrians, and other users, most road right-of-ways also accommodate a variety of underground and aboveground utilities, which are owned by private and public entities. Since the horizontal and vertical location of these utilities must be coordinated with the road improvements design and construction, it is important to take the existing and proposed utilities into consideration in the early stages of project development. Existing utilities identified within the project vicinity are generally described in Table 4-4. In addition, the utility company contacts are presented in Table 4-5.

Table 4-4
Existing Utilities

Utility Company	Type of Service	General Location
Broadwing	Fiber Optic Cable Telecommunications	Buried line along U.S. 27. No facilities along Hartwood Marsh Rd.
City of Clermont	8-inch PVC Water Main	Crossing Hartwood Marsh Rd. at Hancock and running east to the Regency subdivision.
	8-inch PVC Water Main	Crossing Hartwood Marsh Rd. near the Publix shopping center at U.S. 27.
	8-inch PVC Wastewater Force Main	Running from the Kings Ridge lift station on the north side of Hartwood Marsh Rd. to Hancock Road.
	8-inch PVC Wastewater Force Main	Running from the Regency Hills lift station on the south side of Hartwood Marsh Rd. to Hancock Rd. and crossing at Hancock.
City of Orlando Water Conserv II	16-inch Ductile Iron Reclaimed Water Main	Crosses Hartwood Marsh Rd. at the County line and continues west along the north r-o-w for approximately 1 mile to the end of Eddy Groves.
Progress Energy	Aerial Electric Cable	Pole mounted distribution along most of Hartwood Marsh Road.
Lake Apopka Natural Gas District	6-inch Steel Gas Main (180 psi)	Crossing Hartwood Marsh Rd. in line with the east r-o-w of Hancock Rd. and then running east along the south r-o-w approx. 2700' to the Regency Hills Subdivision.
Lake Utility Services Inc.	Water Main	No Involvement at this time. There are tentative plans to extend water lines from west of S.R. 27 to Hartwood Marsh in the future.
Bright House	Fiber Optic Cable Telecommunications	Buried line along the north r-o-w running from the entrance to Kings Ridge subdivision west to S.R. 27.
Sprint United Telephone	Buried Copper Cable	Running along both the north and south r-o-w of Hartwood Marsh Rd.
Sumter Electric Coop.	3-Phase Aerial Electric Distribution	From SR 27 west approx. one mile to Florida Power's service territory.

Table 4-5
Utility Company Contacts for Existing Utilities

Utility Company	Contact Name	Contact Number
Broadwing Communications 1122 Capital of Texas Hwy South Austin, TX 78746	Susan Perkins	512-742-1527
City of Clermont P.O. Box 120219 Clermont FL 34712	Tamra Richardson	352-394-4083 ext 317
City of Orlando Water Conserv II P.O. Box 783125 Winter Garden FL 34778-3125	Al Bowlin	407-656-2332 ext 225
Progress Energy 4306 East CR 462 Wildwood FL 34785	Rudy Seiler	352-748-8770
Lake Apopka Natural Gas District P.O. Box 783007 Winter Garden FL 34778-3007	Rick Gullett	407-656-2734 ext 108
Lake Utility Services Inc. 200 Weathersfield Ave. Altamonte Springs, FL 32714	David Orr	407-869-1919 ext 243
Bright House 1670 E. Hwy 50, Suite D Clermont FL 34711	John Wolski	352-245-2408 ext 7879
Sprint United Telephone P.O. Box 162922 Altamonte Springs, FL 32716-2922	Jim Austin	407-889-6790
Sumter Electric Cooperative 330 South US 301 Sumterville, FL 33585	Gary Burchfield	352-793-3801 ext 1333

4.1.13 Pavement Conditions

The existing flexible pavement was reviewed visually and appears to be at two different stages of service life. The pavement adjacent to the King's Ridge subdivision, from U.S. 27 to Danbury Mill, has been widened to accommodate commercial activities and indicates little need for maintenance. The pavement has minor to significant stress in the rest of the project, indicated by various types of multiple cracking and deterioration of the surface. Examples found were alligator cracking, longitudinal cracking, reflection cracking, and edge failure.

4.2 Existing Bridges

There are no bridges along the Hartwood Marsh Road corridor.

4.3 Environmental Characteristics

4.3.1 Land Use Data

4.3.1.1 Existing Land Use

Existing land use information along the Hartwood Marsh Road project corridor was based on field inspections during project site visits. The study area includes industrial, commercial/business, residential and agriculture/undeveloped land uses. The following is a brief description of the existing land uses and the general location of these uses. Figure 4-6 illustrates the existing land use along Hartwood Marsh Road.

Residential
A number of single-family residences directly front Hartwood Marsh Road on the eastern leg of the corridor. A number of subdivision developments with primary access to Hartwood Marsh Road are found on the western leg of the corridor. These include King's Ridge, Hartwood Pines, and Regency Hills.

Commercial
Commercial properties are scattered around the intersection of US 27 and Hartwood Marsh Road. The principal shopping center includes Clermont Regional Center. Other commercial sites abound throughout the corridor, including fast food restaurants, and multiple business strip plazas.

Vacant & Undeveloped
Vacant areas are scattered along the project corridor. The majority of the currently vacant and undeveloped land is in Lake County. Much of this undeveloped land is planned for future residential or commercial development.

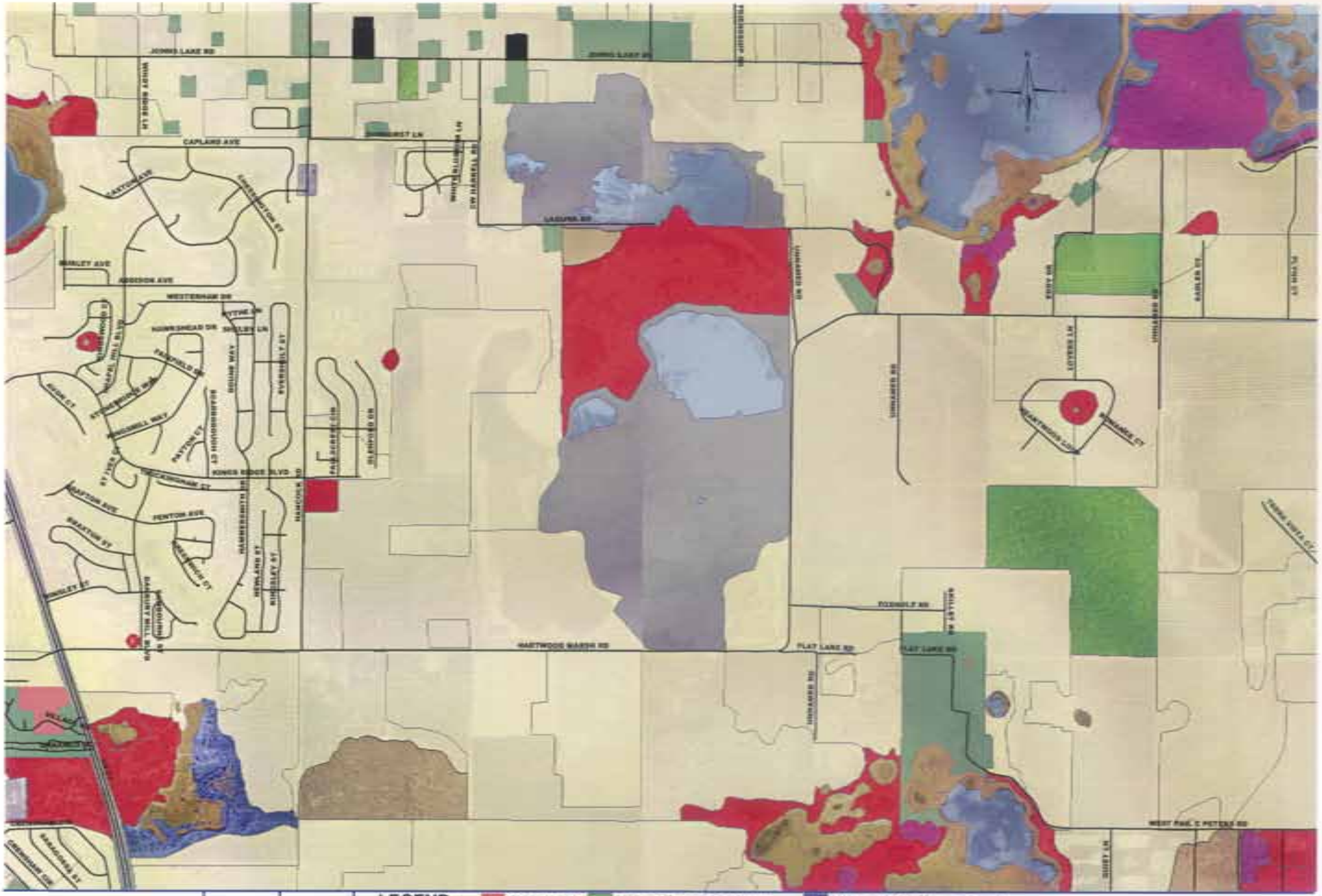
Agricultural
An existing orange grove is located on the south side Hartwood Marsh Road, west of the Orange/Lake County Line.

Institutional
No institutional land uses exist along the Hartwood Marsh Road corridor.

Industrial
TARMAC mining facility is located on the north side of Hartwood Marsh Road, east of South Hancock Road.

4.3.1.2 Future Land Use

Future land use data was obtained from Lake County GIS department. This information was compiled into Figure 4-7 that illustrates future land use designations along the study corridor. The Hartwood Marsh Road study corridor is expected to see continued residential and commercial development, however the future land use map shows the area east of South Hancock Road as being rural.



Engineers & Planners

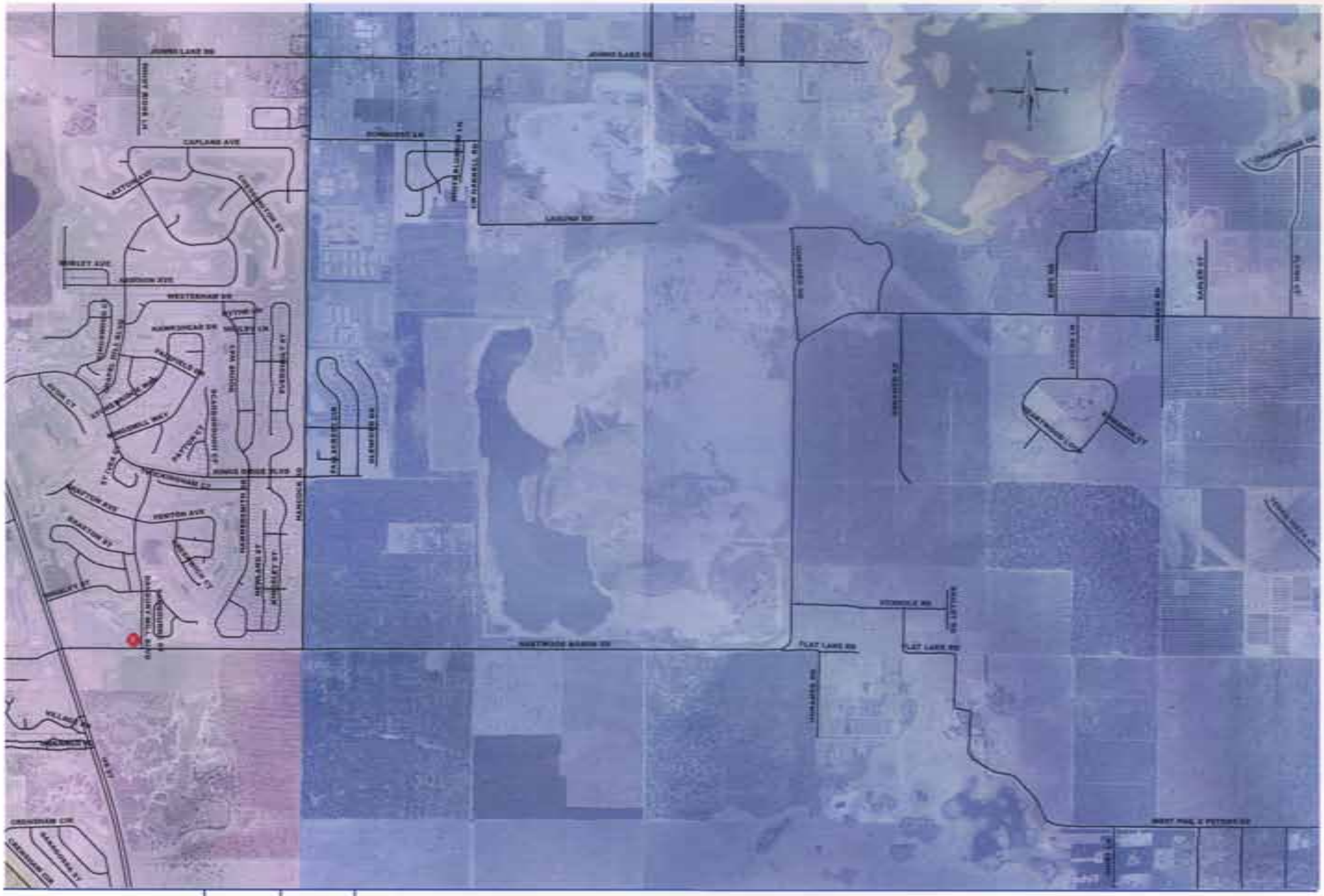
Figure No:
4-6

LEGEND

- Agricultural
- Barren Land
- Extractive
- Industrial
- Open Land
- Range
- Recreational
- Residential
- Transportation, Communication, and Utilities
- Upland Forest-Coniferous
- Upland Forest-Hardwood
- Upland Forest-Tree Plantation
- Water
- Wetlands-Coniferous Forest
- Wetlands-Forest Mixed
- Wetlands-Hardwood Forest
- Wetlands-Vegetated Non-forested

EXISTING LANDUSE

Hartwood Marsh Road PD&E
From US 27 to Orange County Line



TEI Engineers & Planners

Figure No:
4-7

LEGEND

- Lakes
- Rural Conservation
- Ridge
- Rural
- Urban Expansion

FUTURE LANDUSE

Hartwood Marsh Road PD&E
From US 27 to Orange County Line

4.3.2 Cultural Features and Community Services

4.3.2.1 Cultural Resource Assessment Survey

The cultural resource assessment methodology can be divided into three major tasks:

1. Background research
2. Field survey
3. Analysis and documentation

Background research is designed to develop a cultural history for the project area and to determine whether there are any previously known archeological or historic sites in proximity to the project tract. Initial background research included contacting the Florida Master Site File (FMSF) to determine whether there were any previously known sites. Aerial photography, topographic maps, and historical data were reviewed to delineate environmental character to the tract and to identify potential historic sites.

A reconnaissance survey was complete to verify the environmental data and identify any obvious cultural resources. Based on location patterns for known sites in the area, prehistoric Native American sites tend to be located on relatively level well-drained soils within 200 meters of potential water sources. While the project tract soils are generally well-drained, much of the land is over 200 meters from potential water sources and are frequently characterized by steep slopes. Therefore, the tract was considered to have a medium to low potential for containing prehistoric sites.

Based on the survey, subsurface testing was stratified based on distance from potential water source and slope. Highly disturbed areas were excluded from testing. Areas of reasonably well-drained oils with 0 to 5% slope within 200 meters of a potential water source were classified as high. Areas of poorer soils within 200 meters of water and areas between 200 and 300 meters from a water source were classified as medium. All other areas were classified as low.

Areas classified as high potential were tested at 25-meter intervals, medium potential at 50-meter intervals and low potential at 100-meter intervals. Shovel test units were 50cm square and 1 meter deep. Units were excavated by nature soil strata and all soil was screened.

The closest previously identified archeological or historical site is 8LA2216, located on the east side of US 27 south of Hartwood Marsh Road. Background research and reconnaissance survey indicated there are no potential historic sites or structures along the corridor.

4.3.2.2 Cultural Features and Community Services

Cultural features preserve and enhance the cultural nature of a community and include parks and other recreation areas, schools, churches and other religious institutions, historic sites, archaeologically significant sites, and other neighborhood gathering places. Community services include facilities that provide necessary services such as fire stations, police stations, public and private schools, hospitals, cemeteries, public buildings, and civic facilities. Figure 4-8 identifies these cultural and community features adjacent to Hartwood Marsh Road through the project.

The Cultural Resource Assessment for Hartwood Marsh Road can be found in Appendix D.

TEI Engineers & Planners

Figure No:
4-8

LEGEND

- Firestation

COMMUNITY FACALITIES

Hartwood Marsh Road PD&E
From US 27 to Orange County Line

Schools
Windy Hill Middle School – This school is located on Hancock Road, north of Hartwood Marsh Road.

Recreational Facilities/Areas
There are no recreational facilities/areas located on Hartwood Marsh Road through the project corridor.

Churches
There are no churches located on Hartwood Marsh Road through the project corridor.

Social Service Agencies
No Social Service Agencies have been located on Hartwood Marsh Road through the project corridor.

Medical Facilities
There are no medical facilities located on the Hartwood Marsh Road project corridor.

Community Centers
There are no community centers located on Hartwood Marsh Road through the project corridor.

Police and Fire Protection
There are no police facilities located directly on Hartwood Marsh Road through the project corridor. The City of Clermont Fire Station No. 2 is located on the Hartwood Marsh Road project corridor, west of Danbury Mill Boulevard.

4.3.2.3 Section 4(f) Lands

No Section 4(f) Lands exist along the project corridor.

4.3.3 Natural and Biological Features

4.3.3.1 Wetlands

In an effort to comply with the Presidential Executive Order 11990 entitled "Protection of Wetlands," dated May 23, 1977 and the United States Department of Transportation Order 5660.1A entitled "Preservation of the Nation's Wetlands," dated August 24, 1978, the potential wetland impacts resulting from the proposed improvements were evaluated.

Wetland areas were evaluated based on the Corps of Engineers Wetlands Delineation Manual (1987) and the Unified Wetland Delineation Methodology for the State of Florida, dated July 1, 1994 (F.A.C. 62-340). Field investigations and aerial photography were used to map all wetlands in the project area. The wetlands were classified using systems adopted by FDOT as detailed in the Florida Land Use, Cover, and Forms Classification System (FLUCFCS) (FDOT, 1999) and by the United States Fish and Wildlife Service as detailed in the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, et al, 1979).

During field investigations, no wetlands or jurisdictional surface waters were identified within the project corridor. Additional wetlands and surface waters were found adjacent to the existing right of way, but do not appear to be within the proposed right of way. These include a large

evacuated borrow pond (FLUCFCS 533) on the Tarmac Minerals property and a herbaceous marsh (FLUCFCS 641) on the north side of the roadway south of Johns Lake.

The Wetland Evaluation Report for Hartwood Marsh Road can be found in Appendix E.

4.3.3.2 Wildlife Habitat Survey

In concurrence with the methodology described in the FDOT PD&E Manual, chapter 27, a wildlife and habitat evaluation was conducted on the study area. Database searches and field surveys of the study area were performed. Database records were obtained from the Florida Fish and Wildlife Conservation Commission (FFWCC), the Florida National Areas Inventory (FNAI), and the United States Fish and Wildlife Services (USFWS).

Protected Plant Species

Of all the State and Federal plant species listed in Lake County with potential occurrence, there is unlikely or low likelihood of occurrence of these species within the study area. Additionally, during field inventory, none of the listed plants were observed in the study area. Table 4-6 shows the different species found in Lake County, the habitat and the likelihood of occurrence.

Table 4-6
State and Federal Listed Plant Species Documented in Lake County with Potential for Occurrence within the Hartwood Marsh Road Study Area

Common Name	Likelihood of Occurrence	Observed
Curtis' milkweed	Low – Limited suitable habitat	-
Florida bonamia	Low – Limited suitable habitat	-
Ashe's calamintha	Low – Limited suitable habitat	-
Chapman's sedge	Unlikely – No suitable habitat	-
Slender celosia	Unlikely – No suitable habitat	-
Sand butterfly pea	Unlikely – No suitable habitat	-
Pygmy fringe-tree	Unlikely – No suitable habitat	-
Spreading pogonia	Unlikely – No suitable habitat	-
Butterfly pea	Low – Limited suitable habitat	-
Florida jointtail	Unlikely – No suitable habitat	-
Okeechobee gourd	Unlikely – No suitable habitat	-
Water sundew	Unlikely – No suitable habitat	-
Florida butterfly orchid	Unlikely – No suitable habitat	-
Green-fly orchid	Unlikely – No suitable habitat	-
Scrub buckwheat	Low – Limited suitable habitat	-
Non-crested eulophia	Low – Limited suitable habitat	-
Garberia	Unlikely – No suitable habitat	-
Hartwrightia	Unlikely – No suitable habitat	-
Crested coralroot	Unlikely – No suitable habitat	-
Star anise	Unlikely – No suitable habitat	-
Cooley's water-willow	Unlikely – No suitable habitat	-
Scrub pinweed	Low – Limited suitable habitat	-
Catesby's lily	Unlikely – No suitable habitat	-
Double-leaf orchid	Unlikely – No suitable habitat	-

Common Name	Likelihood of Occurrence	Observed
Cardinal flower	Unlikely – No suitable habitat	-
Nodding club-moss	Unlikely – No suitable habitat	-
Florida spiny pod	Unlikely – No suitable habitat	-
Sandhill spiny pod	Low – Limited suitable habitat	-
Pine-sap	Low – Limited suitable habitat	-
Slender naiad	Unlikely – No suitable habitat	-
Fall-flowering ixia	Unlikely – No suitable habitat	-
Britton's beargrass	Low – Limited suitable habitat	-
Cinnamon fern	Unlikely – No suitable habitat	-
Royal fern	Unlikely – No suitable habitat	-
Papery whitlow-wort	Low – Limited suitable habitat	-
Clue flowered butterwort	Low – Limited suitable habitat	-
Yellow flowered butterwort	Low – Limited suitable habitat	-
White-fringed orchid	Unlikely – No suitable habitat	-
Yellow-fringed orchid	Unlikely – No suitable habitat	-
Gypsy-spikes	Unlikely – No suitable habitat	-
Snowy orchid	Unlikely – No suitable habitat	-
Rose pogonia	Unlikely – No suitable habitat	-
Lewton's polygala	Low – Limited suitable habitat	-
Plume polypody	Low – Limited suitable habitat	-
Swamp plume polypody	Unlikely – No suitable habitat	-
Scrub plum	Unlikely – No suitable habitat	-
Needle palm	Unlikely – No suitable habitat	-
Florida willow	Unlikely – No suitable habitat	-
Hooded pitcher-plant	Unlikely – No suitable habitat	-
Lace-lip ladies' tresses	Unlikely – No suitable habitat	-
Little pearl-twist (Spiranthes tuberosa)	Unlikely – No suitable habitat	-
Little pearl-twist (Stenorrhynchos lanceolatus)	Low – Limited suitable habitat	-
Giant wild-pine	Unlikely – No suitable habitat	-
Three-birds orchid	Unlikely – No suitable habitat	-
Ocala vetch	Unlikely – No suitable habitat	-
Clasping warea	Low – Limited suitable habitat	-
Florida coontie	Low – Limited suitable habitat	-
Rainlily	Unlikely – No suitable habitat	-
Simpson's zephyr-lily	Unlikely – No suitable habitat	-
Treat's zephyr-lily	Unlikely – No suitable habitat	-

Protected Wildlife Species

The FFWCC records showed one occurrence of a bald eagle (haliaectus leucocephalus) nest located 0.5 miles north of the study area near Eddy Drive along the shoreline of Johns Lake. However, no eagles were observed during the site investigations.

Of the numerous State and Federal listed animal species documented in Lake County with the potential for occurrence within the Harwood Marsh Road study area, only the gopher tortoise (gopherus polyphemus) was observed.

Suitable habitats for the Eastern Indigo Snake, Florida Pine Snake, and the Short-tailed Snake were found adjacent to the study area and standard measures for the Eastern Indigo Snake will be implemented to avoid any adverse effects on these species. Several species of wading birds, including the limpkin, little blue heron, snowy egret, tricolored heron, and white ibis may utilize wetlands and lakes adjacent to the study area. The proposed improvements should have no effects on these species. Table 4-7 lists the wildlife species that may potentially occur in the study area.

Table 4-7
State and Federal Listed Animal Species Documented in Lake County with Potential for Occurrence within the Hartwood Marsh Road Study Area

Common Name	Likelihood of Occurrence	Observed
Florida scrub jay	Unlikely – No suitable habitat	-
Limpkin	Low – limited suitable habitat	-
Little blue heron	Low – limited suitable habitat	-
Snowy egret	Low – limited suitable habitat	-
Tricolored heron	Low – limited suitable habitat	-
White ibis	Low – limited suitable habitat	-
Arctic peregrine falcon	Low – limited suitable habitat	-
Southeastern American kestrel	Moderate – suitable habitat present	-
Florida sandhill crane	Low – limited suitable habitat	-
Southern bald eagle	Moderate – suitable habitat present	-
Wood stork	Low – limited suitable habitat	-
Red-cockaded woodpecker	Unlikely – No suitable habitat	-
Snail kite	Unlikely – No suitable habitat	-
Burrowing owl	Low – limited suitable habitat	-
Least tern	Low – limited suitable habitat	-
Florida mouse	Low – limited suitable habitat	-
Sherman's fox squirrel	Low – limited suitable habitat	-
West Indian manatee	None – No suitable habitat	-
Florida black bear	Unlikely – No suitable habitat	-
Lake eustist pupfish	None – no suitable habitat	-
Bluenose shiner	None – no suitable habitat	-
American alligator	Low – limited suitable habitat	-
Eastern indigo snake	Moderate – suitable habitat present	-
Gopher tortoise	High – suitable habitat present	Observed
Sand skink	Low – limited suitable habitat	-
Florida pine snake	Moderate – suitable habitat present	-
Suwannee cooter	Unlikely – No suitable habitat	-
Gopher frog, crawfish frog	Moderate – suitable habitat present	-
Short-tailed snake	Moderate – suitable habitat present	-

Upland Areas

The study corridor is defined as being highly developed, and characterized by a variety of commercial, industrial, and residential land uses. However, the predominant land use type is single-family residential housing, followed by various commercial facilities, including retail stores, wholesalers, and professional services.

No USFWS designated critical habitat is located within the study area.

The Wildlife and Habitat Evaluation Report for Hartwood Marsh Road can be found in Appendix F.

4.3.3.3 Outstanding Florida Waters and Aquatic Preserves

There are no listed Outstanding Florida Waters (OFW) or aquatic preserves in the project corridor.

4.3.3.4 Floodplains / Floodways

One area of Hartwood Marsh Road lies within a floodplain; however it not located in a floodway. The section of road is located just east of the Progress Energy easement and includes the low point of the road, the wetland north of the road and the depression south of the road. The 100-year flood elevation was determined used the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps. The Map indicates that the 100- year elevation is 100 feet. Based on contour elevations, the road elevations is approximately 95 feet at the low point. The horizontal distance along the road within the floodplain is approximately 250 feet. The floodplain area is shown on Figures 4-9 through 4-11.

4.3.3.5 Farmlands

The Hartwood Marsh Road PD&E Study was evaluated for farmlands involvement in accordance with the Florida Department of Transportation, PD&E Manual, Part 2, Chapter 28, Rev. 04-14-99 and subsequent directives from the United States Department of Agriculture, Natural Resources Conservation Service (NRCS), dated April 30, 1999 and November 1, 1999. After reviewing the NRCS directives, it has been determined that the widening of Hartwood Marsh Road is under no requirement to make a farmland determination.

4.3.4 Contamination

A contamination screening evaluation was prepared for this study following chapter 22 of the FDOT PD&E Manual Guidelines. In accordance with the FDOT PD&E Guidelines, each property within and adjacent to the proposed right of way limits of the project must have a conscious determination of the contamination potential. Based on observations of the properties, ratings were assigned to the properties as shown in Table 4-8.

Table 4-8
Potential Contamination Sites and Risk Ratings

Property	Rating
Publix Shopping Center	No
Eckerd's	No
Royal Oaks Medical Plaza	No
Residential Developments	No
Pump Station	Low
Citrus Groves	Low
Tarmac Mine Facilities	Medium
Single Family Residences	No

JOINS PANEL 0565

JOINS PA

VISTA

DEL LAGO BLVD

CASTILLO CT

TORO DR

LE DE ES CT

9

HARTWOOD ROAD

City of Clermont 120133

10

11

ZONE A

12

ZONE X

FLAT LAKE

WEST PHIL C PETERS RD

ZONE A

ZONE A

ZONE A

ZONE X

LOUISA ROAD

16

15

14

13

QUIET LN

WOODS DR

AVALON

BLACK BEAR LN

TOWER PINE DR

COUNTY BOUNDARY

FIVE MILE RD

ZONE X

SA

ZONE A

ZONE A

McKINNEY RD

24

SHELL POND RD

21

22

23

N BRADSHAW RD

ZONE X

ZONE A

ZONE A

TEI Engineers & Planners	FIGURE NO. 4-9	FLOOD INSURANCE RATE MAP PANEL 650 - NOT TO SCALE Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line

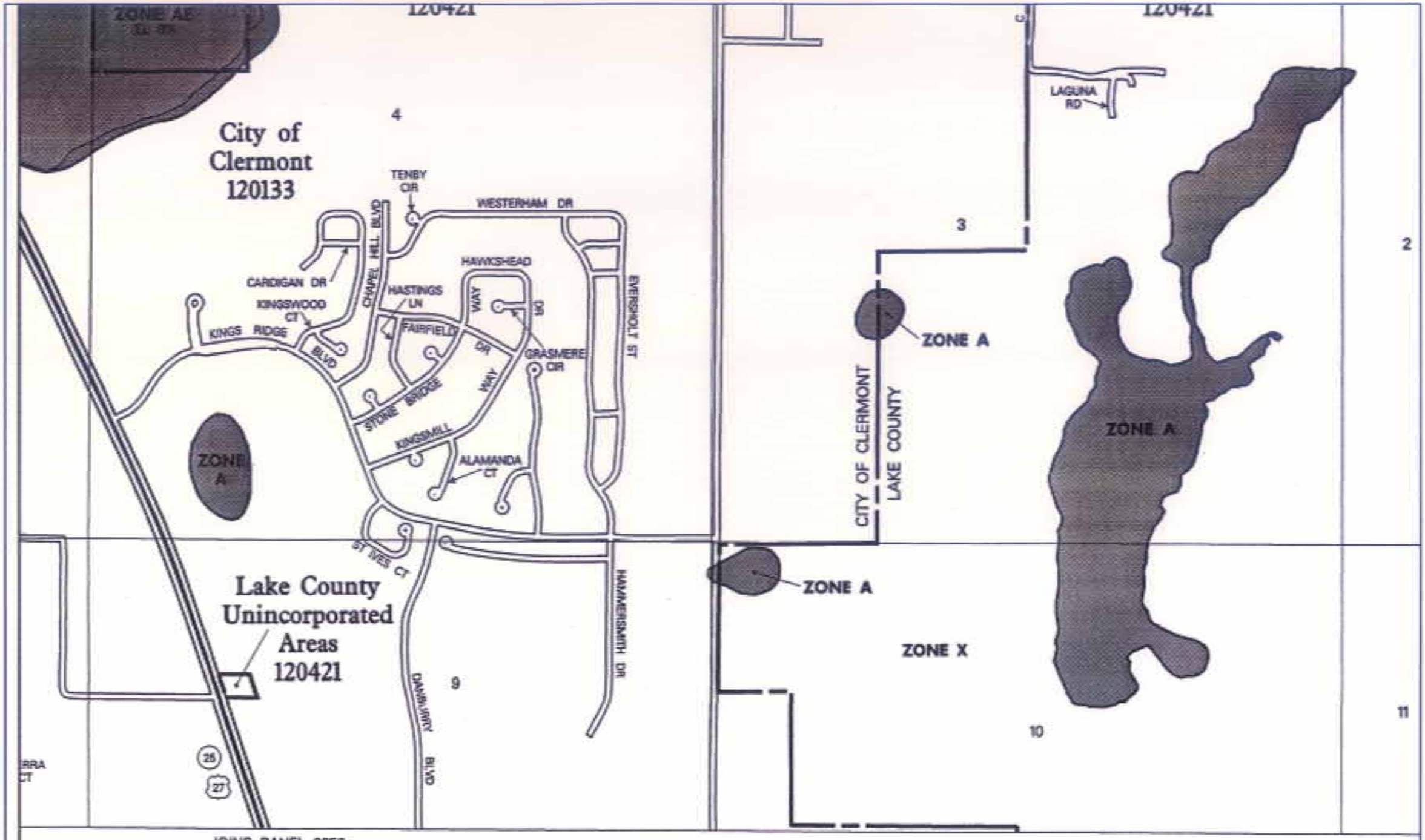


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FIGURE NO. 4-11

FLOOD INSURANCE RATE MAP PANEL 565 - NOT TO SCALE

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

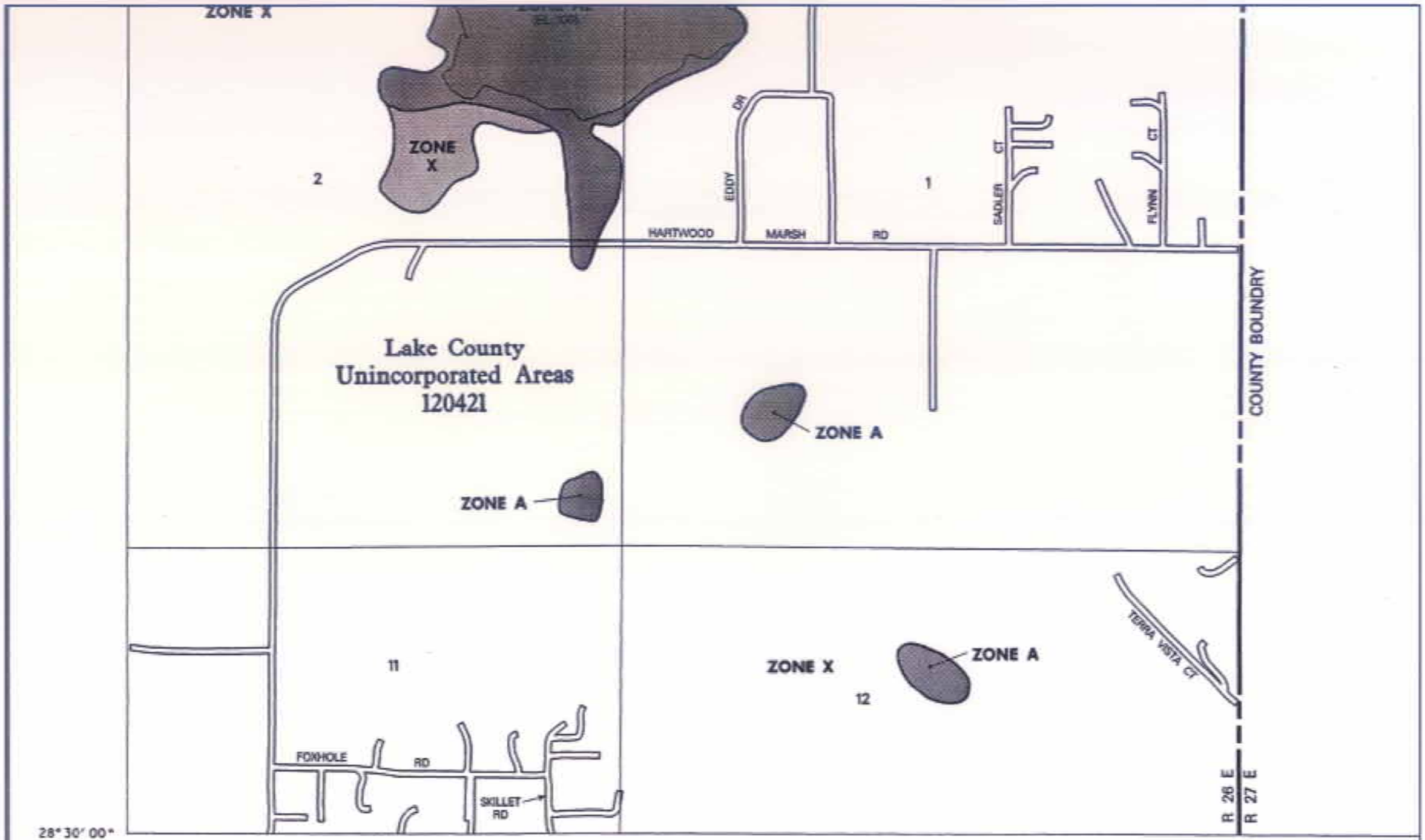

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FIGURE NO. 4-10

FLOOD INSURANCE RATE MAP PANEL 570 - NOT TO SCALE

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

For all sites rated as having a No or Low risk of contamination potential, it is recommended that a review of the Public Record be done to determine if any significant changes in the status of any sites have occurred since the Contamination Screening Evaluation Report was prepared prior to any right-of-way acquisition.

Sites classified as having a Medium or High risk of contamination should have further review into the Public Record, particularly with regard to any Contamination Assessment or Remedial Action Plans which may be generated in the interim period between the date of the preparation of the Contamination Screening Evaluation Report and the date of final design and right-of-way acquisition. A preliminary soils screening evaluation involving auger borings and Organic Vapor Analyzer (OVA) analysis and laboratory testing of soils, and installation and sampling of groundwater monitoring wells should be performed to detect the presence of contaminants in the soil and/of groundwater. Ground Penetrating Radar (GPR) should be considered in areas of right-of-way acquisition involving former gas station sites to detect abandoned underground storage tanks.

The Contamination Screening Evaluation Report for Hartwood Marsh Road can be found in Appendix G.

5.0 Design Criteria

Design and construction criteria for the proposed improvements to Hartwood Marsh Road must adhere to FDOT standards for the design of such roadways and also must comply with recommended standard practices as set forth in the following documents:

- Manual on Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways, State of Florida Department of Transportation (2002)
- A Policy on Geometric Design of Highways and Streets (Green Book), ASHTO (2001)
- Plans Preparation Manual (PPM), Florida Department of Transportation, FDOT (2003)
- Drainage Manual, and Supplements, FDOT
- Manual on Uniform Traffic Control Devices (MUTCD), Federal Highway Administration (2003)
- Traffic Design Standards, FDOT (2004)
- Highway Capacity Manual (HCM), Transportation Research Board

The design criteria listed in Table 5-1 is current. This table shows the design criteria for the urban typical sections. Some criteria vary as a function of traffic volume, and FDOT has established ranges for low, medium and high volumes. The year 2028 projected traffic volumes indicate that the design criteria should be based on a high volume roadway. All criteria are subject to change and only current criteria will be used during the final design phase.

Table 5-1
Urban Arterial Design Criteria

Design Element	Mainline	Source
Design Speed	45 mph	
Posted Speed	45 mph	
Lane Widths	12 ft.	[1]Table 2.1.1
Bike Lanes	4 ft.	[1]Table 2.1.2
Horizontal Clearance (with curb and gutter)	4 ft.	[1]Table 2.11.8
Minimum Median Width	22 ft.	[1]Table 2.2.1
Cross Slope	0.02	[1]Table 2.1.1
Curb and Gutter Outside Inside	 Type F Type E	
Sidewalk *when adjacent to curb and gutter	6 ft.* 5 ft.	[1]Section 8.3.1
Border (Width)	12 ft.	[1]Table 2.5.2

[1] Plans Preparation Manual, 2003, FDOT

6.0 Traffic

The information in this chapter is taken from the *Hartwood Marsh Road Design Traffic Technical Memorandum, dated January 2004*. These reports document the existing traffic conditions and the analysis of the Build and No Build scenarios in support of this Project Development and Environment Study. They include detailed discussion of existing traffic conditions, planned roadway improvements in the area, existing traffic characteristics, development of the projected traffic in the design years and level of service analyses for the design year.

6.1 Existing Intersections

- Lake Louis Road @ US 27
- Harwood Marsh Road/Vista Del Lago Boulevard @ US 27
- Hartwood Marsh Road @ Publix Westerly Driveway
- Hartwood Marsh Road @ Public Easterly Driveway
- Hartwood Marsh Road @ Danbury Mill Boulevard
- Hartwood Marsh Road @ South Hancock Road
- Hartwood Marsh Road @ Flat Lake Road
- Hartwood Marsh Road @ Tarmac Entrance
- Hartwood Marsh Road @ Lovers Lane

Figure 6-1 provides the existing intersection geometry for the listed intersections.

6.2 Multi-modal Transportation System Considerations

The project runs through an area of South Lake County that is transitioning from rural to urban. Hartwood Marsh Road serves mainly commercial and residential land uses, with much more commercial and residential development planned. There are no park and ride facilities in the area. Numerous cyclists utilize the Hartwood Marsh Corridor for recreational purposes.

6.3 Traffic Analysis Assumptions

6.3.1 Design Assumptions

Design traffic forecasts for the Hartwood Marsh Road corridor were provided for the following years:

Existing Year - 2003
Opening Year - 2008
Mid-Year - 2018
Design Year - 2028

6.3.2 Analysis Scenarios

Three scenarios were evaluated in the development of Design Traffic Forecasts for the Hartwood Marsh Road corridor. These included the No-Build and two Build scenarios. The No-Build alternative assumed that for the opening (2008), mid (2018) and design years (2028), the existing mainline laneage was present and that all other planned and programmed improvements will be in place. The Build 1 analysis assumed that the ultimate laneage required for the design year would be in place at the opening year 2008. The Build 2 scenario assumes the widening of Hartwood

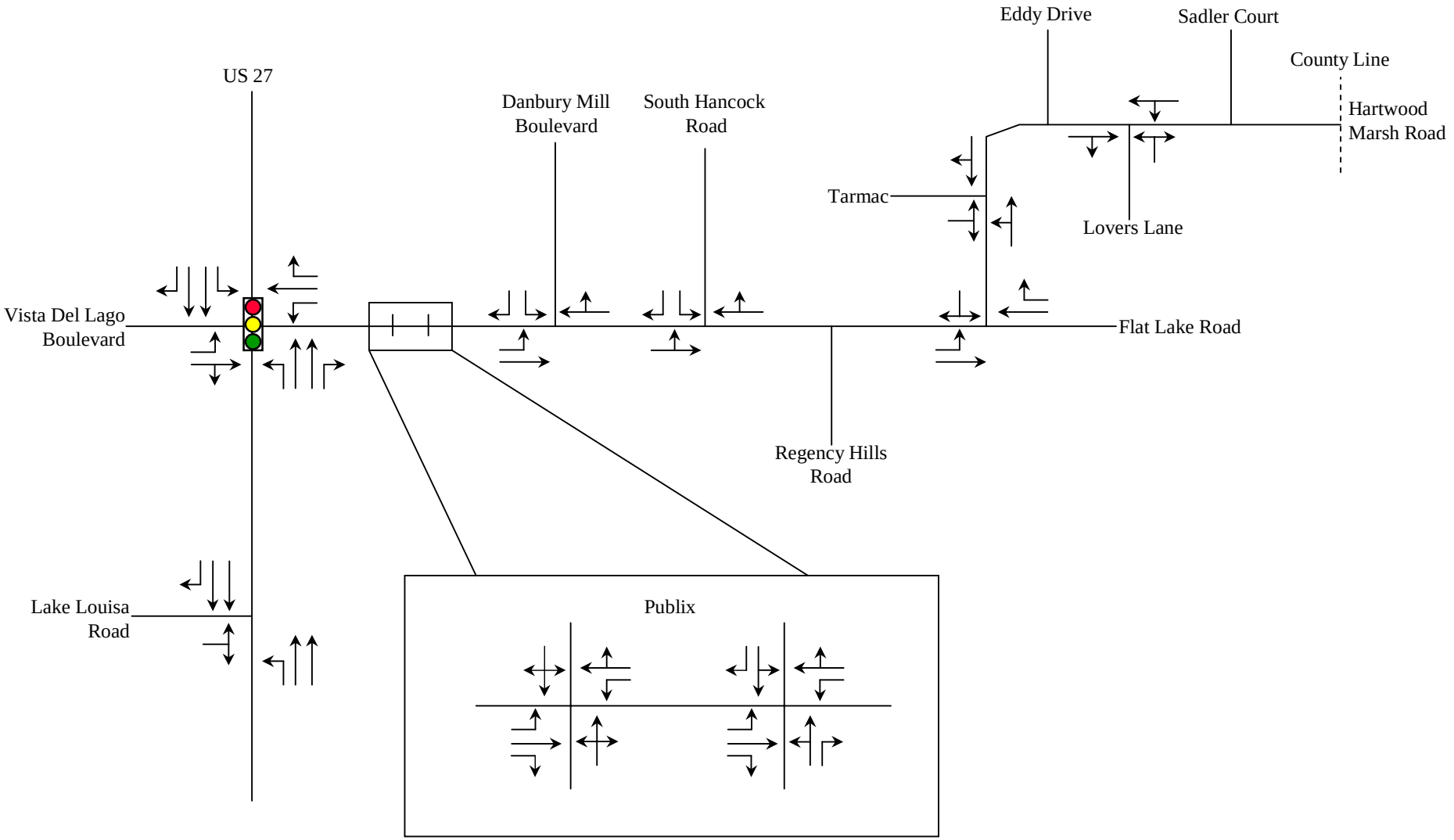

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Figure No:

6-1

- Existing Geometry

- Signalized Intersection

2003 Existing Geometry

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

Marsh Road to 4-lanes as well as the extension of South Hancock Road south to intersect with Lake Louisa Road at US 27, as a two-lane facility.

6.3.3 Design Characteristics

Existing travel characteristics for the project corridor were used to develop design characteristics. Measured K and D factors were established for both Hartwood Marsh Road and the sidestreets. As the only available FDOT RCI data for the area is on US 27, RCI data as used only for comparison purposes. Table 6-1 provides the recommended design characteristics (K_{30}, D and T) for the project.

Table 6-1
Recommended Design Characteristics

MAINLINE FACTORS	
K (Measured)	**0.104**
D (Measured)	**0.773**
K_{30} (Estimated)	**0.111**

SIDESTREETS FACTORS	
K (Measured)	**0.097**
D (Measured)	**0.598**
K_{30} (Estimated)	**0.104**

TRUCK PERCENTAGES (T)	
Tpeak (medium)	**3.45%**
Tpeak (heavy)	**4.35%**
Tpeak (total)	**7.80%**
Tdaily (medium)	**11.60%**
Tdaily (heavy)	**5.20%**
Tdaily (total)	**16.80%**

RECOMMENDED DESIGN CHARACTERISTICS	
Hartwood Marsh Road	
D (Measured)	**0.773**
K_{30} (Estimated)	**0.111**
Sidestreets	
D (Measured)	**0.598**
K_{30} (Estimated)	**0.104**

6.4 Existing Turning Movement Volumes

Figure 6-2 provides the existing peak hour turning movement volumes.

6.5 Existing Intersection Levels of Service

Levels of Service for Hartwood Marsh Road were determined using the current adopted procedures as outlined in the Transportation Research Board's Special Report 209 – Highway Capacity Manual (HCM). Highway Capacity Software (HCS) was used to determine signalized intersection levels of service.

The existing peak hour turning movement volumes, as illustrated on Figure 6-2, were used to evaluate the existing intersections conditions. Intersection signal timings and phasing plans for the PM peak hour provided by Lake County were used in analyzing signalized intersection. The existing intersection levels of service (LOS) are shown on Figure 6-3. As illustrated, the signalized intersection analyzed, US 27 at Hartwood Marsh Road, operates above the acceptable minimum LOS D.

6.6 Existing Roadway Segment Levels of Service

The Florida Department of Transportation 2002 Quality/Level of Service Handbook was used to estimate the current mainline operating conditions of Hartwood Marsh Road. The existing Average Annual Daily Traffic (AADT) volumes, Directional Design Hour Volumes (DDHV), and related roadway segment levels of service are shown on Figures 6-4 and 6-5 which show that two segments of the roadway along Hartwood Marsh Road operate below the minimum acceptable LOS D.

6.7 Future Traffic Projections

The methodology used to develop the Future Traffic Projections is documented in detail in the *Hartwood Marsh Road Design Traffic,* dated January 2004. The future year traffic volumes were developed using a combination of methodologies.

In order to determine projected growth rates for traffic along Hartwood Marsh Road, a number of different methods were analyzed. The first method is a trends analysis that involves a review of historic traffic counts to develop an anticipated growth rate. The second method involves the use of the Metropolitan Planning Organization's (MPO) approved Orlando Urban Area Transportation Study (OUATS) Florida Standard Urban Transportation Model Structure (FSUTMS) traffic model to determine a growth rate between 1990 model volumes and the year 2020 projected traffic model volumes. The third method involves the trends analysis of historical Lake County counts. Other methods included the comparison of the Southwest Orange and Southeast Lake Counties Transportation Alternatives Study (SOCTAS) models, the US Census growth rates and gas consumption rates.

For the No Build condition, the FSUTMS growth rate of 8.18% per year was used to develop projected traffic volumes along Hartwood Marsh Road. The same growth rate was used for the sidestreets.

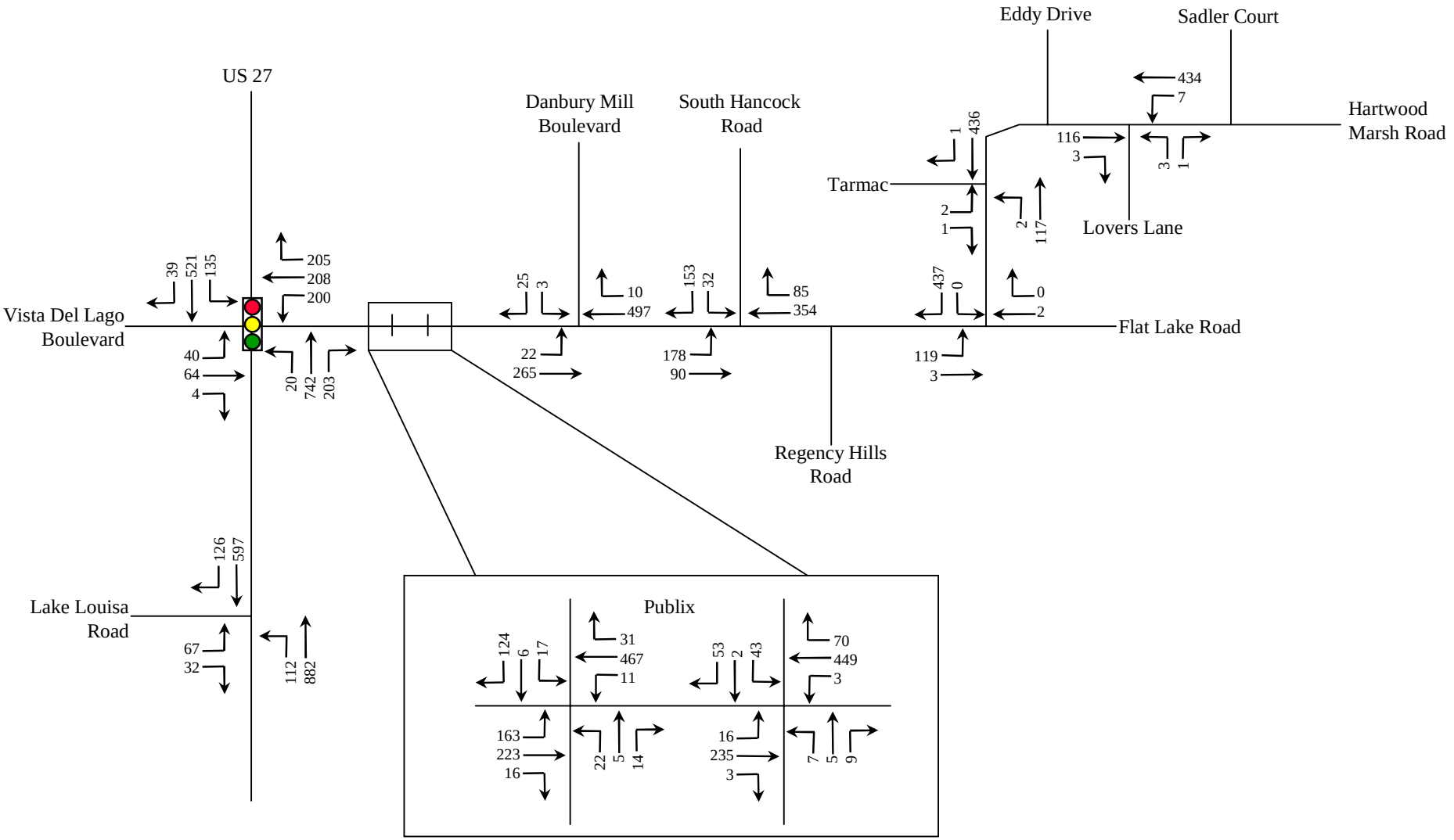

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Figure No: 6-2

163 223 16 - Turning Movement Volumes

- Signalized Intersection

2003 Existing Turning Movement Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

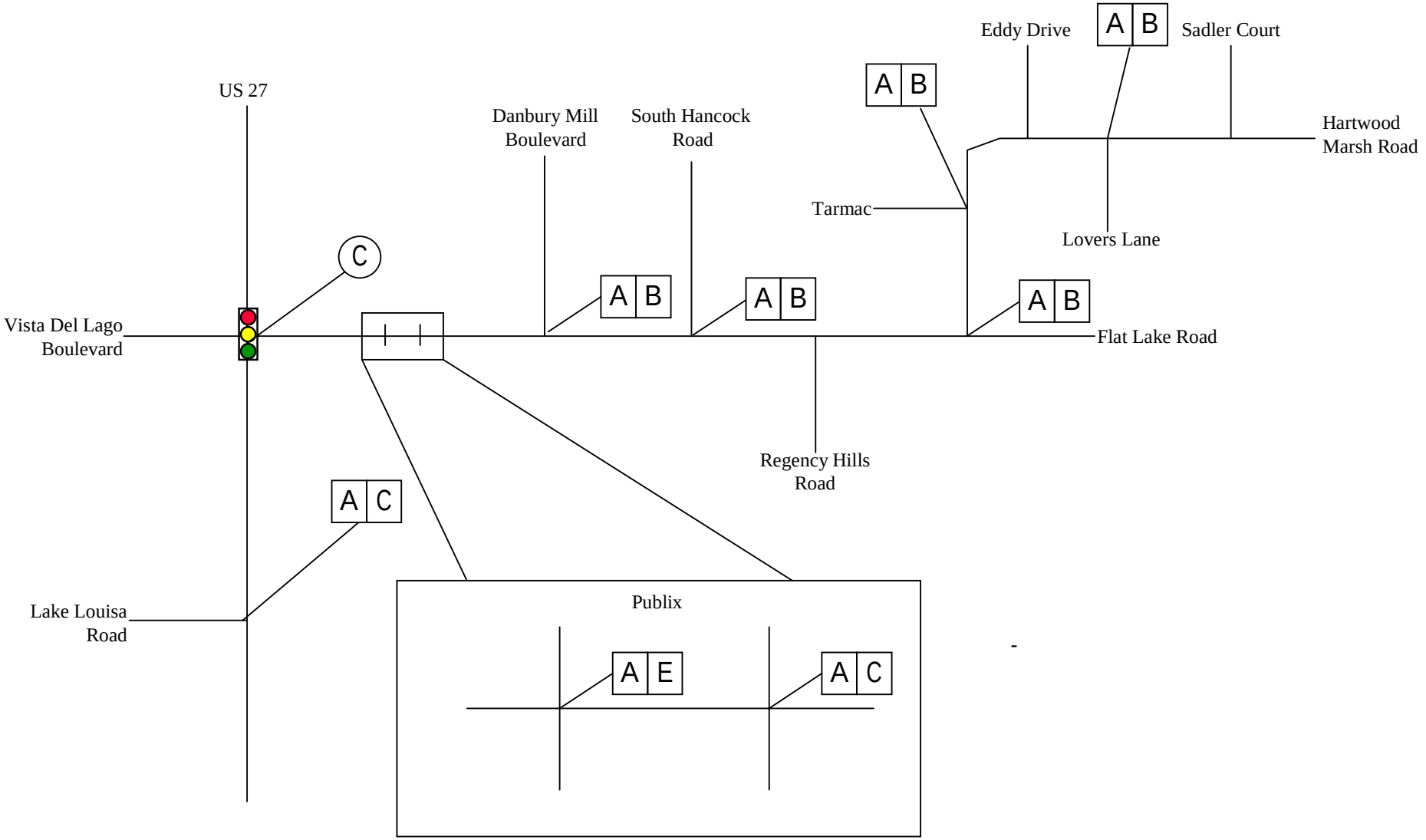

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Figure No:

6-3

B - Signalized Intersection LOS

C F Unsignalized Intersection LOS Mainline(Sidestreet)

- Signalized Intersection

2003 Existing Level of Service

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

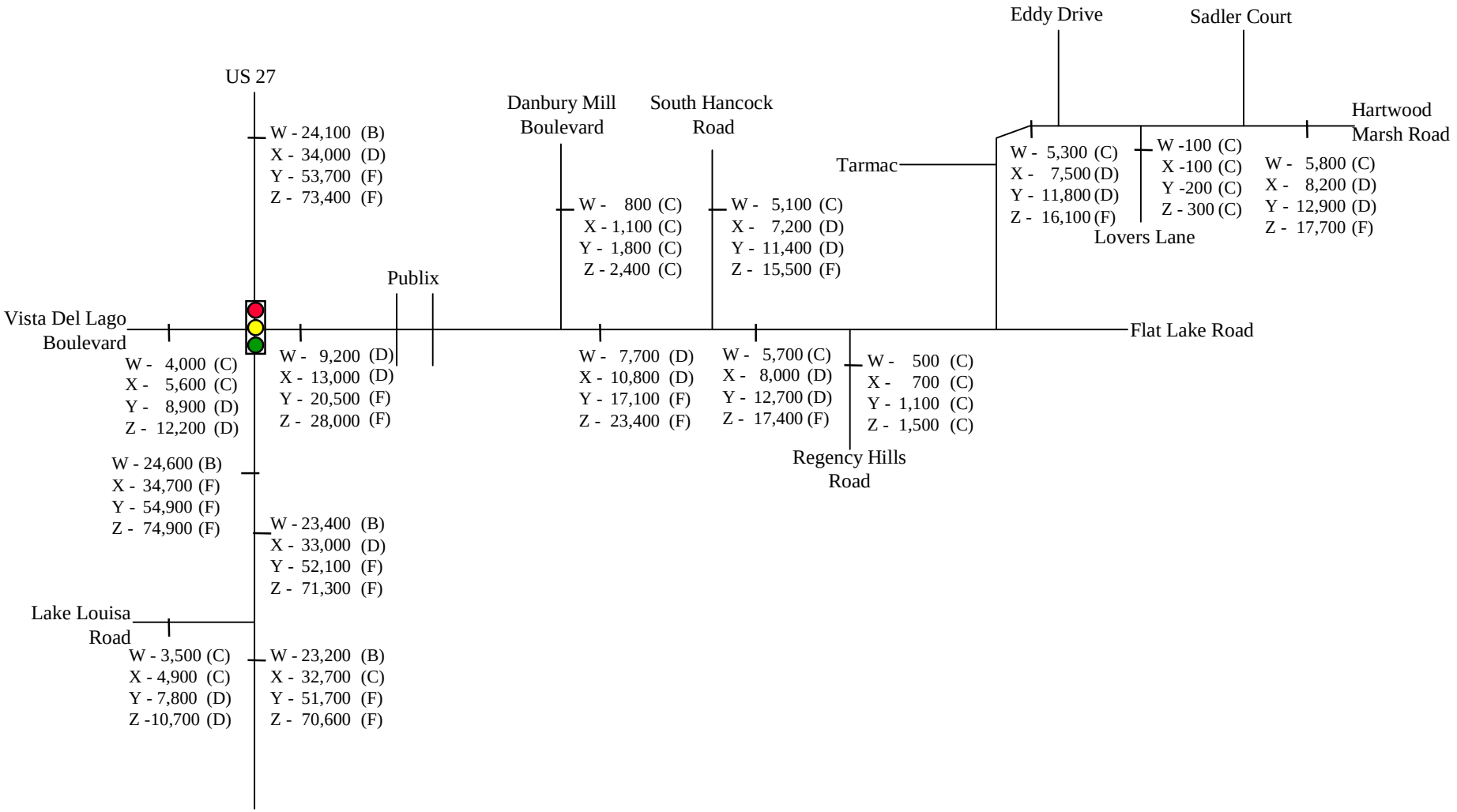

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Figure No: 6-4

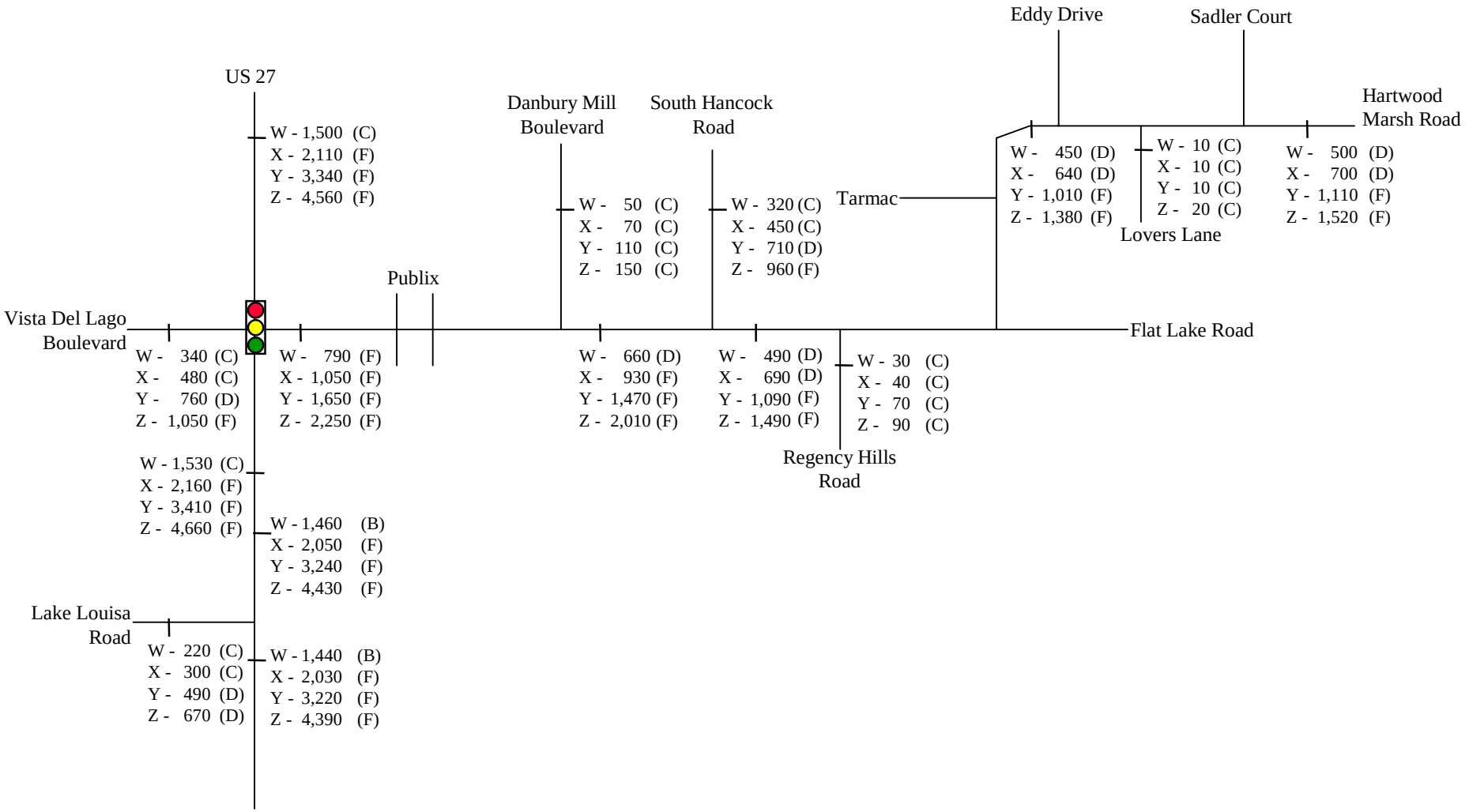
W - 2003 Existing AADT (Estimated)
X - 2008 No Build AADT (Estimated)
Y - 2018 No Build AADT (Estimated)
Z - 2028 No Build AADT (Estimated)

- Signalized Intersection

No Build Average Annual Daily Traffic Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



Engineers & Planners

Figure No:

6-5

W - 2003 Existing DDHV (Estimated)
X - 2008 No Build DDHV (Estimated)
Y - 2018 No Build DDHV (Estimated)
Z - 2028 No Build DDHV (Estimated)

- Signalized Intersection

No Build Directional Design Hour Traffic Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

For the Build conditions, the No Build volumes were increased by 42.6% based on a comparison of the No-Build and Build SOCTAS models.

6.7.1 No Build Traffic Projections

Traffic projections were made for the No Build scenario as described above. The projected AADT volumes are shown on Figure 6-4 for the opening (2008), mid (2018) and design year (2028), and the DDHV's are shown on Figure 6-5.

The recommended growth rate of 8.18% per year was used to develop peak hour design turning movement volumes at the intersections. Figures 6-6, 6-7, and 6-8 provide the opening, mid and design year No Build turning movement volumes.

6.7.2 Build Traffic Projections

Traffic projections were made for the Build 1 scenario by comparing the No-Build and Build SOCTAS traffic models as described previously. The projected Build 1 opening, mid and design year AADT volumes and DDHV's are illustrated on Figures 6-9, and 6-10, respectively. The Build 2 AADT and DDHV's are shown in Figures 6-11 and 6-12.

The existing turning movement counts were used to develop peak hour turning movement volumes at the intersections for the opening, mid and design years. The peak hour turning movements were developed using the 8.18% per year growth rate. Figures 6-13, 6-14 and 6-15 provide the opening, mid and design year Build 1 turning movement volumes.

The Build 2 scenario traffic projects and turning movement volumes were developed by diverting the Build 1 projects based on percentages of vehicles expected to use the new extension of South Hancock Road. The Build 2 turning movement volumes are shown in Figures 6-16, 6-17, and 6-18.

6.8 Future Intersection Levels of Service

Future levels of service for Hartwood Marsh Road were determined using the current adopted procedures as outlined in the Transportation Research Board's Special Report 209 – Highway Capacity Manual (HCM). Highway Capacity Software (HCS) was used to determine signalized intersection levels of service.

6.8.1 No Build Intersection Levels of Service

The future No Build peak hour turning movement volumes, as illustrated on Figures 6-6, 6-7 and 6-8, were used to evaluate the anticipated No Build intersection conditions. Intersection signal timings and phasing plans for the PM peak hour provided by Lake County were used in analyzing signalized intersection. The No Build intersection levels of service for the opening, mid and design years are shown on Figures 6-19, 6-20 and 6-21. As illustrated, the signalized intersections of Hartwood Marsh Road at US 27 operates below the acceptable minimum LOS D, by the mid-design year (2018).

6.8.2 Build Intersection Levels of Service

The proposed Build 1 intersection geometry is illustrated in Figures 6-22. The future Build 1 peak hour turning movement volumes, as illustrated on Figures 6-13, 6-14 and 6-15, were used to

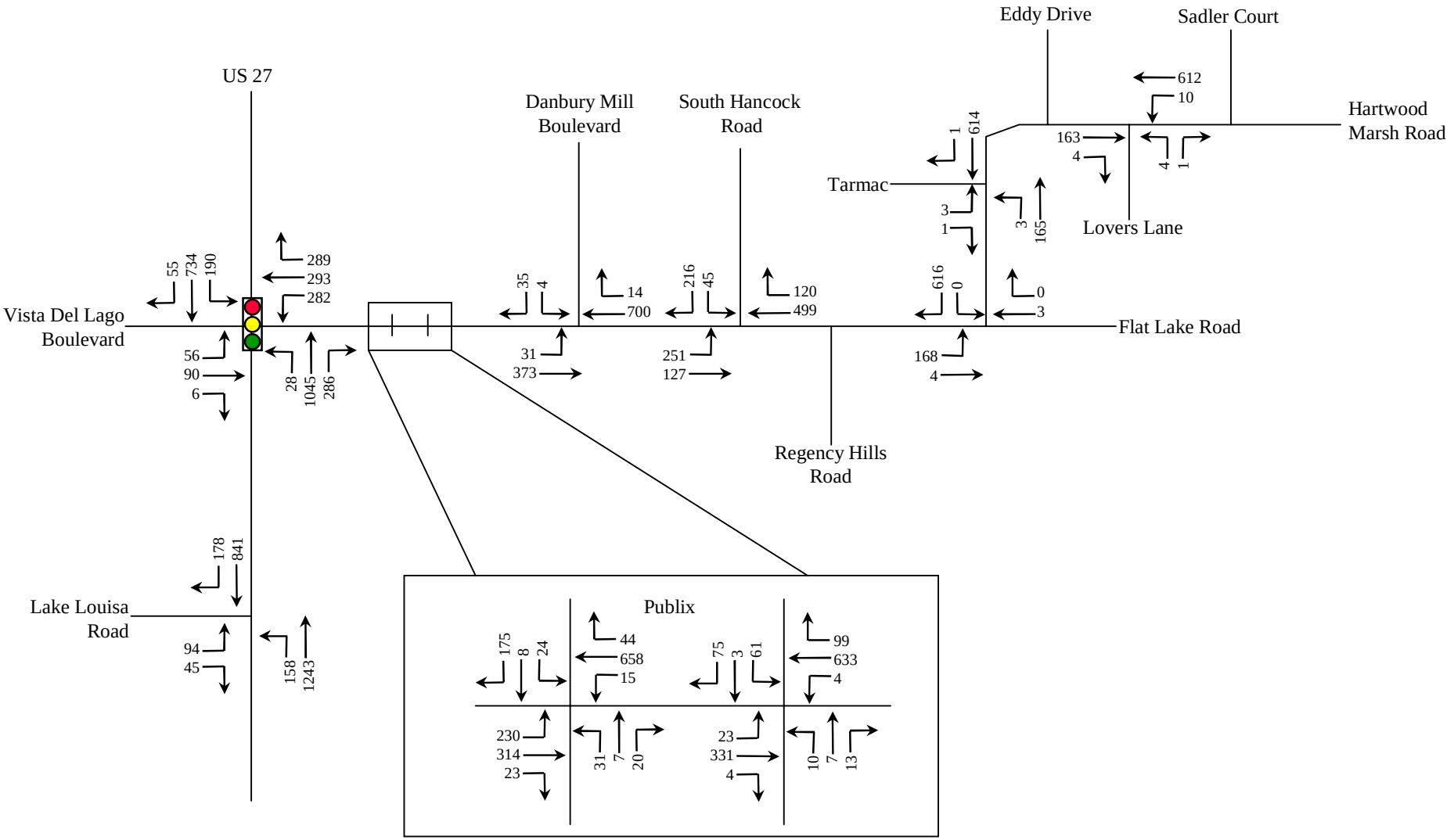


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Figure No: 6-6

163 / 223 / 16 - Turning Movement Volumes

- Signalized Intersection

2008 No-Build Turning Movement Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

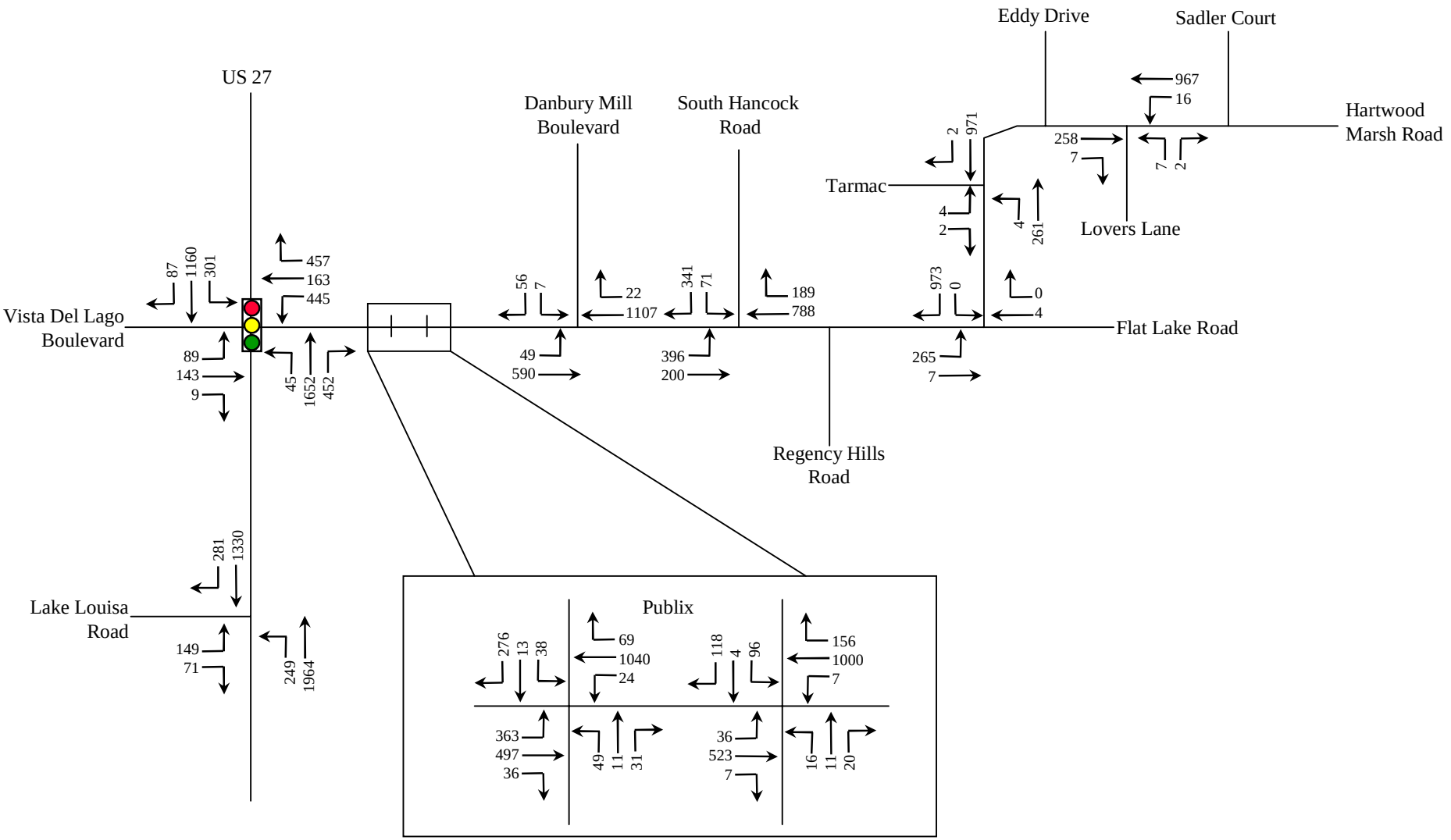


Figure No: 6-7

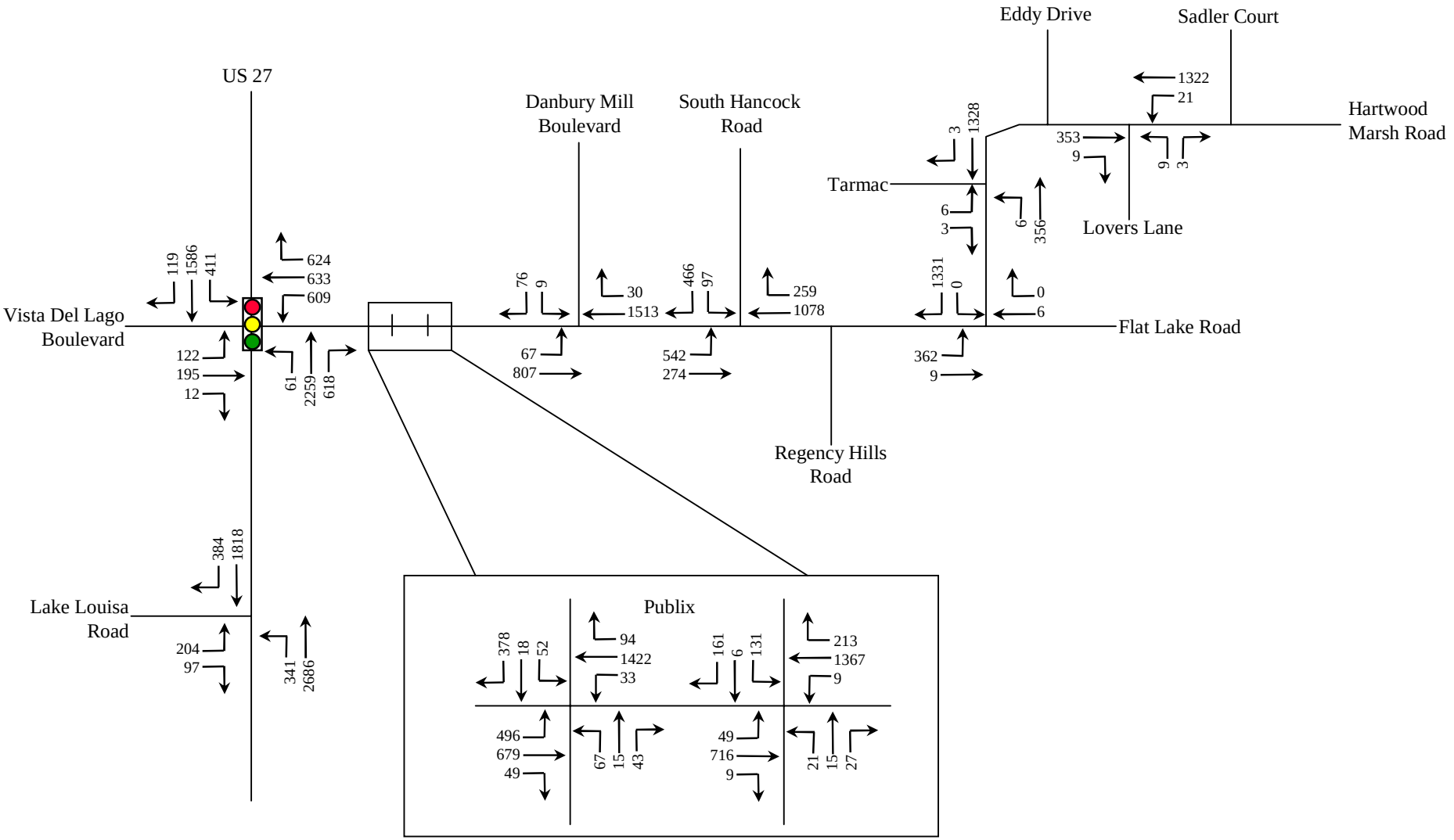
163 / 223 / 16 - Turning Movement Volumes

- Signalized Intersection

2018 No-Build Turning Movement Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



Engineers & Planners

Figure No: 6-8

163
223
16
- Turning Movement Volumes

- Signalized Intersection

2028 No-Build Turning Movement Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

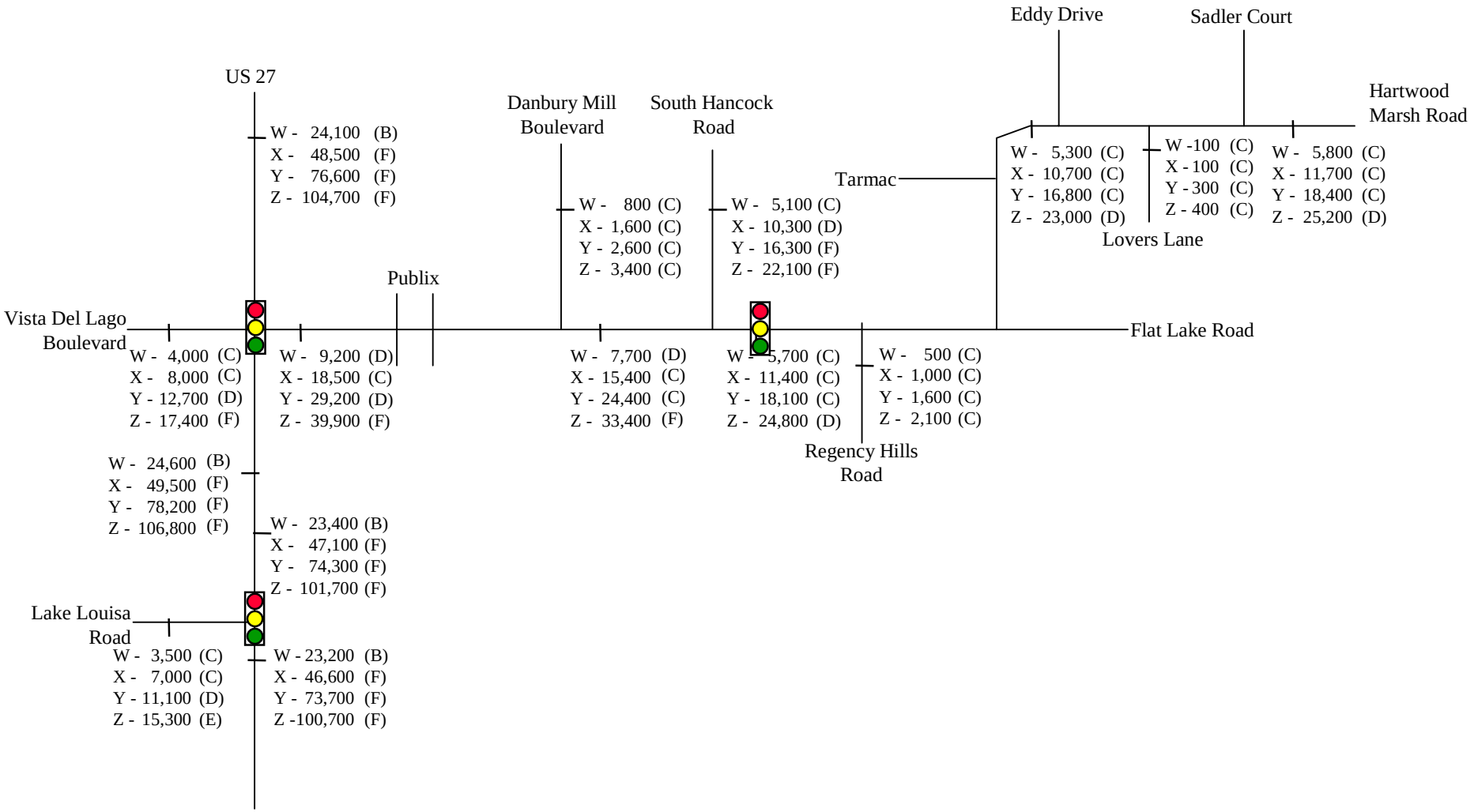


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Figure No: 6-9

W - 2003 Existing AADT (Estimated)
X - 2008 Build AADT (Estimated)
Y - 2018 Build AADT (Estimated)
Z - 2028 Build AADT (Estimated)

- Signalized Intersection

Build 1 Average Annual Daily Traffic Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

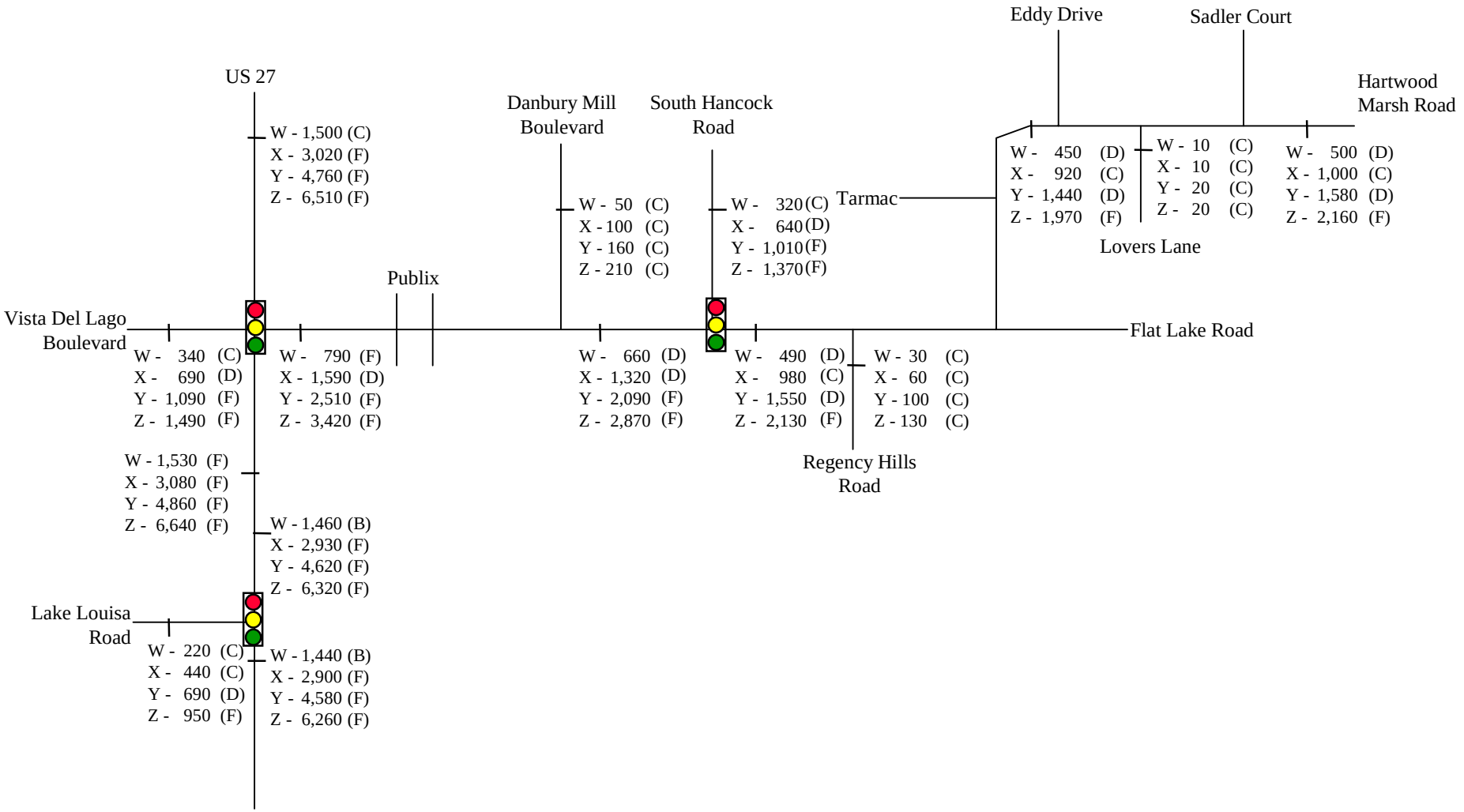

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Figure No:

6-10

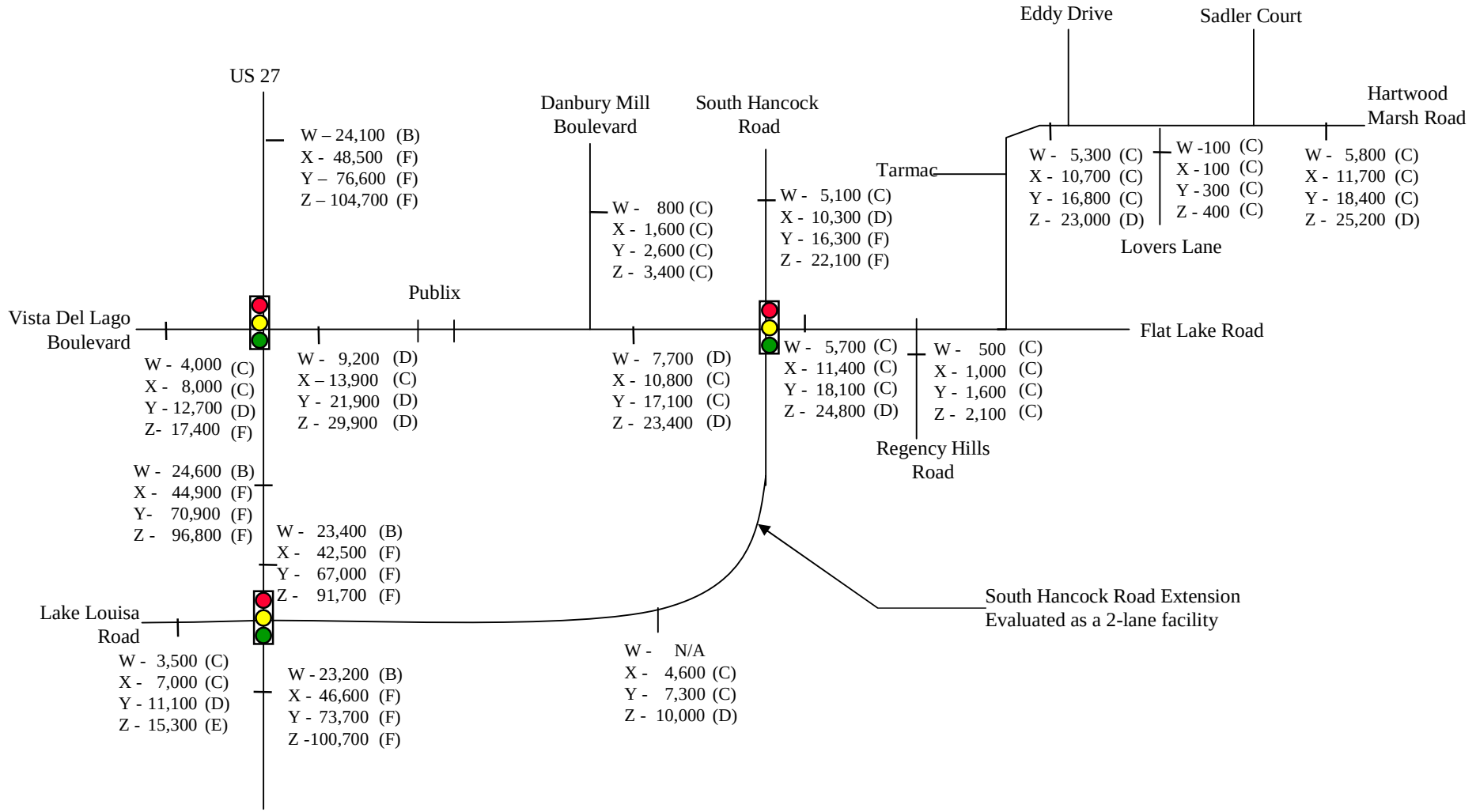
W - 2003 Existing DDHV (Estimated)
X - 2008 Build DDHV (Estimated)
Y - 2018 Build DDHV (Estimated)
Z - 2028 Build DDHV (Estimated)

- Signalized Intersection

Build 1 Directional Design Hour Traffic Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



Engineers & Planners

Figure No: 6-11

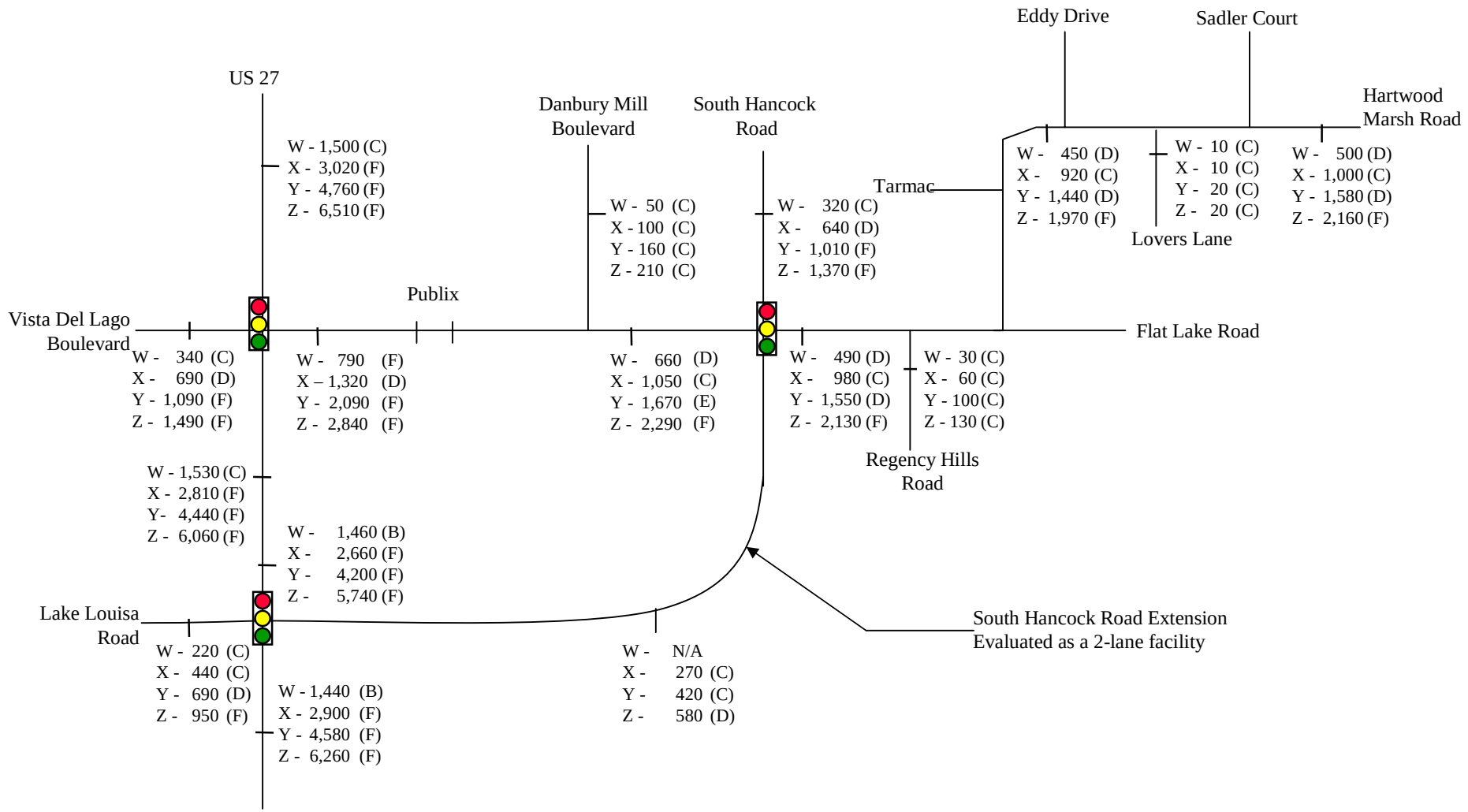
W - 2003 Existing AADT (Estimated)
X - 2008 Build AADT (Estimated)
Y - 2018 Build AADT (Estimated)
Z - 2028 Build AADT (Estimated)

- Signalized Intersection

Build 2 Average Annual Daily Traffic Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



Engineers & Planners

Figure No: 6-12

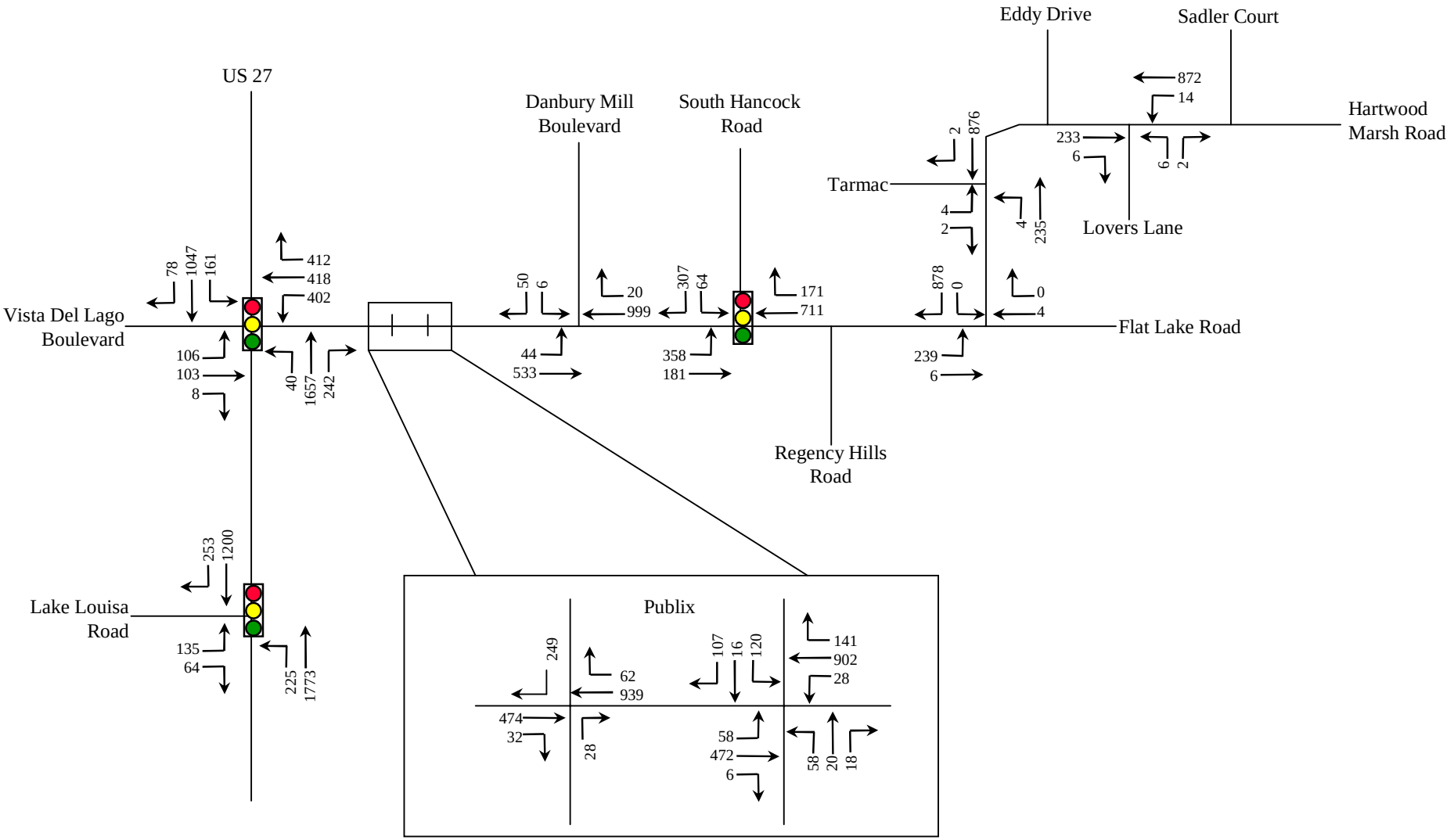
W - 2003 Existing DDHV (Estimated)
X - 2008 Build DDHV (Estimated)
Y - 2018 Build DDHV (Estimated)
Z - 2028 Build DDHV (Estimated)

- Signalized Intersection

Build 2 Directional Design Hour Traffic Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



Engineers & Planners

Figure No:

6-13

163 / 223 / 16 - Turning Movement Volumes

- Signalized Intersection

2008 Build 1 Turning Movement Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

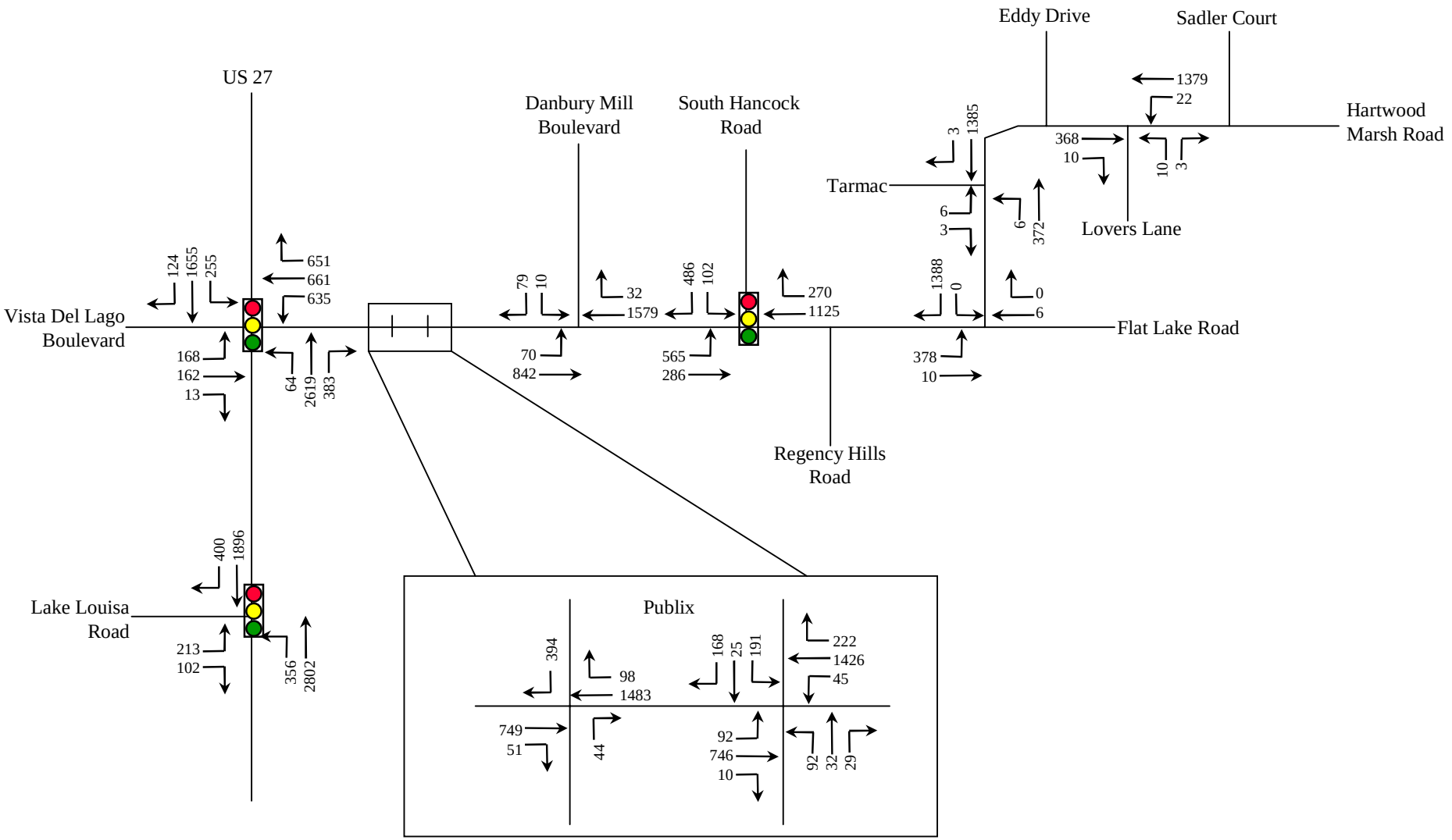


Figure No: 6-14

163
223
16
- Turning Movement Volumes

- Signalized Intersection

2018 Build 1 Turning Movement Volumes
Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line

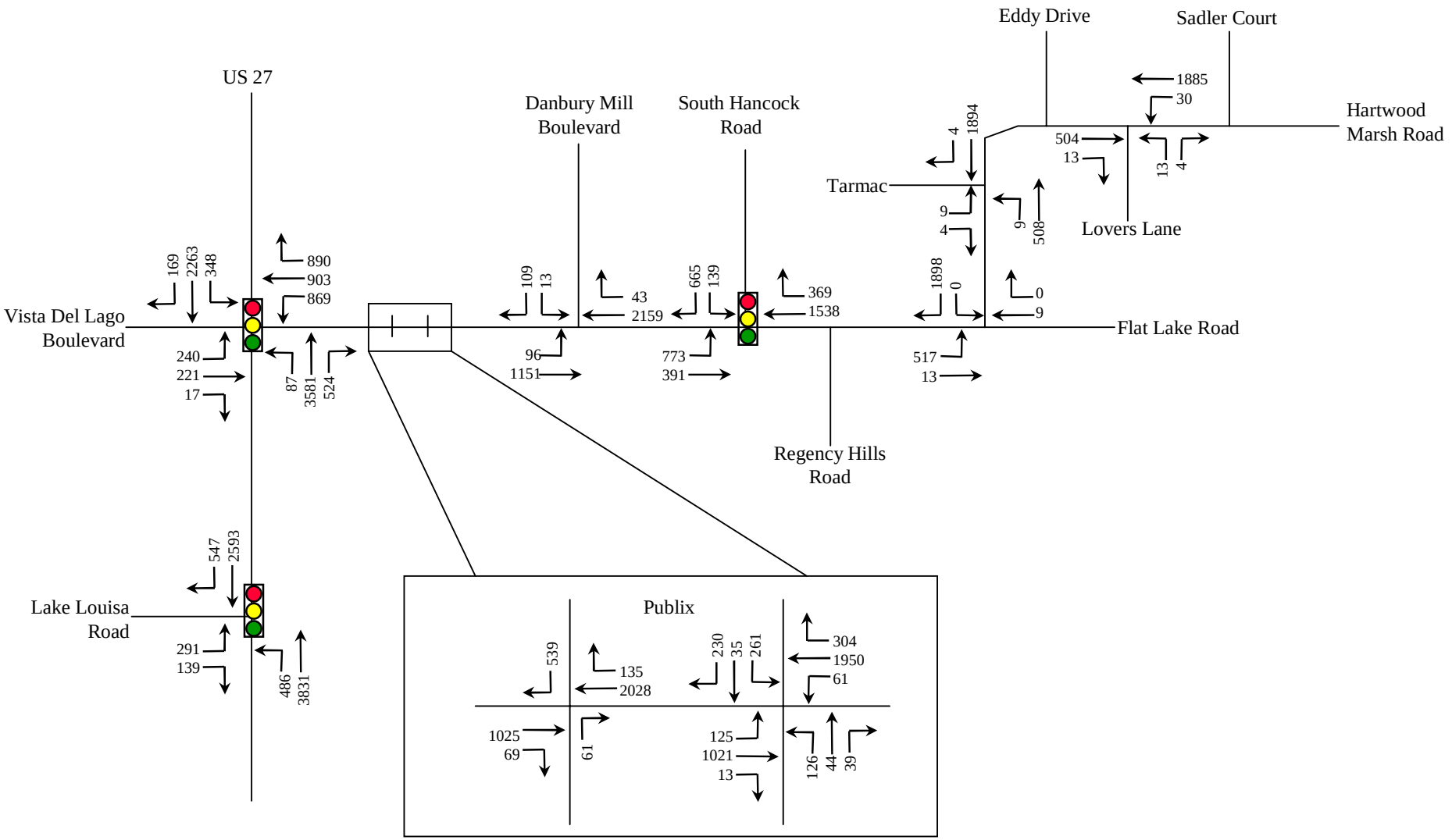


Figure No: 6-15

163 223 16 - Turning Movement Volumes

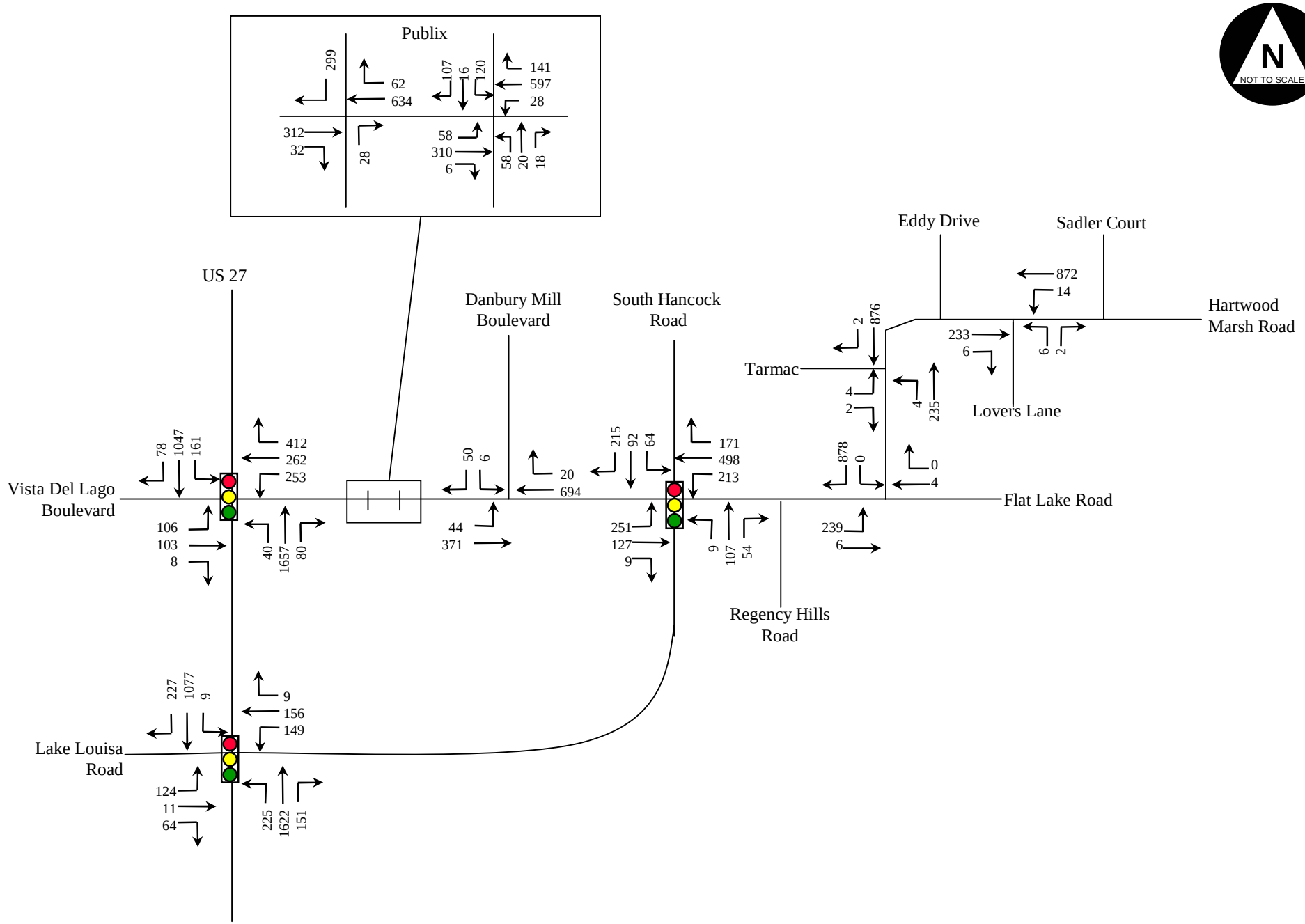
- Signalized Intersection

2028 Build 1 Turning Movement Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

Engineers & Planners



Engineers & Planners

Figure No:

6-16

163
223
16
- Turning Movement Volumes

- Signalized Intersection

2008 Build 2 Turning Movement Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

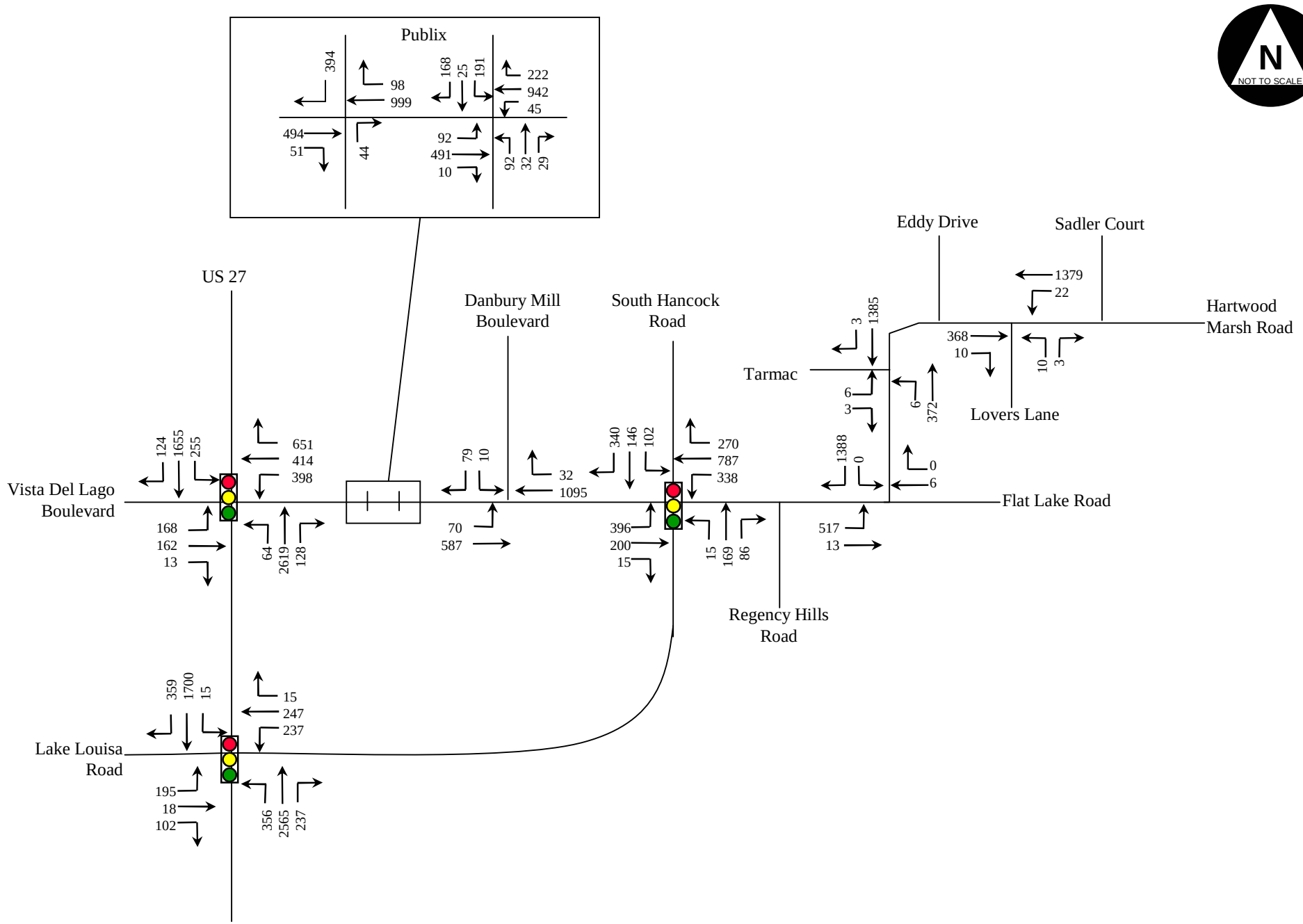
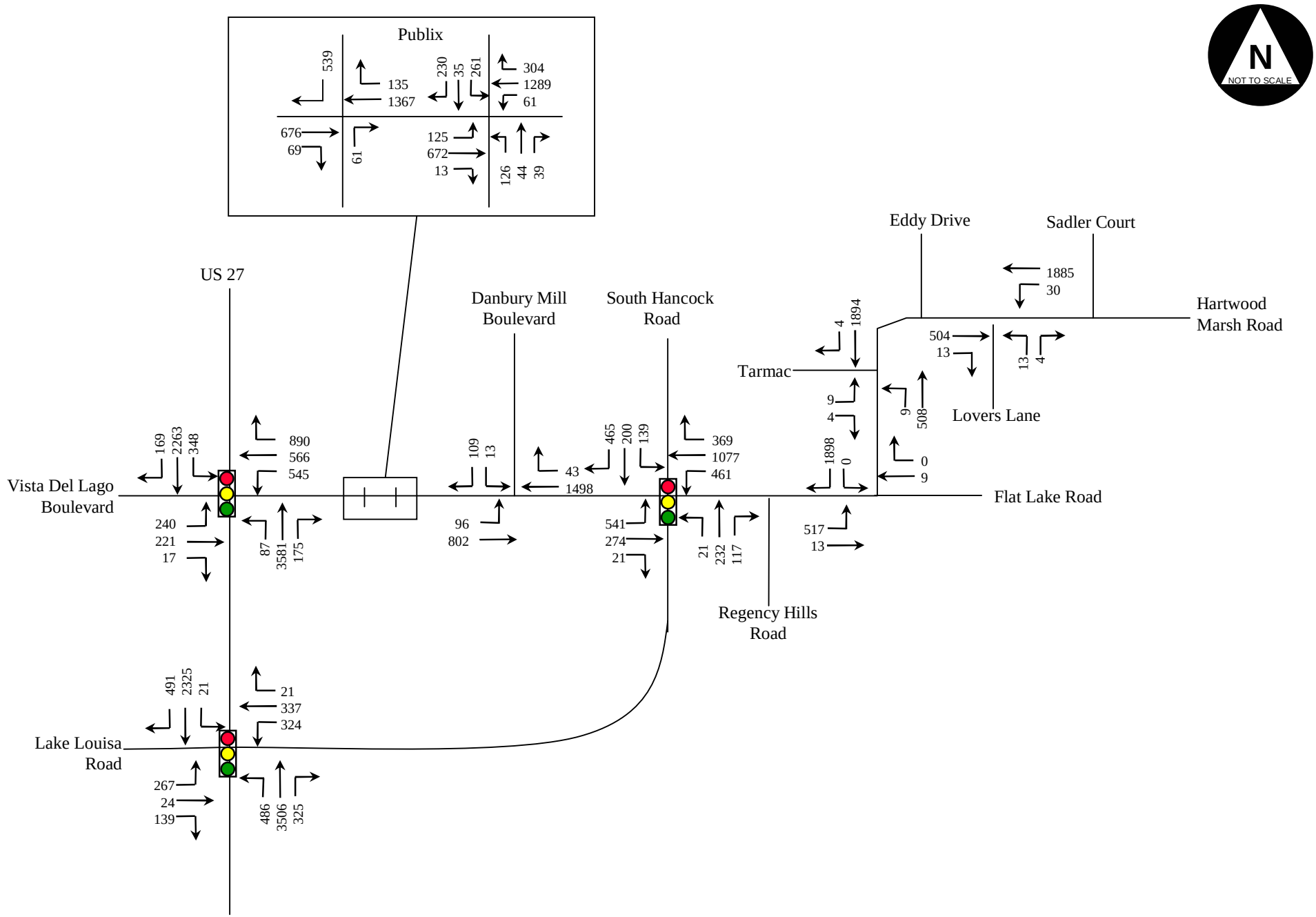


Figure No: 6-17

163
223
16
- Turning Movement Volumes

- Signalized Intersection

2018 Build 2 Turning Movement Volumes
Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line


Publix
539
135
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230
35
261
304
1289
61
676
69
61
125
672
13
126
44
39
N
NOT TO SCALE
US 27
Danbury Mill Boulevard
South Hancock Road
Eddy Drive
Sadler Court
Hartwood Marsh Road
1885
30
Tarmac
4
1894
504
13
13
4
9
4
9
508
Lovers Lane
1898
0
0
9
Vista Del Lago Boulevard
169
2263
348
890
566
545
109
13
43
1498
465
200
139
369
1077
461
Flat Lake Road
240
221
17
87
3581
175
96
802
541
274
21
21
232
117
517
13
Regency Hills Road
491
2325
21
21
337
324
Lake Louisa Road
267
24
139
486
3506
325

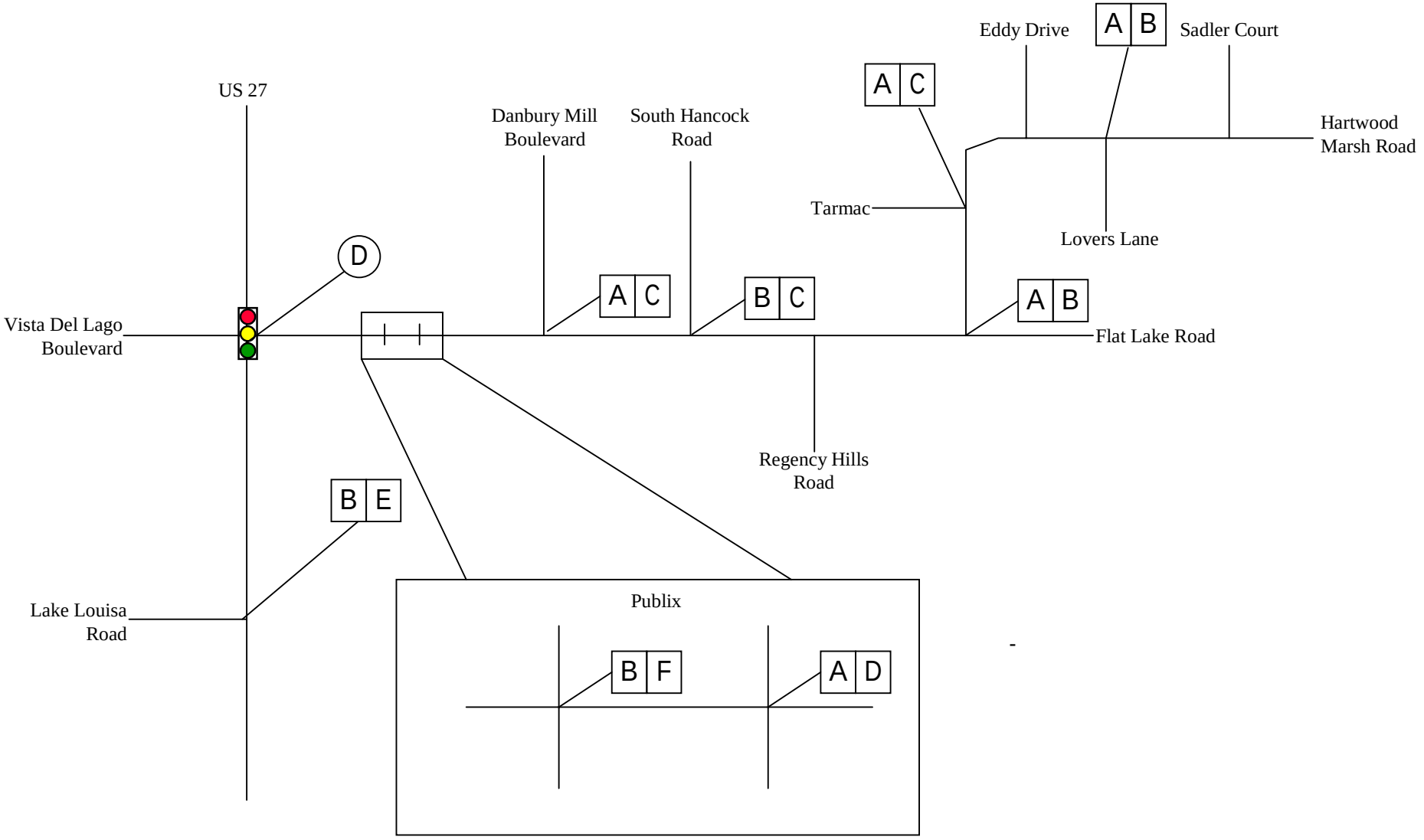

Figure No: 6-19

B
C F

- Signalized Intersection LOS

Unsignalized Intersection LOS
Mainline(Sidestreet)

- Signalized Intersection

2008 No Build Level of Service
Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line

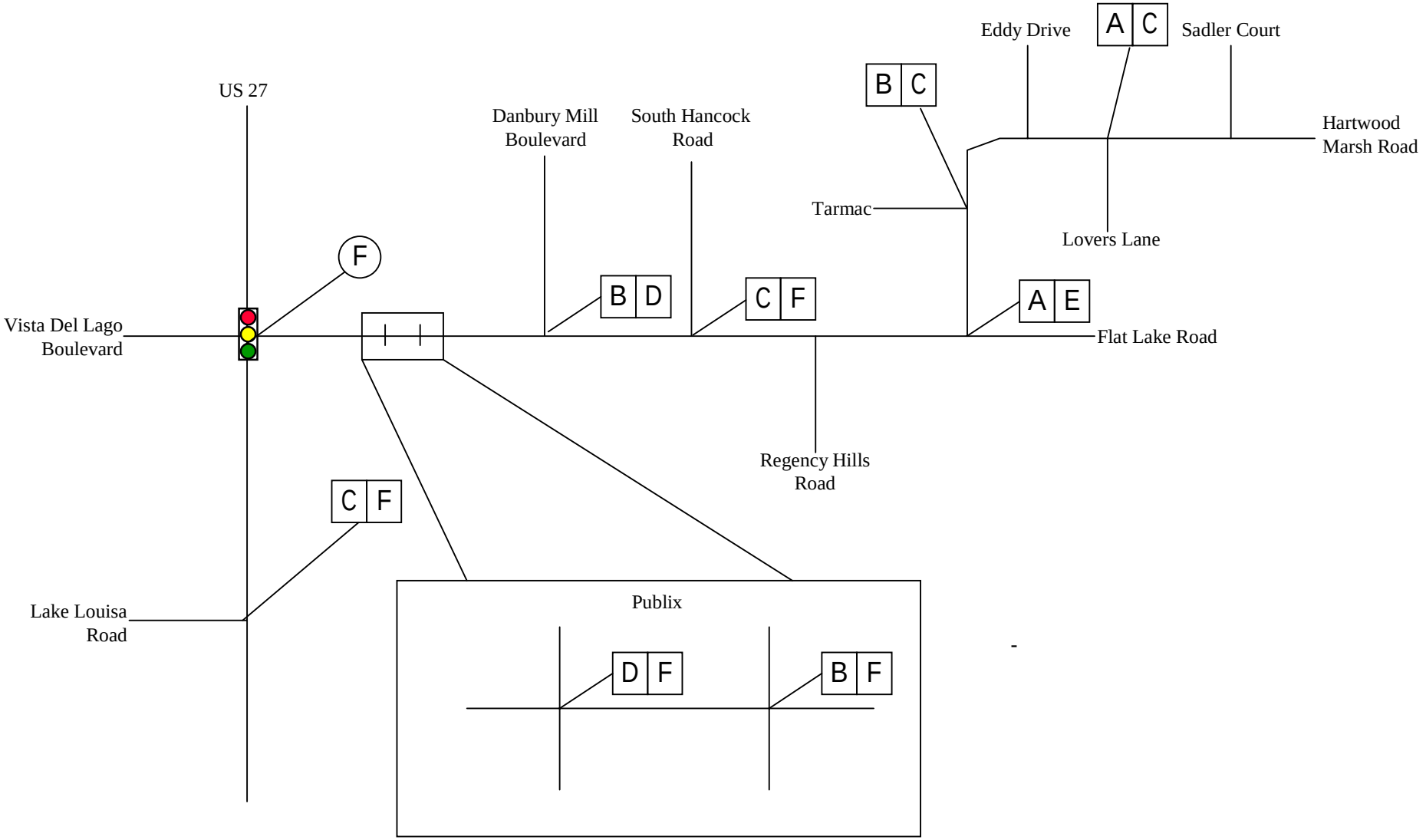

Figure No: 6-20

B / C F - Signalized Intersection LOS / Unsignalized Intersection LOS Mainline(Sidestreet)

- Signalized Intersection

2018 No Build Level of Service
Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line

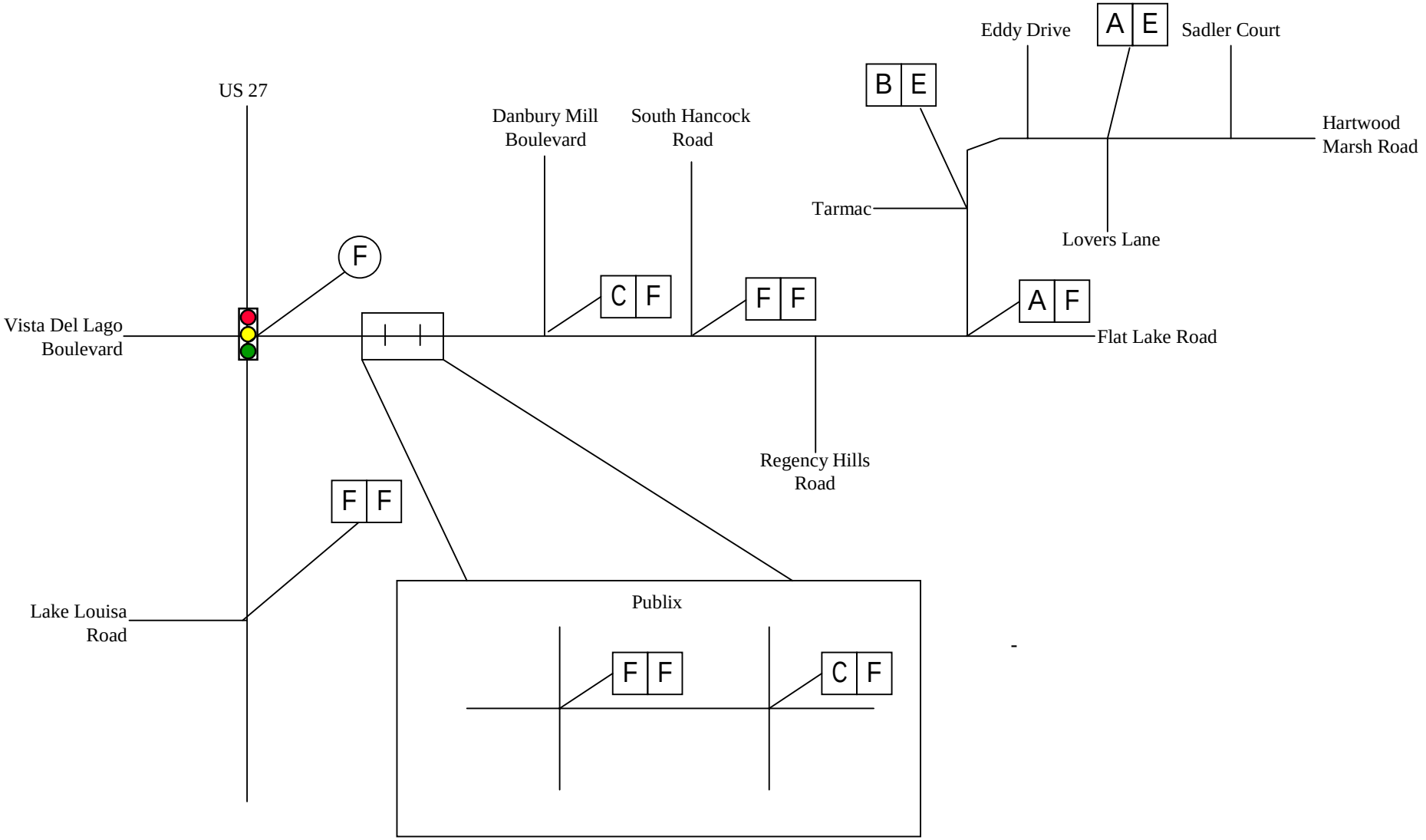

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Figure No:

6-21

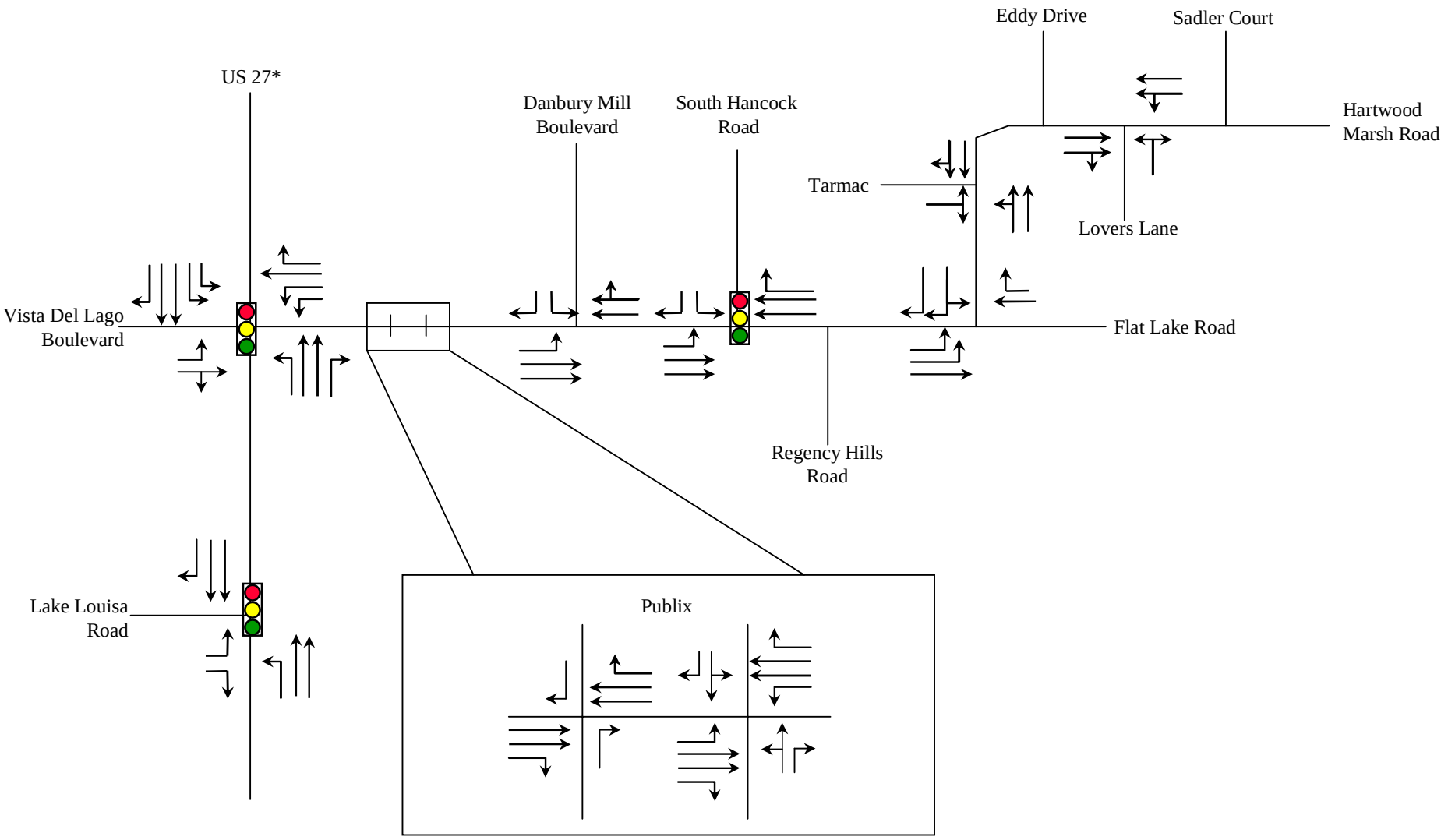
B
C F

- Signalized Intersection LOS

Unsignalized Intersection LOS
Mainline(Sidestreet)

- Signalized Intersection

2028 No Build Level of Service
Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line



* US 27 will be 6-laned by 2018

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Figure No:

6-22

- Build Geometry

- Signalized Intersection

Build 1 Geometry

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

evaluate the anticipated Build 1 intersection conditions. The Build 1 intersection levels of service for the opening, mid and design years are shown on Figures 6-23, 6-24 and 6-25. As illustrated, one of the two signalized intersections along Hartwood Marsh Road are expected to operate below the minimum acceptable LOS D in the mid-design year (2018). By the design year (2028), both intersections will operate below the minimum LOS D standard.

The proposed Build 2 intersection geometry is illustrated in Figure 6-26. The future Build 2 peak hour turning movement volumes, as illustrated in Figures 6-16, 6-17, and 6-18 were used to evaluate the anticipated Build 2 intersection conditions. The Build 2 intersection Levels of Service for the opening, mid and design year are shown on Figures 6-27, 6-28, and 6-29. As shown in Figure 6-29, two of the three intersections operate at or below the minimum LOS D standard by the design year 2028.

6.9 Future Roadway Levels of Service

Future levels of service for Hartwod Marsh Road were determined using the current adopted procedures as outlined in the Transportation Research Board's Special Report 209 – Highway Capacity Manual (HCM). FDOT 2002 Quality/Level of Service Handbook tables were used to determine roadway link levels of service.

6.9.1 No Build Roadway Segment Levels of Service

The future No Build AADT volumes, as illustrated on Figures 6-4, were used to evaluate the anticipated No Build roadway link levels of service. The opening, mid and design year roadway link No Build levels of service also illustrated on Figures 6-4.

During the opening year, all of the roadway segments will operate at or above the minimum acceptable LOS D. By the mid-design year, two roadway links will operate below LOS D. Finally, by the design year, all of the roadway segments will operate at or below the LOS D minimum.

6.9.2 Build Roadway Segment Levels of Service

The future Build 1 AADT's, as illustrated on Figures 6-9, were used to evaluate the anticipated Build 1 roadway link levels of service. The Build 1 opening, mid and design year roadway link levels of service are also illustrated on Figures 6-9.

During the opening year, two of the roadway segments will operate at the minimum acceptable LOS D. By the mid-design year, all of the roadway segments will operate at or below LOS D. Finally, by the design year, all of the roadway segments will operate below the LOS D minimum.

The future Build 2 AADT's shown in Figure 6-11 were used to evaluate the anticipated Build 2 roadway segment LOS. The segment LOS are shown in Figure 6-11 for the corresponding years.

By opening year 2008, all of the segments are expected to operate above the minimum acceptable LOS D. By mid-design year, two of the segments are expected to operate at LOS D and by the design year, all of the segments are expected to operate at LOS D.

A review of the expected roadway and intersection levels of service indicates that the four-laning of Hartwood Marsh Road will not alone satisfy the projected traffic needs through Lake County. Improvements to other area roadways such as SR 50, Florida's Turnpike and Orlando-Orange

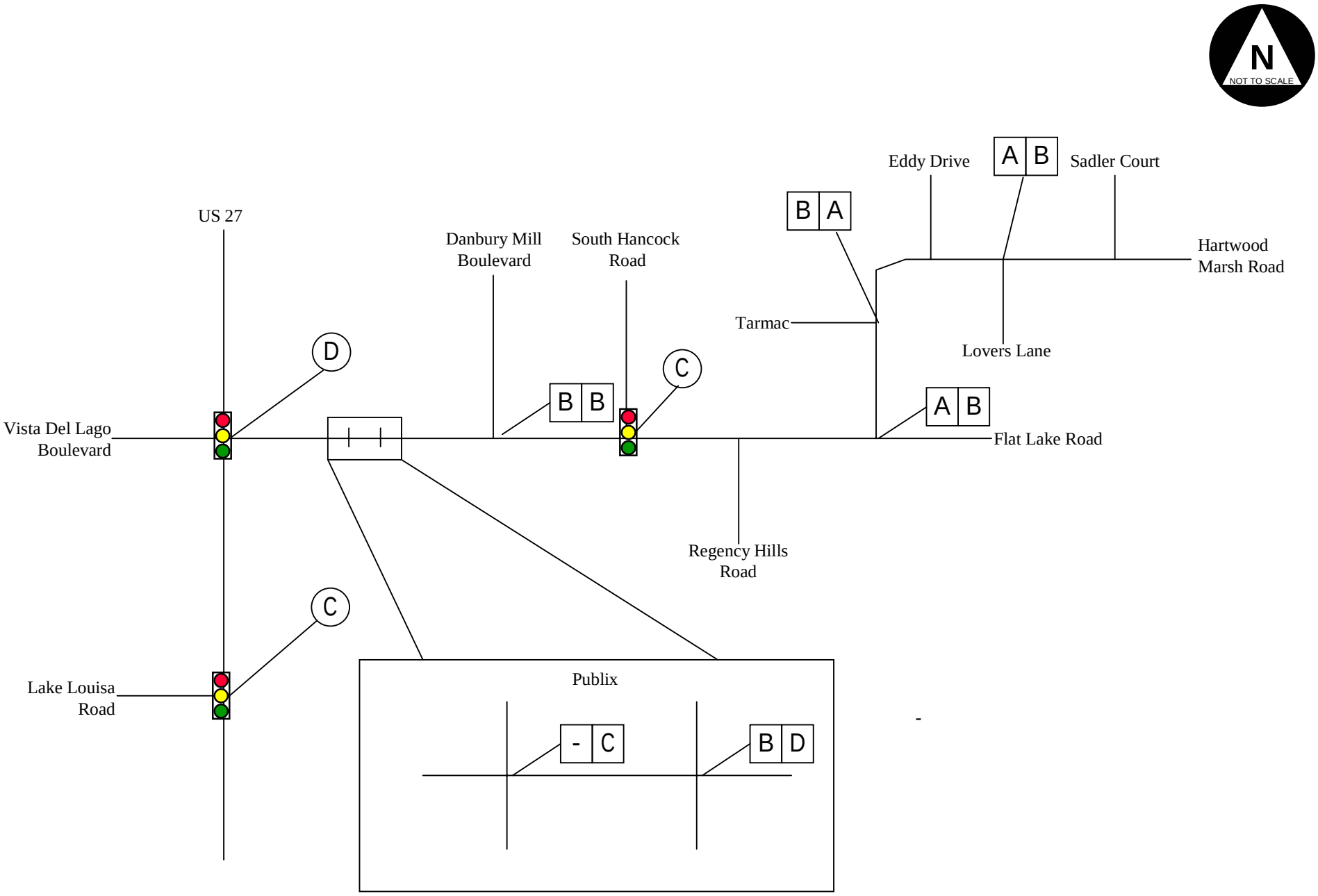


Figure No: 6-23

B — Signalized Intersection LOS

C F — Unsignalized Intersection LOS Mainline(Sidestreet)

- Signalized Intersection

2008 Build 1 Level of Service

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

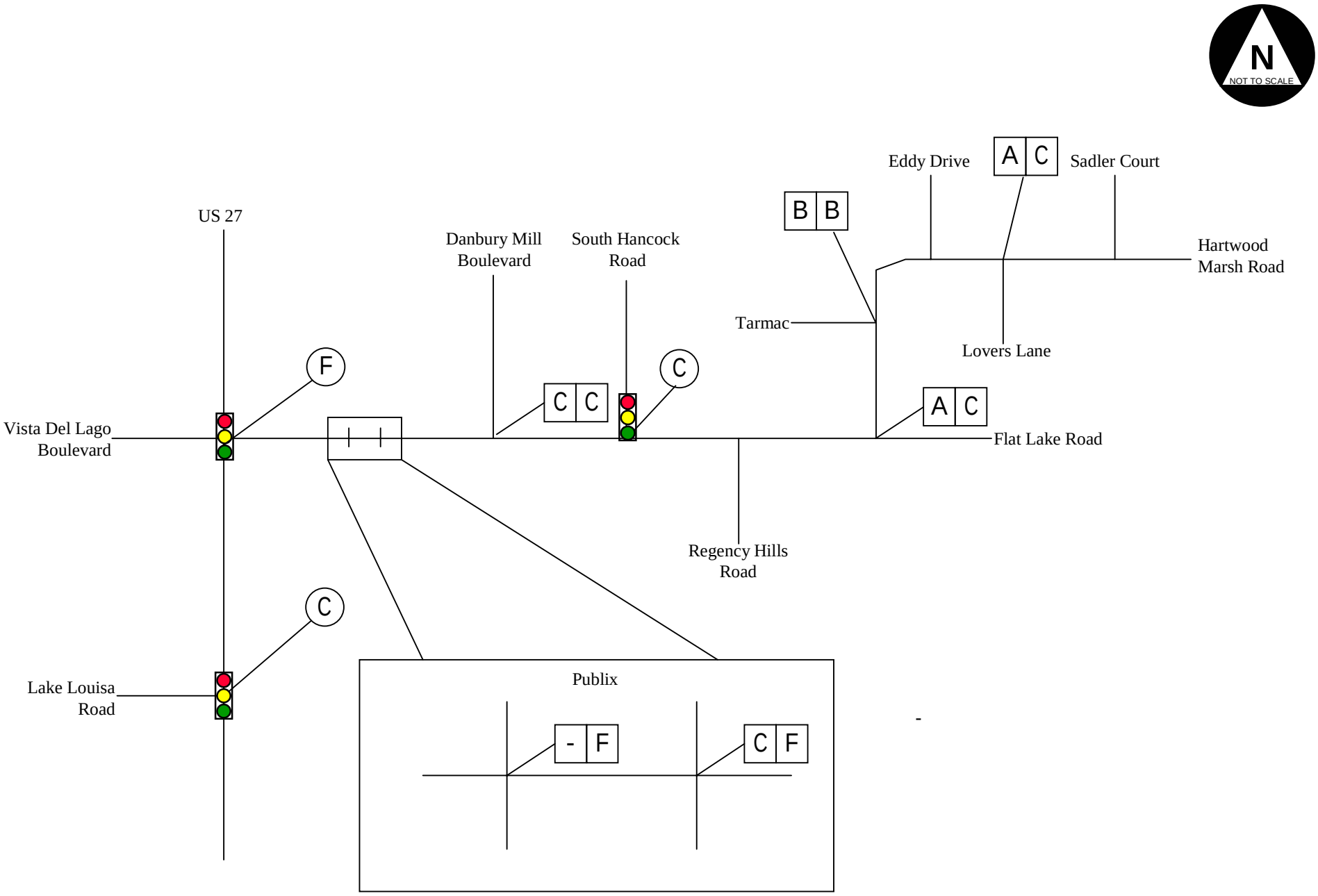


Figure No: 6-24

B
C F
- Signalized Intersection LOS
Unsignalized Intersection LOS
Mainline(Sidestreet)

- Signalized Intersection

2018 Build 1 Level of Service
Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line

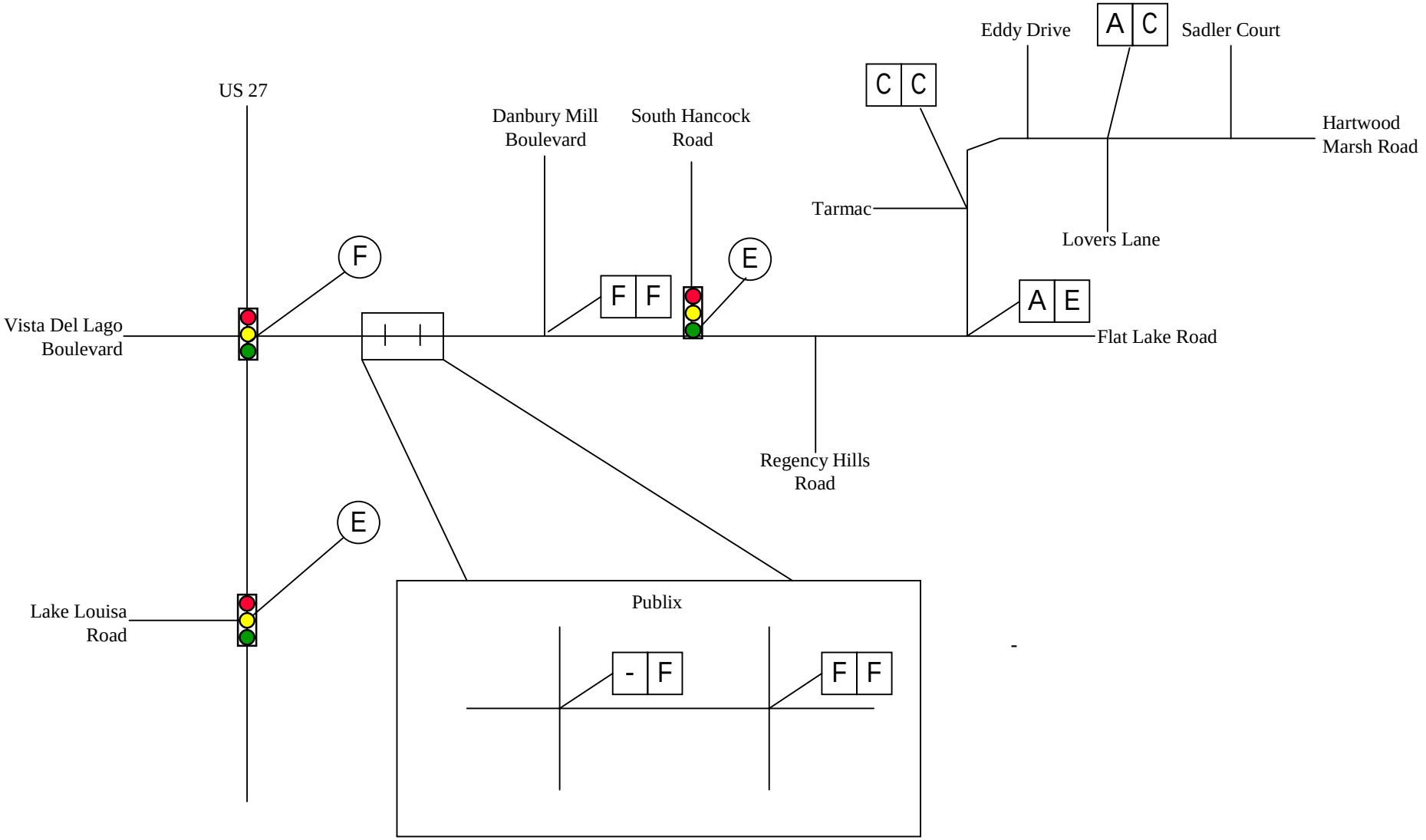
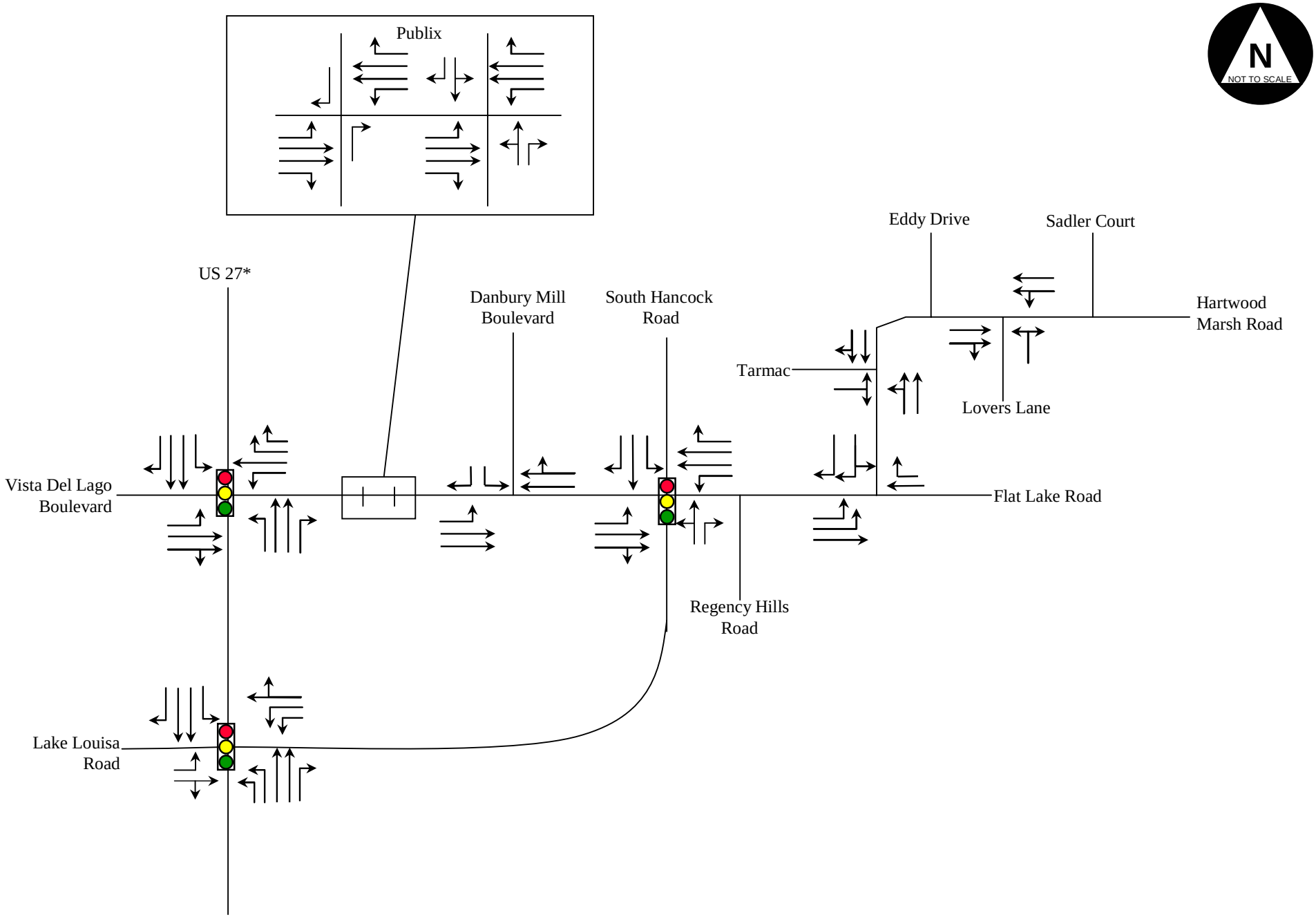


Figure No: 6-25

B
C F
- Signalized Intersection LOS
Unsignalized Intersection LOS
Mainline(Sidestreet)

- Signalized Intersection

2028 Build 1 Level of Service
Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line



* US 27 will be 6-laned by 2018

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Figure No:

6-26

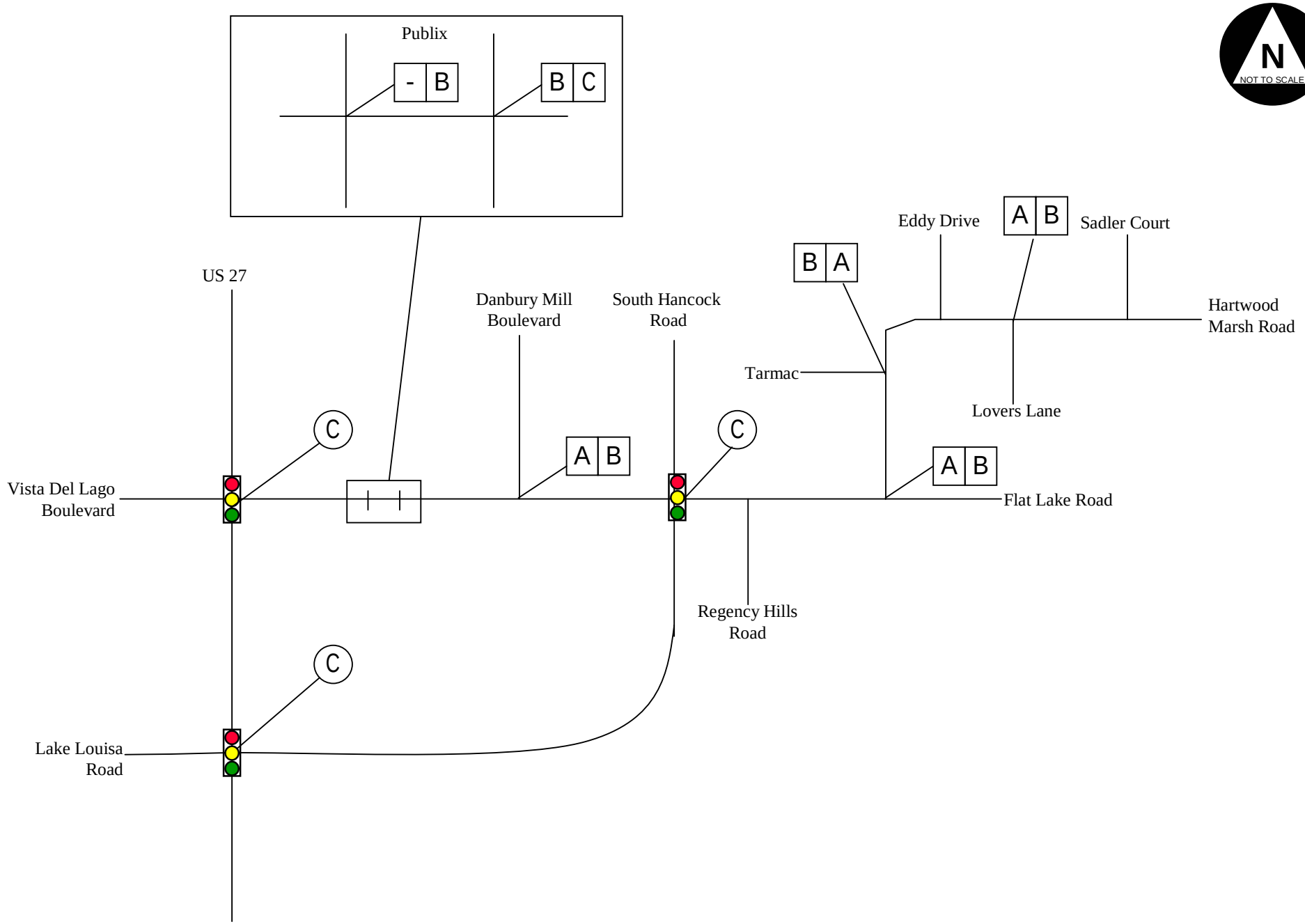
- Build Geometry

- Signalized Intersection

Build 2 Geometry

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



Engineers & Planners

Figure No:

6-27

B - Signalized Intersection LOS

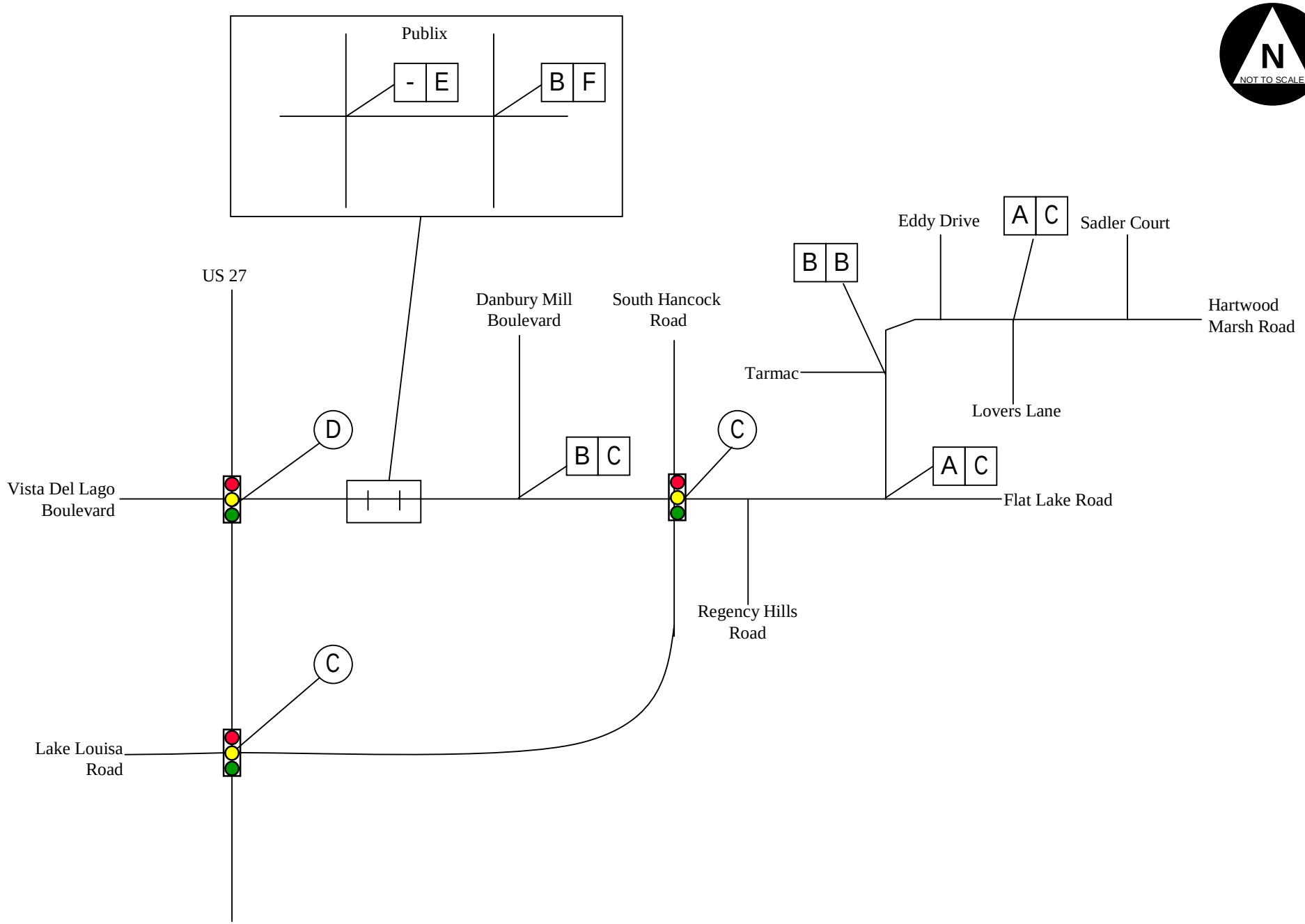
C F Unsignalized Intersection LOS Mainline(Sidestreet)

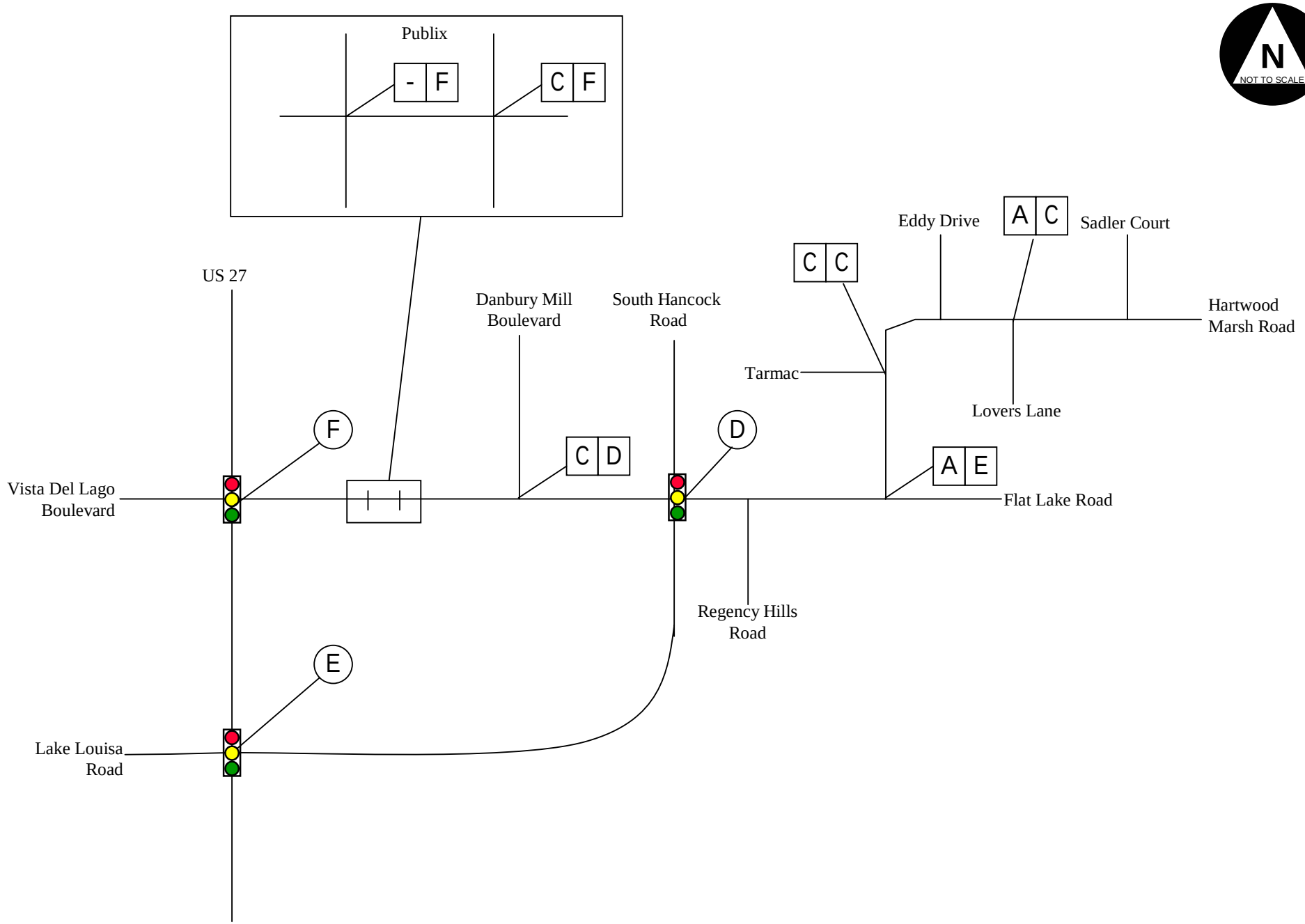
- Signalized Intersection

2008 Build 2 Level of Service

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line


Publix
- E
B F
N
NOT TO SCALE
US 27
Danbury Mill Boulevard
South Hancock Road
B B
Eddy Drive
A C
Sadler Court
Hartwood Marsh Road
Tarmac
Lovers Lane
D
B C
C
A C
Vista Del Lago Boulevard
Flat Lake Road
Regency Hills Road
C
Lake Louisa Road


Publix
- F
C F
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NOT TO SCALE
US 27
Danbury Mill Boulevard
South Hancock Road
C C
Eddy Drive
A C
Sadler Court
Hartwood Marsh Road
Tarmac
Lovers Lane
F
C D
D
A E
Vista Del Lago Boulevard
Flat Lake Road
Regency Hills Road
E
Lake Louisa Road

County Expressway Authority's expressway system are planned. Additional roadway improvements may still be that could range from expansion of existing parallel facilities to new roadways.

6.10 Recommended Intersection Geometry

In addition to the four-laning of Hartwood Marsh Road and the extension of South Hancock Road south to intersect with US 27 at Lake Louisa Road, the following intersection improvements are recommended:

- Hartwood Marsh Road at US 27 – Addition of eastbound through lane and a westbound right turn lane.
- Hartwood Marsh Road at Publix Westerly Driveway – Closure of the existing median opening, modification of the northbound and southbound approaches to right turn only, addition of a westbound right turn lane.
- Hartwood Marsh Road at Publix Easterly Driveway – Addition of a westbound right turn lane.
- Hartwood Marsh Road at South Hancock Road – Signalization of intersection, addition of an eastbound shared through/right lane, westbound right and left turn lanes and proposed geometry consisting of a shared left/through lane and a right turn lane for the new leg of the intersection.
- Lake Louisa Road at US 27 – Signalization of intersection, dual left turn lanes and a through/right lane are proposed for the new leg of the intersection, addition of a southbound left turn lane, eastbound left turn lane, and dual northbound left turn lanes.

Figure 6-26 provides the recommended intersection geometry.

7.0 Corridor Analysis

7.1 Overview

The objective of the corridor analysis process is to select a viable corridor in which to provide technically and environmentally sound alignment alternatives that are cost effective and acceptable to the community. The alignment of the existing roadway is acceptable throughout a majority of the corridor.

Realignment of Hartwood Marsh Road through the TARMAC property has been discussed. This scenario would take Hartwood Marsh Road north of the existing TARMAC entrance and align it with Hartwood Marsh Road west of South Hancock road, thereby eliminating the bends west of Eddy Drive and west of Flat Lake Road.

8.0 Alternative Alignment Analysis

The following sections describe the different roadway improvement alternatives being considered, including the “No Build" alternative.

8.1 No Build Alternative

The No Build Alternative assumed that the existing mainline laneage (two through travel lanes) on Hartwood Marsh Road would remain through the design year 2028.

The existing two-lane Hartwood Marsh Road corridor from US 27 to the Lake County Line will fall below the minimum acceptable level of service D (LOS D) along with all roadway segments analyzed, by the design year 2028. In addition, the signalized intersections analyzed will fall below the minimum acceptable LOS D by the opening year 2008. Based on the results of the 2028 No Build Alternative level of service analysis, the following improvements would need to be implemented prior to the year 2026:

- Four through lanes from US 27 to Lake County Line
- Extension of South Hancock Road to intersect with US 27 at Lake Louisa Road

The No Build Alternative does not achieve an acceptable level of service (minimum LOS D) in future years.

There are some No Build benefits, however, which are typical when considering a roadway construction project. These include the following:

- No additional right-of-way acquisition,
- No additional relocations,
- No additional inconvenience to the traveling public and property owners during construction, and
- No additional design, right-of-way and construction costs.

The lack of any improvements would result in a continued increase in traffic congestion and longer travel times for users of the Hartwood Marsh Road corridor. Consequently, deficiencies associated with providing the No Build Alternative include low travel speeds, lengthy vehicle queues (especially at major intersections), impaired traffic flow and higher crash rates. In addition, the No Build alternative would not be consistent with the Lake County Comprehensive Plan or the METROPLAN Orlando’s Long Range Transportation Plan. Nonetheless, the No Build alternative will remain a viable alternative through the Public Hearing phase.

8.2 Transportation Systems Management

The Transportation Systems Management (TSM) alternative includes those types of activities designed to maximize the use of the existing transportation system. A TSM project is a limited construction alternate that would use minor improvements to enhance capacity to the Hartwood Marsh Road corridor. These strategies include intersection widening, improved signalization, increased mass transit usage, the possibility of reverse lane operation and/or lane use restrictions for high-occupancy vehicles, and provisions for bicycles and pedestrians. The advantage of this alternative would be the limited expenditure of funds to relieve existing congestion problems. While some increased efficiency might be realized at individual signalized intersections through

minor improvements, the overall capacity restrictions of maintaining the existing roadway configuration would not allow improvement of the overall level of service to support existing and future traffic demands on Hartwood Marsh Road. Anything less than the expansion of Hartwood Marsh Road is not considered a viable solution to the existing capacity problems. Therefore, Transportation Systems Management was dismissed as a viable long-term improvement alternative.

8.3 Screening of Build Alternatives

8.3.1 Overview

The objective of the alternatives analysis process is to identify technically and environmentally sound alignment alternatives that meet the traffic needs of the project and that are cost effective and acceptable to the community. This section documents the results of the identification and evaluation of the alternatives that were considered in the Hartwood Marsh Road PD&E Study. Each alternative considered in the study is presented below.

As stated in Section 7 of this report, the existing corridor as well as the realignment of Hartwood Marsh Road was reconsidered.

8.3.2 Typical Sections

The proposed roadway is intended to be urban corridor. In general the urban typical section is a four-lane section with two twelve-foot travel lanes in each direction. A four-foot bicycle lane, two-foot Type F curb and gutter and five-foot sidewalks are provided along both sides of the roadway. The proposed median is 22 feet in width with Type E curb and gutter. Storm water runoff is collected in curb inlets and pipe to retention ponds. The proposed right-of-way varies between 100 and 120 feet. An additional typical section is also included, showing a 10-foot multi-purpose trail on one side of the roadway. This typical section is included as an option, should the County decide to build a trail in this area. Figure 8-1 illustrates the urban typical sections.

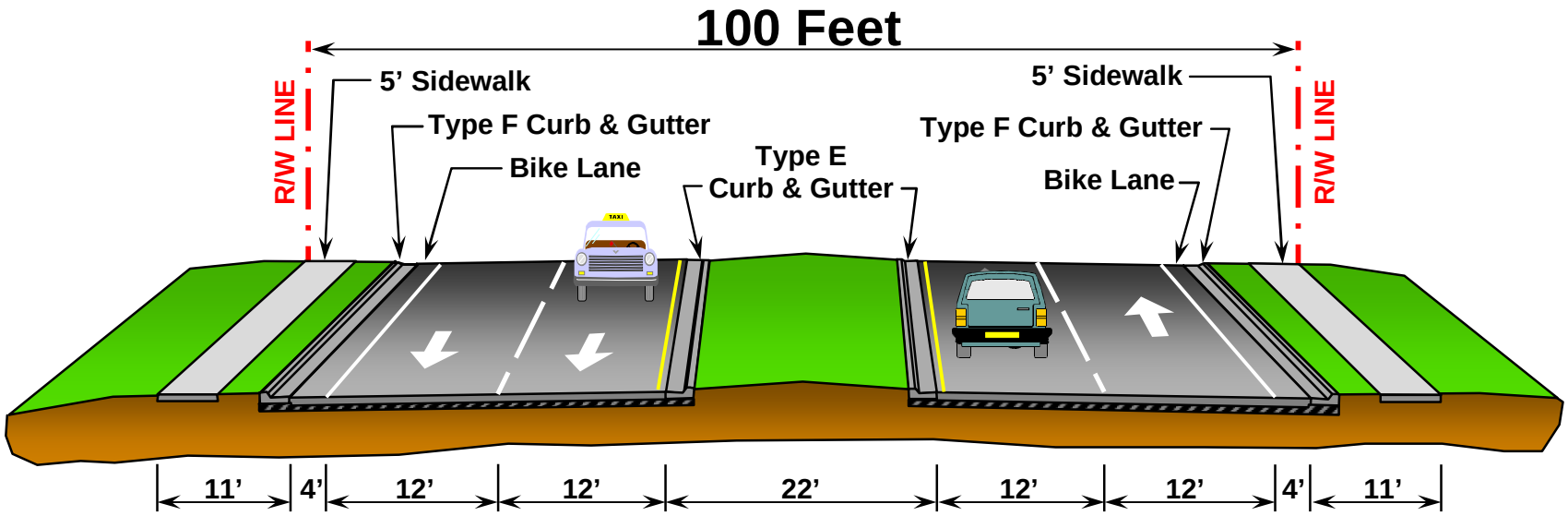
8.3.3 Alignments

There are two alignments considered in the corridor. The first alignment is centered on the existing road alignment. The second alignment follows the existing roadway and then curves off into the Tarmac facility at the southwest corner of the property and exits at the northeast corner of the property to coincide with the existing road corridor. A sub-alternative to both of these alignments is the extension of South Hancock Road from Hartwood Marsh Road to US 27 at Lake Louisa Road. These alignments are depicted on Figure 8-2.

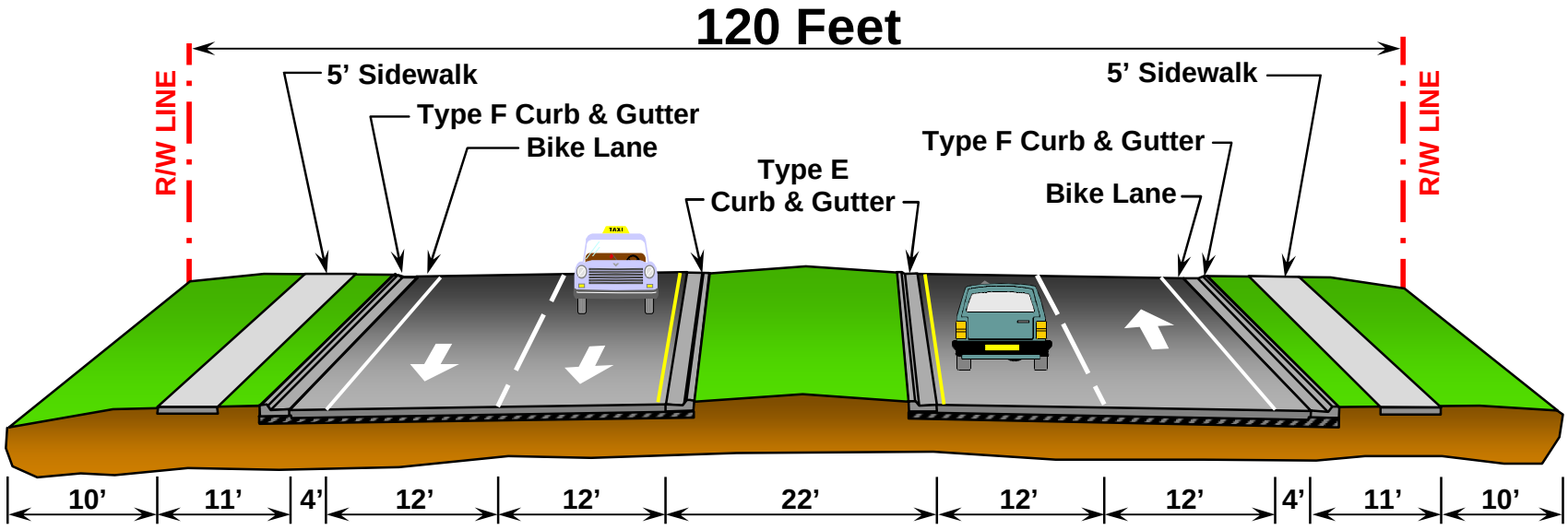
8.3.3.1 Alignment 1

Alignment 1 follows the existing centerline of Hartwood Marsh Road from US 27 to the Orange County line. The three existing curves would be modified to conform to current standards for a 45 mph design speed. The limits of the widening are considered to be symmetrical around the roadway centerline. To accommodate this alignment, right-of-way would be required on both sides of the Hartwood Marsh.

Between US 27 and Danbury Mill Boulevard, there is an existing 100-foot right-of-way width that is sufficient to accommodate the urban typical section. From Danbury Mill Boulevard to



Sta 10+00.00 (U.S. 27) to Sta 46+56.03 (Hancock Road)
Sta 200+63.56 to Sta 227+01.99 (County Line)



Sta 46+56.03 (Hancock Road) to Sta 200+63.56

Design Speed = 45 mph

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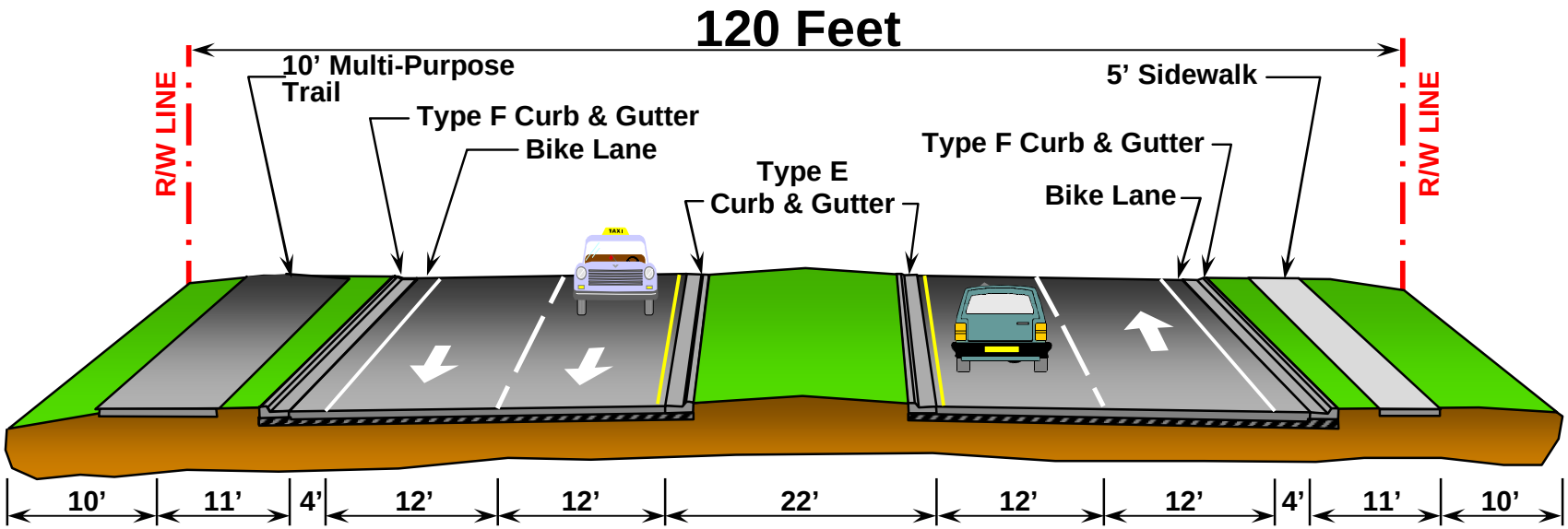
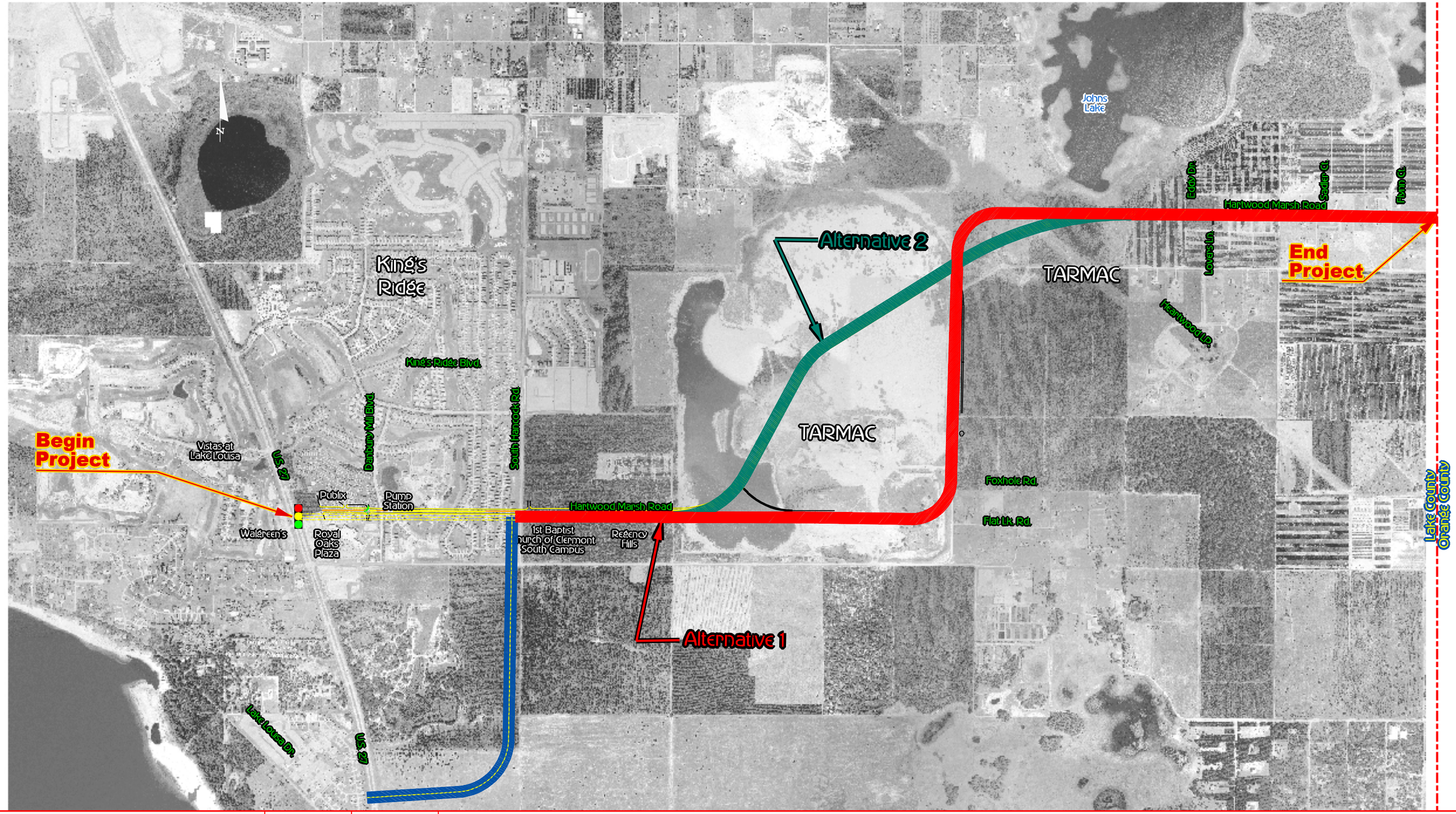
Figure No: 8-1a

Recommended Typical Sections
Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line



Optional Typical Section for Hartwood Marsh Road
With a Ten-Foot Multi-Purpose Trail on One Side
Sta 46+56.03 (Hancock Road) to Sta 200+63.56

Design Speed = 45 mph



TEI Engineers & Planners

FIGURE NO. 8-2

Alignment Alternatives

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

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Hancock Road, a 100-foot right-of-way width is considered requiring approximately 11 feet of right-of-way on the north side of the road, impacting the southern common area of the Kings Ridge subdivision. On the south side of the road, 9 feet of right-of-way would be required.

From Hancock Road to the southwest corner of the Tarmac facility, considering a total 120-foot right of way width, 87 feet of right-of-way would be required on the north side of the road. For this particular section, County records do not indicate any existing right-of-way north of the section line. From the eastern limits of the Regency Hills subdivision to the first curve on Hartwood Marsh Road, 20 feet of right-of-way would be required to the north and 19 feet to the south. To reconstruct the first curve to meet the current standards, an approximate 2.5 acre triangular portion of right-of-way would be needed on the north side of the road.

As Hartwood Marsh traverses northward, 21.5 feet of right of way would be required on the west side of the road and 18.5 feet on the east side of the road. To adjust the second and third curves, an approximate 1.5 acre section of right-of- way would be needed on the south side of the road. Continuing in an easterly direction, between the third curve and the western edge of the Avalon Estates subdivision, 19 feet of right-of-way is required on the north side and 21 feet on the south side. From the western edge of Avalon Estates to the eastern edge of Avalon Estates, 3.5 feet of right-of- way is required on the north side of the road and 36 feet on the south side of the road, which would increase the amount of land already donated by the subdivision.

From the subdivision to the Orange County line, the total right-of-way width considered is 100 feet. The proposed Orange County right-of-way width for Marsh Road east of the county line is 120 feet. The 20 foot reduction on the Lake County side is due to the fact that the existing road lies outside the platted right-of-way. Therefore, a total of 50 feet of right-of-way width would be required on the south side of the road. By reducing the right-of-way by 10 feet to a total of 50 feet south of the centerline of the road, the impact to the functioning orange grove along the southern edge of pavement is reduced. In addition there is a large metal storage building close to the north side of the road. Reducing the right of-way to 50 feet increases the offset to the building. Therefore, approximately 1.5 feet of property is required on the north side of the road. Both Sadler Court and Flynn Court do not have dedicated road right-of-way. Some property acquisition may be necessary to provide transitions to the existing dirt roads.

8.3.3.2 Alignment 2

The preferred roadway alignment generally follows the existing roadway corridor until Regency Hills. The alignment then curves into the Tarmac facility and exits at the northeast corner of the property where the road meets the existing Hartwood Marsh Roadway corridor. The project terminates at the Orange County line. The right-of-way needs for this alignment are described in the following paragraphs.

Between US 27 and Danbury Mill Boulevard, there is an existing 100 foot right-of-way width which is sufficient to accommodate the urban typical section. From Danbury Mill Boulevard to Hancock Road and holding the northern right-of-way line to avoid impact to the Kings Ridge subdivision, approximately 20 feet of right-of-way would be required on the south side of the road from the currently undeveloped properties to form a total right-of-way width of 100 feet.

From Hancock Road to the southwest corner of the Tarmac facility, the southern right-of-way line of Regency Hills is held, resulting in approximately 70 feet of right-of-way on the north side of the road. For this particular section, County records do not indicate any existing right-of-way north of the section line. The road alignment then shifts into the Tarmac facility at the southwest

corner of the property and exits at the northeast corner of the property. The total right-of-way width is 120 feet through the facility.

The Tarmac facility will eventually be discontinuing operation at its current location and will be moving to an unmined area directly east of the north-south portion of Hartwood Marsh Road. The existing mined site will be reconstructed as a housing development where the realigned Hartwood Marsh Road would serve as the main road through the development. Old Hartwood Marsh Road at the point where the proposed alignment curves to the northeast, would have to be realigned to intersect the new roadway in order to maintain access to the Flat Lake area. A cul-de-sac would be constructed on old Hartwood Marsh Road, north of Flat Lake Road. The remaining portion of Hartwood Marsh Road north of the cul-de-sac would be used strictly for vehicles accessing the mine.

In the northeast corner, in order to maintain access to the existing mining operation and to also provide access to the new mining site, the existing 2-lane Hartwood Marsh Road would have to be realigned to intersect with the new alignment. The 2-lane road would terminate at the current entrance to the mining operation.

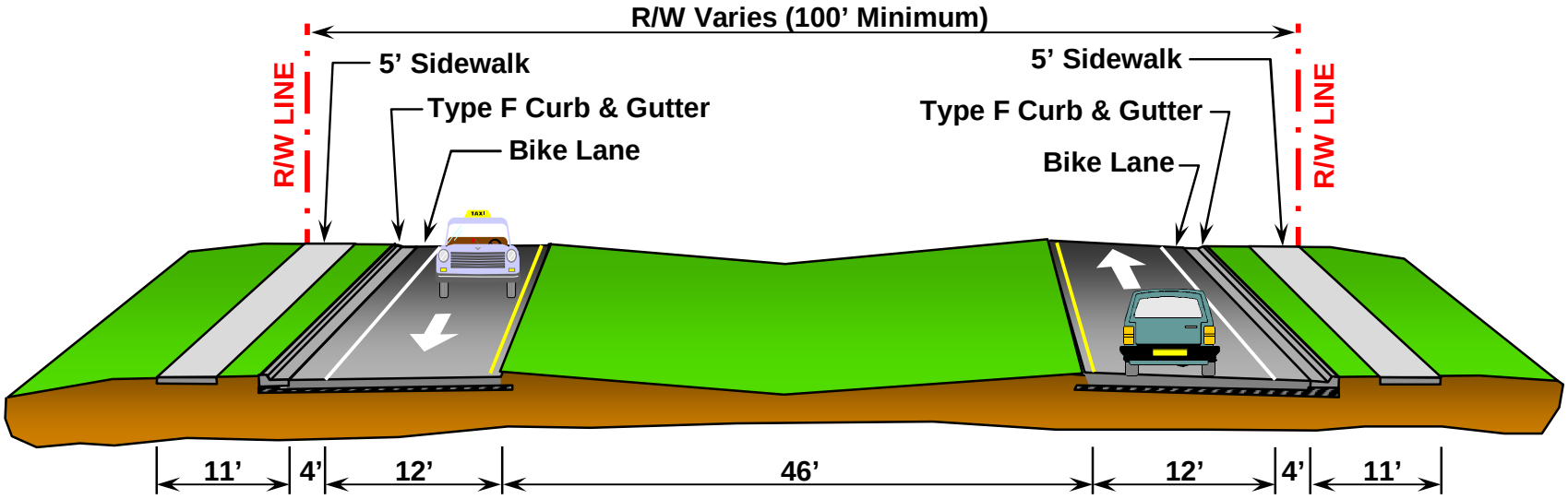
From the northeast corner of the Tarmac property to approximately Lover's Lane, the south right-of-way line is held, requiring 30 feet of property to the north for a total right-of-way width of 120 feet. From Lover's Lane to the Orange County line, the alignment must transition to match the existing roadway at the county line. The proposed Orange County right-of-way width for Marsh Road is 120 feet; however, the Lake County right-of-way width is shown as 100 feet from the eastern property line of Avalon Estates to the county line.

From the eastern limits of Avalon Estates to the county line, existing Hartwood Marsh Road shifts outside the existing right-of-way. Because the proposed centerline needs to match the existing road on the Orange County side, a shift of the road to the south is necessary. As a result, a narrow sliver of right-of-way is required from the Avalon Estates subdivision to the south. To minimize impact to the functioning orange grove along the southern edge of pavement, the required right-of-way can be reduced by 10 feet to a total of 50 feet south of the centerline of the road. The right-of-way need is reduced to a width between 23 and 53 feet. On the north side of the road there is a large metal storage building close to the road. By reducing the right of-way to 50 feet, from the centerline, the offset to the building is maximized. Approximately 0 to 28 feet of right-of-way would be required on the north side of the road from the mid-section line to the county line. Both Sadler Court and Flynn Court do not have dedicated road right-of-way. Some property acquisition may be necessary to provide transitions to the existing dirt roads.

8.3.3.3 Hancock Road Sub-Alternative

A sub-alternative to both Alignment 1 and 2 was considered. This alternative includes extending Hancock Road to US 27 and was considered in the traffic analysis to determine if the extension of Hancock Road reduced the required lanes on Hartwood Marsh Road between US 27 and Hancock Road. The traffic analysis demonstrated that extending Hancock Road did not reduce the required number of travel lanes on Hartwood Marsh Road, west of Hancock Road. The proposed alignment of the South Hancock Extension begins at the southern terminus at Hartwood Marsh Road and extends to the south to connect to US 27 at Lake Louis Road. It is assumed that the South Hancock Road extension will be constructed as two lanes of a future four- lane typical section. The two-lane typical section is shown in Figure 8-3.

100 Foot Typical Section



South Hancock Road Extension
From the Existing Terminus
To U.S. 27 at Lake Louisa Road

Design Speed = 45 mph

8.3.4 Evaluation Matrix of Alternatives

The evaluation process for the alternatives considered involved the analysis of a several factors. These factors considered include social impacts, natural environmental impacts, residential and business relocations and project costs. Both alignments have low social impact, the same area of floodplain impact, no wetland impacts and no required relocations. Therefore the remaining factor that differs is the project cost.

Table 8-1 summarizes the evaluation matrix.

Table 8-1
Alternatives Evaluation Matrix

Evaluation Factor	Alternative 1	Alternative 2	Alternative 2 (with Trail)	South Hancock Road
Construction Cost	$11,139,950	$10,241,660	$10,278,765	$2,236,970
Roadway Right-of-Way Cost	$2,393,100	$3,721,700	$3,721,700	N/A
Retention Pond Right-of-Way Cost	$2,466,300	$2,326,100	$2,326,100	N/A
Engineering (Design) Cost	$1,336,795	$1,229,000	$1,233,455	$200,350
Total Cost	$17,336,146	$17,518,460	$17,560,020	$2,437,320
Residential Relocations	0	0	0	0
Business Relocations	0	0	0	0
Wetland Impacts	0	0	0	0
Floodplain Impacts	0.7 acres	0.7 acres	0.7 acres	0
Social Impacts	Low	Low	Low	Low

8.4 Recommended Alternatives

Alignment 2 is the recommended alignment because it will benefit the development of the existing Tarmac facility as well as provide a safer access to the new mining operation east of Hartwood Marsh Road. In addition, the right-of-way cost is less than Alignment 1. Alignment 1 impacts properties on both sides of the corridor increasing cost as well as acquisition time. Alternative 2 (with Trail) is an option, should the County decide to construct a multi-purpose trail along one side of the roadway.

9.0 Preliminary Design Analysis

The following sections describe the results of the preliminary design analysis conducted for the preferred alternative discussed in Section 8.4.

9.1 Design Traffic Volumes

9.1.1 Overview

The *Hartwood Marsh Road Design Traffic* dated January 2004, documents the existing traffic conditions and the analysis of the No Build and two Build scenarios in support of this Project Development and Environment Study. They include detailed discussion of existing traffic conditions, planned roadway improvements in the area, existing traffic characteristics, development of the projected traffic in the design years and level of service analyses for the design year. Detailed discussion of the findings of these reports can be found in Chapter 6 of this report.

9.1.2 Traffic Factors

Existing travel characteristics for the project corridor were used to develop design characteristics. Measured K and D factors were established for both Hartwood Marsh Road and the sidestreets. As the only available FDOT RCI data for the area is on US 27, RCI data is used for comparison purposes only. Table 9-1 provides the recommended design characteristics (K_{30}, D and T) for the project.

Table 9-1
Recommended Design Characteristics

MAINLINE FACTORS	
K (Measured)	**0.104**
D (Measured)	**0.773**
K_{30} (Estimated)	**0.111**

SIDESTREETS FACTORS	
K (Measured)	**0.097**
D (Measured)	**0.598**
K_{30} (Estimated)	**0.104**

TRUCK PERCENTAGES (T)	
Tpeak (medium)	**3.45%**
Tpeak (heavy)	**4.35%**
Tpeak (total)	**7.80%**
Tdaily (medium)	**11.60%**
Tdaily (heavy)	**5.20%**
Tdaily (total)	**16.80%**

RECOMMENDED DESIGN CHARACTERISTICS	
Hartwood Marsh Road	
D (Measured)	**0.773**
K_{30} (Estimated)	**0.111**
Sidestreets	
D (Measured)	**0.598**
K_{30} (Estimated)	**0.104**

9.1.3 Traffic Projections

Figure 9-1 identifies the projected daily traffic volumes for the opening, mid-design and design years along Hartwood Marsh Road.

9.2 Typical Sections

The preferred typical section for Hartwood Marsh is a four-lane divided urban typical section with two, twelve-foot (3.6 meter) travel lanes in each direction. Four-foot (1.2 meter) bicycle lanes and five-foot (1.5 meter) sidewalks are provided along both sides of the roadway. The proposed median is 22 feet (6.8 meters) in width. Stormwater runoff is collected in curb inlets and piped to retention ponds. This typical section requires a total of 120 feet (36.6 meters) minimum of right-of-way. Additional right-of-way may be required at numerous intersections. The preferred typical section is illustrated in Figure 9-2.

9.3 Intersection Improvements and Signal Analysis

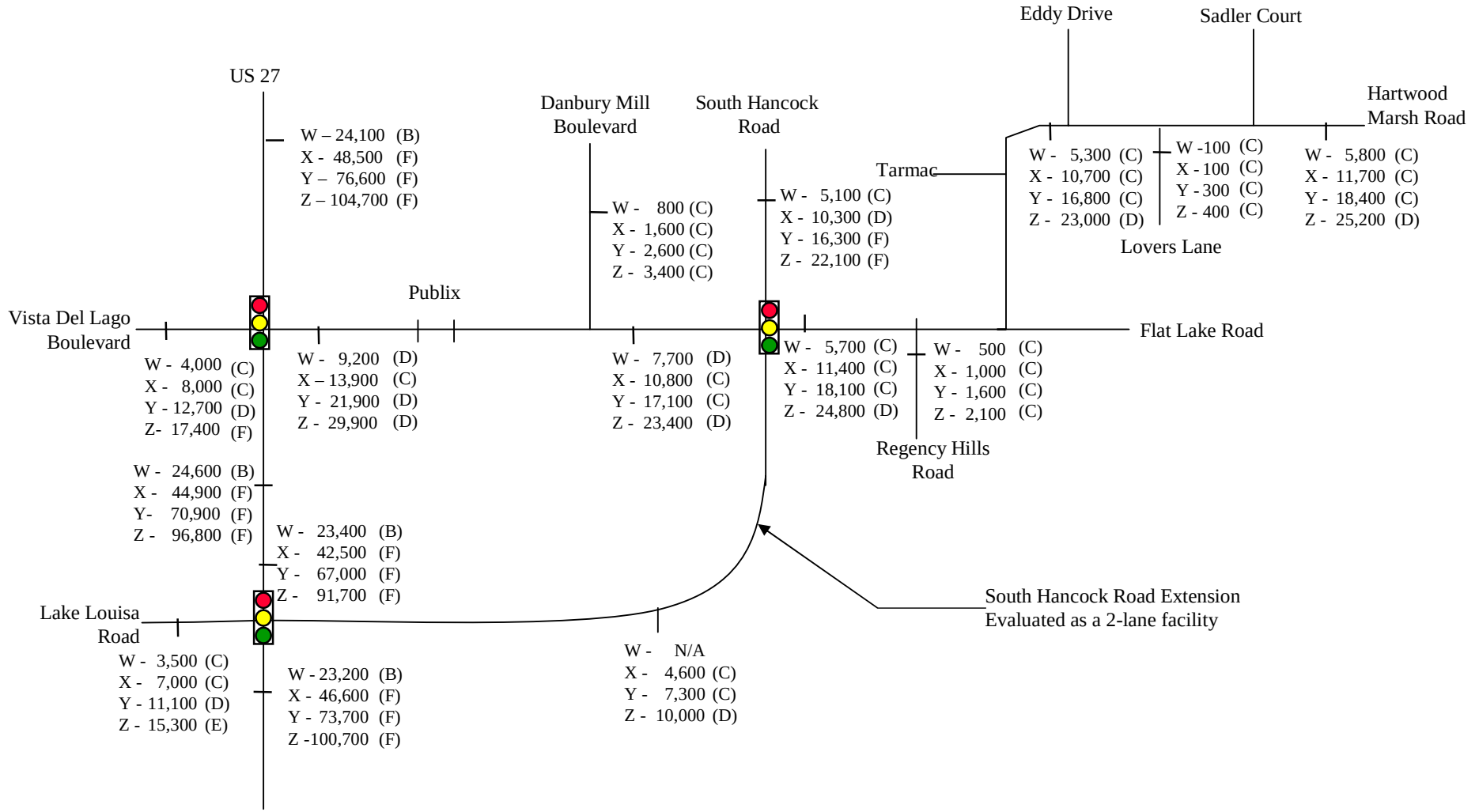
9.3.1 Lane Geometrics and Signalization

The methodology used to develop the future turning movement volumes at the project intersections is documented in detail in the *Hartwood Marsh Road Design Traffic* dated October, 2003. Individual intersection geometric requirements were determined through a series of intersection analyses. The design year (2028) Build 2 Alternative includes four through lanes along the entire project between US 27 and the Lake County Line. The recommended intersection geometry is illustrated on Figure 9-3.

The results of the signalized intersection analyses conducted for the year 2028 Build 2 Alternative show that the signalized intersection of US 27 and Hartwood Marsh Road is projected to operate at or below Level of Service D.

In addition to the four-laning of Hartwood Marsh Road and the extension of South Hancock Road south to intersect with US 27 at Lake Louisa Road, the following intersection improvements are recommended:

- Hartwood Marsh Road at US 27 – Addition of eastbound through lane and a westbound right turn lane.
- Hartwood Marsh Road at Publix Westerly Driveway – Closure of the existing median opening, modification of the northbound and southbound approaches to right turn only, addition of a westbound right turn lane.
- Hartwood Marsh Road at Publix Easterly Driveway – Addition of a westbound right



Engineers & Planners

Figure No:

9-1

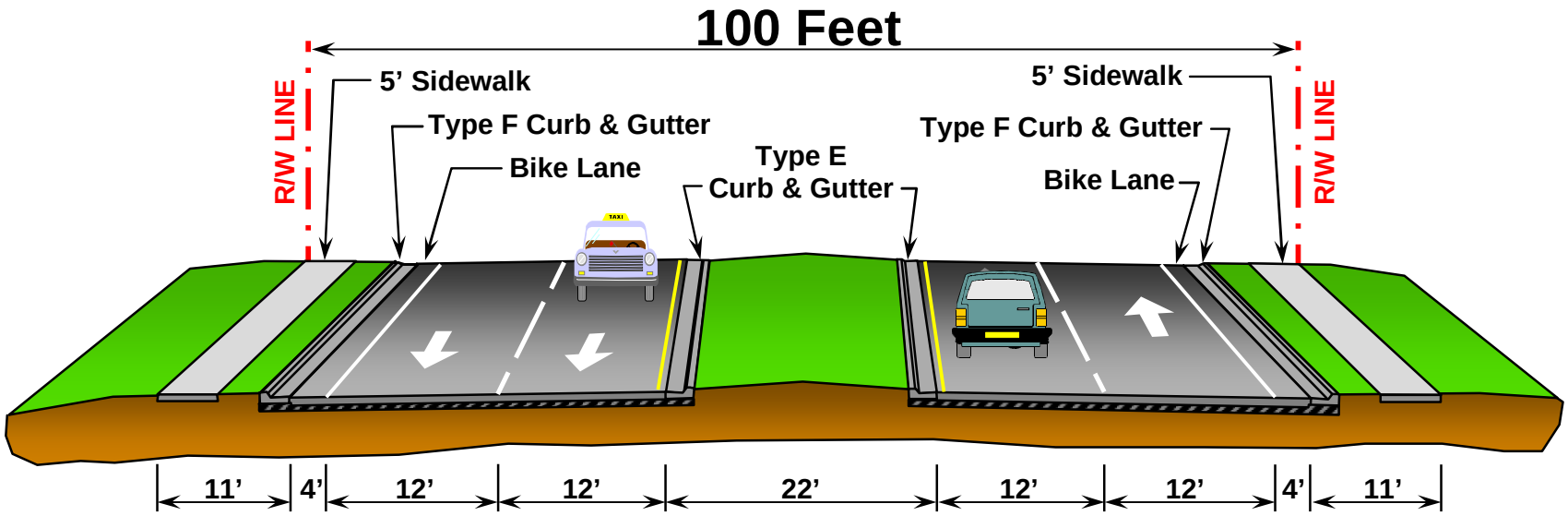
W - 2003 Existing AADT (Estimated)
X - 2008 Build AADT (Estimated)
Y - 2018 Build AADT (Estimated)
Z - 2028 Build AADT (Estimated)

- Signalized Intersection

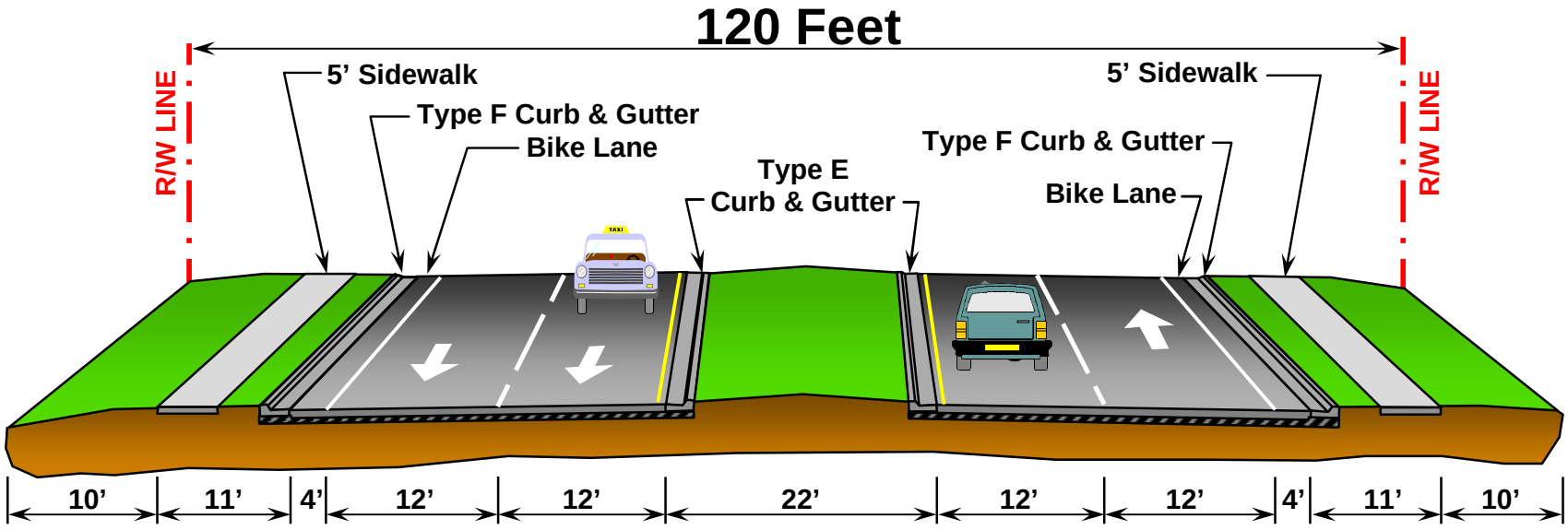
Build 2 Average Annual Daily Traffic Volumes

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



Sta 10+00.00 (U.S. 27) to Sta 46+56.03 (Hancock Road)
Sta 200+63.56 to Sta 227+01.99 (County Line)



Sta 46+56.03 (Hancock Road) to Sta 200+63.56

Design Speed = 45 mph

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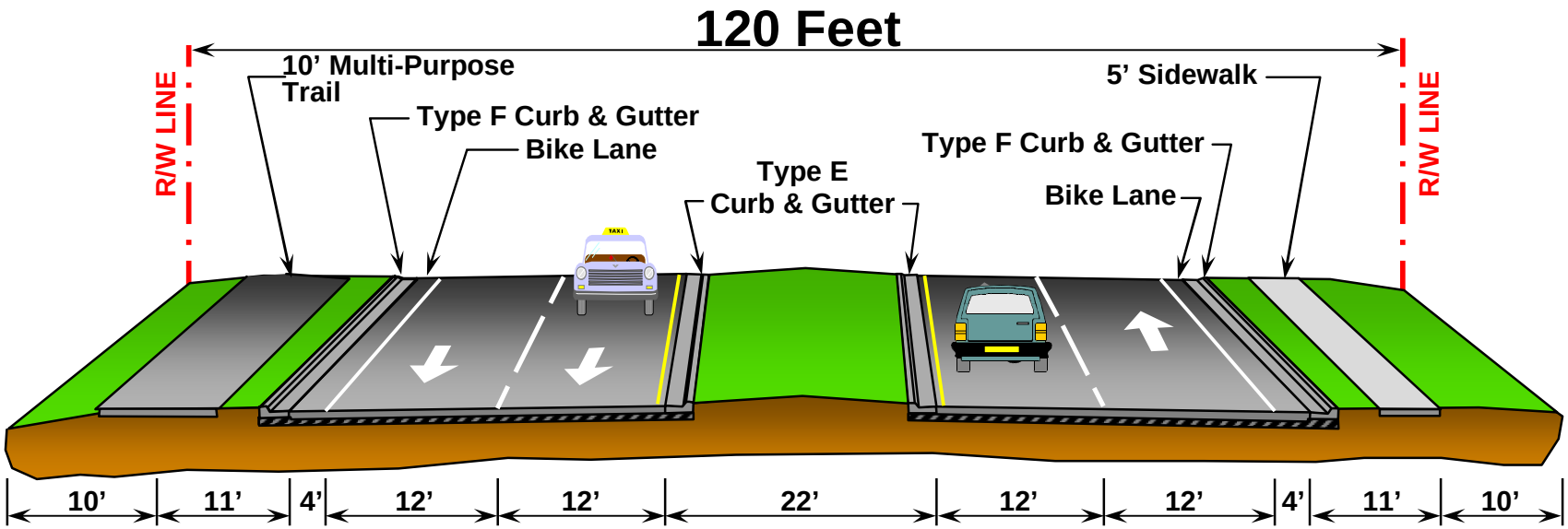
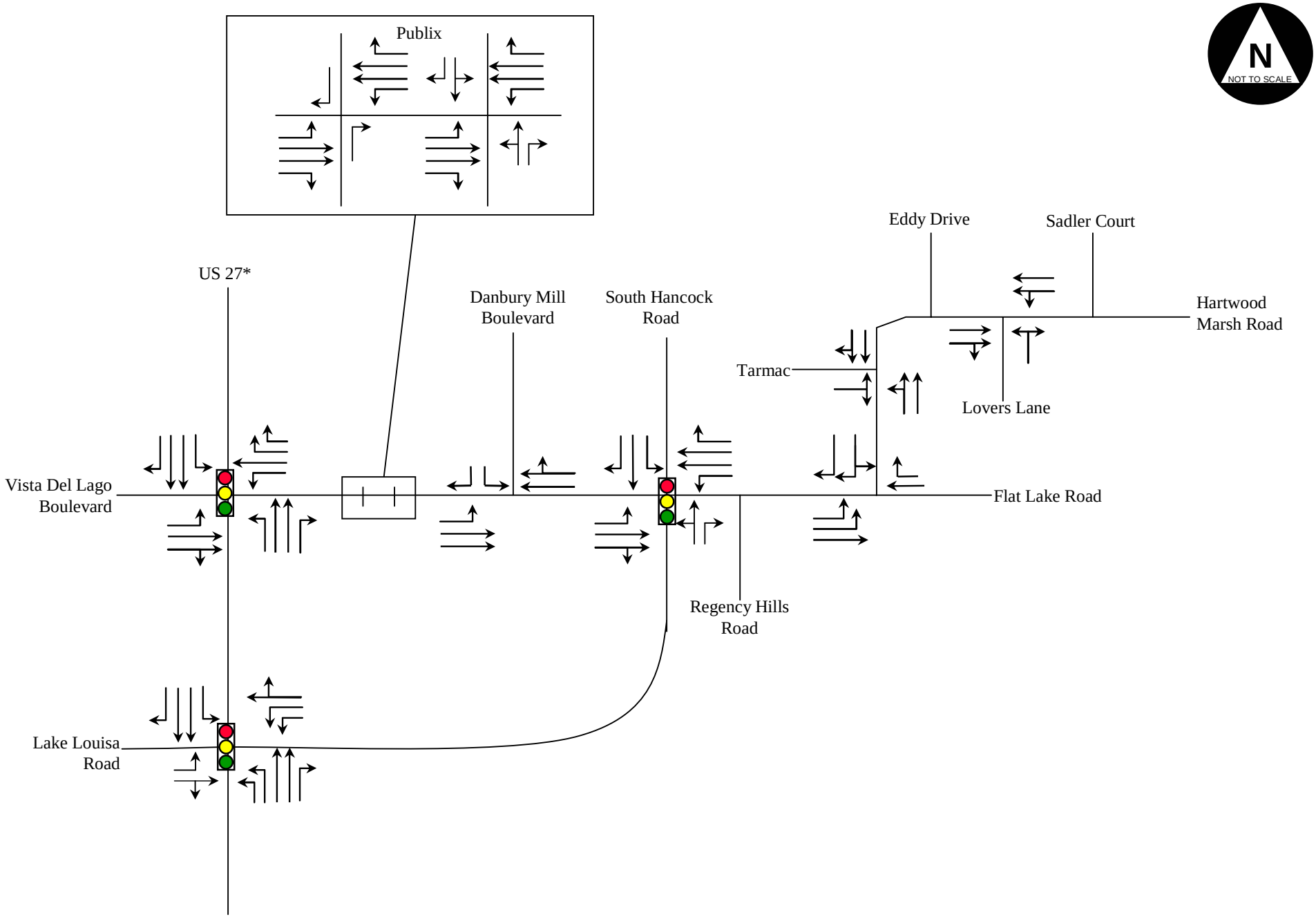
Figure No: 9-2a

Recommended Typical Sections
Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line



Optional Typical Section for Hartwood Marsh Road
With a Ten-Foot Multi-Purpose Trail on One Side
Sta 46+56.03 (Hancock Road) to Sta 200+63.56

Design Speed = 45 mph



* US 27 will be 6-laned by 2018

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Figure No:

9-3

- Build Geometry

- Signalized Intersection

Recommended Geometry

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

turn lane.

- Hartwood Marsh Road at South Hancock Road – Signalization of intersection, addition of an eastbound shared through/right lane, westbound right and left turn lanes and proposed geometry consisting of a shared left/through lane and a right turn lane for the new leg of the intersection.
- Lake Louisa Road at US 27 – Signalization of intersection, dual left turn lanes and a through/right lane are proposed for the new leg of the intersection, addition of a southbound left turn lane, eastbound left turn lane, and dual northbound left turn lanes.

The proposed improvements to Hartwood Marsh Road are consistent with the Southwest Orange and Southeast Lake Counties Transportation Alternatives Study. However for this project to maximize its potential, the improvement is dependent on the completion of improvements along the Orange County section of this roadway.

9.4 Alignment and Right-of-Way Needs

The preferred roadway alignment generally follows the existing roadway corridor until Regency Hills. The alignment then curves into the Tarmac facility and exits at the northeast corner of the property where the road meets the existing Hartwood Marsh Roadway corridor. The project terminates at the Orange County line. The right-of-way needs for this alignment are described in the following paragraphs.

Between US 27 and Danbury Mill Boulevard, there is an existing 100 foot right-of-way width which is sufficient to accommodate the urban typical section. From Danbury Mill Boulevard to Hancock Road and holding the northern right-of-way line to avoid impact to the Kings Ridge subdivision, approximately 20 feet of right-of-way would be required on the south side of the road from the currently undeveloped properties to form a total right-of-way width of 100 feet.

From Hancock Road to the southwest corner of the Tarmac facility, the southern right-of-way line of Regency Hills is held, resulting in approximately 70 feet of right-of-way on the north side of the road. For this particular section, County records do not indicate any existing right-of-way north of the section line. The road alignment then shifts into the Tarmac facility at the southwest corner of the property and exits at the northeast corner of the property. The total right-of-way width is 120 feet through the facility.

The Tarmac facility will eventually be discontinuing operation at its current location and will be moving to an unmined area directly east of the north-south portion of Hartwood Marsh Road. The existing mined site will be reconstructed as a housing development where the realigned Hartwood Marsh Road would serve as the main road through the development. Old Hartwood Marsh Road at the point where the proposed alignment curves to the northeast, would have to be realigned to intersect the new roadway in order to maintain access to the Flat Lake area. A cul-de-sac would be constructed on old Hartwood Marsh Road, north of Flat Lake Road. The remaining portion of Hartwood Marsh Road north of the cul-de-sac would be used strictly for vehicles accessing the mine.

In the northeast corner, in order to maintain access to the existing mining operation and to also provide access to the new mining site, the existing 2-lane Hartwood Marsh Road would have to be realigned to intersect with the new alignment. The 2-lane road would terminate at the current entrance to the mining operation.

From the northeast corner of the Tarmac property to approximately Lover's Lane, the south right-of-way line is held, requiring 30 feet of property to the north for a total right-of-way width of 120 feet. From Lover's Lane to the Orange County line, the alignment must transition to match the existing roadway at the county line. The proposed Orange County right-of-way width for Marsh Road is 120 feet; however, the Lake County right-of-way width is shown as 100 feet from the eastern property line of Avalon Estates to the county line.

From the eastern limits of Avalon Estates to the county line, existing Hartwood Marsh Road shifts outside the existing right-of-way. Because the proposed centerline needs to match the existing road on the Orange County side, a shift of the road to the south is necessary. As a result, a narrow sliver of right-of-way is required from the Avalon Estates subdivision to the south. To minimize impact to the functioning orange grove along the southern edge of pavement, the required right-of-way can be reduced by 10 feet to a total of 50 feet south of the centerline of the road. The right-of-way need is reduced to a width between 23 and 53 feet. On the north side of the road there is a large metal storage building close to the road. By reducing the right of-way to 50 feet, from the centerline, the offset to the building is maximized. Approximately 0 to 28 feet of right-of-way would be required on the north side of the road from the mid-section line to the county line. Both Sadler Court and Flynn Court do not have dedicated road right-of-way. Some property acquisition may be necessary to provide transitions to the existing dirt roads.

Concept plans for the preferred alignment are contained in Appendix A.

9.5 Relocations

There are no business or residential relocations associated with this project.

9.6 Cost Estimates

An estimated project cost estimate is summarized in Table 9-2. These costs include preliminary engineering (design), right-of-way, construction and construction and engineering and inspection (CEI). Roadway costs are based on the concept plans contained in Appendix A. To determine the drainage costs, the pond alternative for each basin as described in Section 9.16 that yielded the most conservative cost was used in the estimate.

Table 9-2
Preferred Alignment Costs

	Alignment Without Trail	Alignment With Trail
Construction Cost	$10,241,660	$10,278,765
Roadway Right-of-Way Cost	$3,721,700	$3,721,700
Retention Pond Right-of-Way Cost	$2,326,100	$2,326,100
Engineering (Design Cost)	$1,229,000	$1,223,455
Construction, Engineering and Inspection Cost	$2,102,215	$2,107,202
Total Cost	$19,620,675	$19,667,222

Unit costs for right-of-way for estimating purposes were developed from the existing property appraiser's data. The right-of-way cost for the preferred alignment did not account for offsetting the overall need by vacating the existing right–of-way. This is included in an agreement being

structured between Lake County and Tarmac and would significantly reduce the right-of-way cost on the preferred alignment.

9.7 Recycling of Salvageable Material

The opportunity to recycle any salvageable materials by the contractor is encouraged by the FDOT. The existing pavement may be milled for recycling during the construction of the project. Any other salvageable materials would be identified during the design of the project. If these materials should be removed from the construction site, it is to be done as specified in the current *FDOT Standard Specifications for Road and Bridge Construction.* The opportunity to utilize existing pavement would also be identified during the design of the project.

9.8 User Benefits

Highway user costs are defined by AASHTO's *A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements*, 1977, as the sum of (1) motor vehicle running cost, (2) the value of the vehicle user travel time and (3) traffic accident cost. User benefits are the cost reductions and other advantages that occur to highway motor vehicle users through the use of a particular transportation facility as compared with the use of another. Benefits are generally measured in terms of a decrease in user costs. Since the "No Build" concept will operate at an unacceptable Level of Service and delays in travel time and higher accident rates can be expected in comparison with the build alternatives, it is anticipated that the build alternatives would provide user benefits in comparison with the "No Build" Alternative.

For this project to maximize its potential benefits, the improvement is dependent on the completion of improvements in Orange County from the terminus of this project to the Western Beltway.

9.9 Pedestrian and Bicycle Facilities

There are no bicycle facilities along the Hartwood Marsh Road corridor. Bicyclists must currently use the roadway or paved shoulder to travel along Hartwood Marsh Road. An optional typical section has been provided and includes a 10-foot multi-purpose trail on one side of the roadway.

The proposed four-lane urban typical section includes on-road, four-foot (1.2 meter) bicycle lanes along the outside lane on both sides of the road through the project limits. The signalized intersections will also include pedestrian features.

9.10 Safety

The purpose of this project is to reduce congestion in the transportation corridor. Without improvements to the current transportation facilities in the region, additional traffic would create greater congestion which would lead to increased accidents.

Safety related features have been incorporated into every aspect of design in this project. Some of the design aspects that have been considered are listed:

- Effective clear zone widths have been factored into the typical sections.
- Adequate provisions for pedestrian walkways and bicycle facilities exist throughout the project.

- The use of appropriate taper, deceleration, and storage lengths have been designed for turn lanes throughout the project.
- Adequate provisions for vertical and horizontal sight distances have been incorporated into the design of this project.
- Appropriate designs that meet driver expectancy have been incorporated into the conceptual plans.
- The conceptual design addresses access management standards that would increase the operational efficiency and safety throughout the corridor.

Final design of this project will be in accordance with all FDOT criteria.

9.11 Economic and Community Development

The Lake County Comprehensive Plan identifies the future land uses along Hartwood Marsh Road as predominantly commercial and residential. Much of the development through the corridor is in the planning stage and will be constructed over the next few years.

Current and future development will place additional demands on this transportation corridor in Southwest Orange and Southeast Lake Counties.. A major impetus for the proposed action comes from economic development and the need to sustain area growth trends, including provisions for future employment and tax base. Improvements to expand the Hartwood Marsh Road transportation facility are expected to enhance the realization of approved land use plans within the project corridor and to improve access to adjoining properties. Therefore, the proposed roadway improvements would increase economic and community development potential along the Hartwood Marsh Road corridor.

9.12 Environmental Impacts

9.12.1 Section 4(f) Lands

No Section 4(f) Lands exist along the project corridor.

9.12.2 Cultural Resources

Background research, including contacting the Florida Master Site File (FMSF) was performed to determine if there are any previously known archeological or historical sites in the area. A reconnaissance survey was completed to verify the environmental data and to identify any obvious cultural resources. Sub-surface testing was performed based on the reconnaissance survey. The background research and reconnaissance survey indicated there are no potential historic sites or structures along the corridor.

The closest previously identified archeological or historical site is 8LA2216 located on the east side of US 27 south of Hartwood Marsh Road.

The proposed road improvements will not impact any archeological or historical resources which are significant or eligible for the National Register of Historic Places. No further research is required.

9.12.3 Wetlands

In compliance with Presidential Executive Order 11990, and using assessment methodology, evaluation procedures and document preparation guidance found in the US Army Corps of

Engineers Wetlands Delineation Manual (1987) and the Unified Methodology for the State of Florida dated July 1, 1994 (62-340, Florida Administrative Code (FAC)), project consideration was given to protect wetland resources. Extensive assessments of wetland and environmental resources within the project corridor have been conducted. The primary goal of these tasks was to identify natural resources that occur within the proposed right-of-way.

Wetlands that may be potentially impacted were assessed for functional significance using the Wetland Rapid Assessment Procedure (WRAP) as developed by the South Florida Water Management District (SFWMD) and utilized by the U.S. Army Corps of Engineers (USACE). The WRAP analysis establishes a numerical ranking for individual ecological and anthropomorphic variables for each wetland and provides an assessment of wetland functions.

As no wetlands occur within the project corridor, no WRAP analysis was conducted for this study. Additionally, secondary and cumulative effects of wetland involvement in the study area were not assessed due to the absence of wetlands.

The Build alternative does not directly impact nor indirectly influence wetlands within or immediately adjacent to the proposed right-of-way. Surface water management ponds have yet to be sited, and involvement of adjacent wetlands may occur in the future.

Additional study of the effects of the future surface water management ponds will likely be required. Any wetland alternatives would be mitigated through the use of a mitigation option that is deemed acceptable to regulatory agencies, such as the use of a permitted mitigation bank.

One wetland is located approximately 175 feet north of the right-of-way. The SFWMD will likely exert jurisdiction over the area. Based on the size of the contributing watershed for the roadway expansion, the project would require an Individual ERP from the SFWMD.

9.12.4 Aquatic Preserves

There are no listed Aquatic Preserves in the project corridor.

9.12.5 Water Quality

The proposed stormwater facility design will include, at a minimum, the water quality requirements for water quality impacts as required by the St. Johns River Water Management District, in Rule 40C. Therefore, no further water quality mitigation measures will be needed.

9.12.6 Outstanding Florida Waters

Within the project study area, there are no Outstanding Florida Waters as defined by Chapter 62-302.700, Florida Administrative Code. Therefore, there will be no impacts to Outstanding Florida Waters associated with this project.

9.12.7 Floodplains / Floodways

One area of Hartwood Marsh Road lies within a floodplain; however it not located in a floodway. The section of road is located just east of the Progress Energy easement and includes the low point of the road, the wetland north of the road and the depression south of the road. The 100-year flood elevation was determined used the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps. The Map indicates that the 100- year elevation is 100 feet.

It is recommended that this section of road be raised above the 100-year floodplain, approximately 5 feet above the existing road surface. The horizontal extent of this impact is approximately 250 feet along the alignment It is anticipated that vertical retaining walls would be utilized to stabilize the side slopes between the roadway and the adjacent ground. Based on these considerations, the resultant impact is approximately 1.72 acre-feet. The compensation of this loss of floodplain volume can be considered in the design of the storm water management facility within the contributing basin to the floodplain.

9.12.8 Wildlife and Habitat

The wildlife and protected species assessment consisted of a literature search and review and a field investigation. Information on Federal and State listed threatened and endangered species, potentially occurring within the project corridor, was obtained from the Florida Natural Areas Inventory (FNAI) and the US Fish and Wildlife Service (USFWS). The Florida Fish and Wildlife Conservation Commission (FFWCC) database on Bald Eagle occurrence and nesting was reviewed for information concerning nests that may be within the project vicinity. Vegetative community descriptions are based on FDOT's *Florida Land Use Cover and Forms Classification System* (FLUCCS). The project will have no adverse impacts on wildlife or protected species.

Protected Plant Species
According to the FNAI report, there is unlikely or low likelihood of occurrence of rare flora (plant) species within the study area. No protected plant species were observed within the study area. This project will not impact any protected plant species.

Protected Wildlife Species
According to the FNAI report, portions of the study area appear to be located on or near potential habitat for rare fauna (wildlife) species. Potential habitat is defined as those areas, which may offer suitable habitat for one or more rare species that may be known to occur in the vicinity.

According to FFWCC, one bald eagle nest was identified as being within one mile of the project corridor. However, the bald eagle nest is not located directly within the project study area or their primary and secondary zones surrounding the nest. No bald eagles were observed during the site investigations.

Of the federal or state listed threatened or endangered species with the potential for occurrence within the Hartwood Marsh Road study area, gopher tortoises and active borrows were observed.

Suitable habitats for the Eastern Indigo Snake, Florida Pine Snake, and the Short-tailed Snake were found adjacent to the study area. Standard measures for the Eastern Indigo Snake should be implemented to avoid any adverse effects on these species.

Several wading birds identified by the State of Florida as SSC, were observed in ditches and stormwater ponds within the project corridor. These birds included Snowy Egret (*Egretta thula*), Tricolored Heron (*Egretta tricolor*), and White Ibis (*Eudocimus albus*).

It is likely that the proposed project will affect gopher tortoises and their commensal species where the footprint of the proposed roadway improvements crosses through occupied habitat. It is unlikely that the proposed action would affect any other threatened or endangered species based on the review of existing state and federal wildlife databases and field surveys. These conclusions do not exclude the possibility that listed species may occasionally forage on-site or

may move onto the site at a later date. For this reason, pre-construction surveys for gopher tortoise burrows and new bald eagle nests are recommended. Additionally, the use of Standard Protection Measures for the Eastern Indigo Snake should be employed as a precautionary matter.

9.12.9 Farmlands

The Hartwood Marsh Road PD&E Study was evaluated for farmlands involvement in accordance with the Florida Department of Transportation, PD&E Manual, Part 2, Chapter 28, Rev. 04-14-99 and subsequent directives from the United States Department of Agriculture, Natural Resources Conservation Service (NRCS), dated April 30, 1999 and November 1, 1999. After reviewing the NRCS directives, it has been determined that the widening of Hartwood Marsh Road is under no requirement to make a farmland determination.

9.12.10 Noise

A detailed noise study was not performed during the PD&E process as the vast majority of the alignment has no dwellings in close proximity with the corridor. In the section between US 27 and South Hancock Road, the right of way corridor is established by dedication of right of way during the process of development,

Requests from the public during the public meetings to quantify the anticipated noise levels were noted. Lake County committed to performing that analysis during the final design phase of the project. The alignment through this section of the project is utilizing existing right of way so the noise issue would not effect the selection of design elements.

9.12.11 Air

All State and local agencies were provided with an opportunity to comment on this project. There were no adverse comments regarding air quality. The project is in an area that has been designated as attainment for all of the air quality standards under the criteria in the Clean Air Act. Therefore, conformity does not apply.

9.12.12 Contamination

The contamination screening evaluation prepared for this study revealed three sites with potential for hazardous materials or petroleum contamination of the soil or groundwater. Of these sites, two were assigned a contamination risk potential rating of Low and one was assigned a contamination risk rating of Medium. For all sites rated as having a No or Low risk of contamination potential, it is recommended that a review of the Public Record be done to determine if any significant changes in the status of any sites have occurred since the Contamination Screening Evaluation Report was prepared prior to any right-of-way acquisition. Sites classified as having a Medium risk of contamination should have further review into the Public Record, particularly with regard to any Contamination Assessment or Remedial Action Plans which may be generated in the interim period between the date of the preparation of the Contamination Screening Evaluation Report and the date of final design and right-of-way acquisition. A preliminary soils screening evaluation involving auger borings and Organic Vapor Analyzer (OVA) analysis and laboratory testing of soils, and installation and sampling of groundwater monitoring wells should be performed to detect the presence of contaminants in the soil and/of groundwater. Ground Penetrating Radar (GPR) should be considered in areas of right of-way acquisition involving former gas station sites to detect abandoned underground storage tanks.

9.13 Utility Impacts

The existing utilities within the Hartwood Marsh study area have the potential to be affected by the proposed project. The utility owners and general locations of these utilities are presented in Section 4.1.12. The exact location of these utility systems will be determined during the design phase of this project. Also during the design phase, utility conflicts will be identified and coordination with the affected utility owner will commence to determine appropriate resolution of all conflicts.

All of the utilities identified to date along the Hartwood Marsh study area are within the existing right-of-way (not within dedicated utility easements). If the proposed improvements conflict with the existing utilities, it will be the utility owners responsibility to design and construct the relocation of the utilities in question. As shown on Table 4-6, depending on the final improvement design, water, wastewater, reclaimed water, power, gas and telecommunications facilities could be affected.

9.14 Traffic Control Plan

The traffic control plan developed to construct Hartwood Marsh Road shall adhere to the latest FDOT Design Standards, Series 600, must maintain the existing number of through travel lanes and maintain access to businesses along the corridor. A conceptual plan is described as follows.

Phase 1: Construct all retention ponds and outfall structures and any offsite conveyance system to the ponds. Construct the new 4-lane roadway through the Tarmac site while maintaining traffic on existing Hartwood Marsh Road. Construct any temporary pavement to be used in Phase II.

Phase II: From US 27 to the southwest corner of the Tarmac site, the intent of the traffic control plan is to construct the south half of the road including drainage infrastructure, while maintaining traffic on existing Hartwood Marsh Road and any temporary pavement placed during Phase 1. Signal modifications will be required at US 27 for this phase.

From the southwest corner of the Tarmac facility to the northeast corner of the property, traffic can be diverted to the new roadway if it is complete or can be maintained on the existing 2-lane road. It is possible to have portions of the Phase I and Phase II construction to occur concurrently.

From the northeast corner of the Tarmac site to the end of the project, the intent is to construct the north half of the roadway including drainage infrastructure while maintaining traffic on the existing roadway and any temporary pavement placed in Phase I. Traffic will need to be transitioned at the end of the project to match Marsh Road east of the county line.

Phase III: From US 27 to the southwest corner of the Tarmac site, the intent of the traffic control plan is to construct the north half of the road including drainage infrastructure, while maintaining 2 lanes of traffic on the new pavement on the south side of the centerline. Signal modifications will be required at US 27 for this phase.

From the southwest corner of the Tarmac facility to the northeast corner of the property, traffic can be diverted to the new roadway if it is complete or can be maintained on the existing 2-lane road.

From the northeast corner of the Tarmac site to the end of the project, the intent is to construct the south half of the roadway including drainage infrastructure while maintaining 2 lanes of traffic on the on the new pavement on the north side of the centerline. Traffic will need to be transitioned at the end of the project to match Marsh Road east of the county line. Signal installation should be complete at this phase.

Phase IV: The intent is to divert traffic to the new pavement maintaining at least one travel lane in each direction. Construct any remaining median work including turn lanes, curb and drainage structures. Place friction course and final striping.

9.15 Results of Public Involvement Program

9.15.1 Public Involvement Plan

A Public Involvement Plan was prepared for the project. This plan is in compliance with the Project Development and Environmental Guidelines; Florida Statute 339.155; Executive Orders 11990 and 11988; CEQ Regulations for Implementing the Procedural provisions of the Natural Environmental Policy Act; and FHWA Order 5610.1C.

9.15.2 Advanced Notification

Because this PD&E is being completed as a County funded project and federal funds are not being used, an Advanced Notification Package is not required.

9.15.3 Newsletters

Three newsletters were prepared for this project and mailed to the public in September 2003, February 2004, and April 2004. These newsletters informed the public of the start of the project, included a discussion of the study process and schedule, and stressed the need for public input. Newsletters were sent out prior to the first and second Public Workshops and the presentation to the Lake County Board of County Commissioners (BCC).

9.15.4 Public Information Workshops

Two public information workshops are scheduled during this study. The Kickoff Public Workshop was held on Thursday, September 25, 2003 at the Shepherd of the Hills Church. The second Public Workshop was held on March 2, 2004 at the Shepherd of the Hills Church.

Both the first and second workshops began at 6:00 pm with an open-house format, followed by a formal presentation. The open-house portion of the meeting included members of the Study Team available to answer questions from residents and business owners one-on-one. At 6:30 pm, the Study Team gave a formal presentation, which included an overview of the project and described the project activities that would occur over the next few months. Following this presentation, a question & answer period was held to allow the public to ask questions in a formal setting.

Verbal and written comments were received at each workshop. The written comment forms included requests for plots of the project aerial map, suggestions for alternative roadway improvements and comments on the lack of turn lanes on the existing corridor. Input from the property owners in attendance was generally positive with most in favor of the proposed four-

laning of Hartwood Marsh Road. Sign –in sheets and comment forms from the public workshops are included in Appendix C.

9.15.5 Public Hearing

A presentation was given to the Lake County BCC on April 20, 2004. The Board approved the document, with the request that an optional typical section with a multi-purpose trail be added to the analysis. A transcript of the BCC presentation is included in Appendix C.

9.16 Drainage

The proposed drainage system will be designed to convey storm water runoff from the roadway to storm water retention or detention ponds. The conveyance system will consist of a series of curb inlets connected by storm sewer pipe which will discharge into the proposed ponds. Potential locations for storm water ponds for each drainage basin were identified and are discussed below.

9.16.1 Drainage Criteria

The storm water management system will be designed to conform to the St. Johns River Water Management District (SJRWMD) criteria and applicable Lake County storm water criteria. The entire project corridor lies within the SJRWMD Ocklawaha River Hydrologic Basin. A portion of the project from approximately the center of the Tarmac sand-mining site to the Orange County line falls within the Lake Apopka Hydrologic Basin.

Systems within the Ocklawaha River Hydrologic Basin shall meet applicable discharge criteria for 10-year and 25-year frequency storms. Onsite storage and outlet capacity should be designed for the 25-year storm and refined as necessary for the 10-year storm event. In the Lake Apopka Drainage Basin, the phosphorous criterion for Lake Apopka is 55 parts per billion. For sites within this basin, the post development total phosphorous load discharged from the project area shall not exceed the pre-development total phosphorous load discharged from the project area. Usually with roadway projects, the typical SJRWMD water quality treatment requirements will be greater than that necessary to meet the phosphorous criterion. The criterion is not cumulative, so whichever criterion results in the largest calculated storage volume is the one used for design of the pond.

The majority of soils in the Hartwood Marsh corridor consist of excessively drainaed to moderately well-drained soil. A complete soil survey and geotechnical investigation should be completed in the design phase to determine the actual soil conditions. The type of soil present in the corridor is suitable for dry retention or detention ponds. The proposed ponds analyzed for this project are all considered online ponds, such that the storm sewer system will discharge directly into a single pond. Off-line systems would involve the separation of water quality treatment storage from the flood attenuation storage. This type of system is not always practical because it requires a greater amount of land than a single pond.

The proposed ponds for this project are designed based on the drainage characteristics of each drainage basin. Some of the ponds discharge to landlocked lakes, others have no outfall and some discharge to Johns Lake which has a positive outfall. The type of outfall can significantly affect the size of a pond. Since it is presumed that all the proposed ponds will provide some retention, the water quality treatment is based on retention of one inch of runoff over the project area or 1.25 inches of runoff over the impervious area plus 0.5 inches of runoff over the entire

project area, whichever is greater. The water quality treatment volume would have to be recovered in 72 hours. It is anticipated that all recovery will occur through natural percolation into the soil.

The ponds that discharge to a landlocked lake are designed to attenuate the 25-year/96- hour storm event runoff volume. Any runoff above the required attenuation volume would discharge to the lake over a weir or through an outfall structure and pipe. The attenuation volume must be recovered in no more than 14 days through infiltration through the soil or with the use of underdrain.

The ponds that would have no outfall to a downstream water body or depression are considered landlocked. The pond must be sized to retain the entire runoff from the 100- year/24- hour storm event and recover the total volume within 14 days and the water quality volume within 3 days. For the ponds that lie within a basin with a positive outfall, the water quality treatment volume requirements are the same as described above. However, the attenuation volume is based on the difference between the pre-development and post development 25-year/24-hour discharge rate. These ponds have an outfall structure with a weir set at the stage of the required water quality volume. The weir is sized to control the discharge rate to the pre-development condition.

9.16.2 Drainage Basins and Pond Alternatives

The roadway corridor can be divided into several drainage basins based on the vertical alignment of the proposed roadway. For purpose of this analysis, the basin divides were assumed to be at the existing high points of the road. Through the Tarmac facility, the road is not assumed to follow the existing ground elevations as discussed in the applicable subbasin section below. Based on site reviews and available contour data the basin boundaries can be defined. Much of the contour data is not reflective of the development within the corridor. Therefore, some of the areas that appear to drain toward the road based on contour elevations actually drain to existing ponds designed to retain all the runoff from the developed site.

As previously discussed in the existing drainage sections in Section 4 of this report, there is no well-defined drainage system in the corridor. Therefore, there are no existing storm water outfalls that need to be preserved. The pond alternative analysis involved selecting potential sites near the existing low points of the road, but considering the placement to make the best use of remaining portions of the parcel. All the ponds were analyzed as if they will be only retaining the runoff from the roadway and offsite area that cannot be bypassed. There may be the potential for expansion of these ponds as joint-use ponds as the land surrounding the potential pond site is developed. All the ponds were sized based on a 6 foot depth, 1 to 6 side slopes and a 20 foot maintenance berm. Actual geotechnical data may indicate that the ponds can be deepened or must be shallower. The limits of the basin boundaries and the location of the potential ponds sites are shown on the concept drawings in Appendix B. Table 9-3 summarizes the drainage basin data.

Basin 1

Basin 1 lies between US 27 and Hancock Road. The contributing area is assumed to be only the area within the proposed right-of-way. The Kings Ridge subdivision, the Publix shopping center and the Eckerd shopping plaza all have storm water management systems. This basin is considered to be landlocked but with discharge to a landlocked lake. There is an unnamed lake approximately 700 feet south of the Hartwood Marsh Road at approximately Sta. 30+00. The pond within this basin would be designed to attenuate the difference in runoff between the pre-development and post development 25-year/96-hour storm event.

Table 9-3
Drainage Basin Data

Basin	Basin Limits	Basin Area (ac)	Impervious Area (ac) (exc. ponds)	Applicable SJRWMD Storm Event	Required Retention Volume (ac-ft)	Pond Alternative	Pond Size (ac)
1	Sta. 10+00 to Sta. 47+00	11.09	6.33	25 yr/96 hr	7.02	P-1 P-2	1.70 1.70
2	Sta. 47+00 to Sta. 58+00	16.07	1.88	100 yr/24 hr	5.26	P-3	2.14
3	Sta. 58+00 to Sta. 142+00	31.95	3.25	100 yr/24 hr	10.09	P-4 P-5	4.40 5.15
4	Sta. 142+00 to Sta. 155+00	10.29	2.22	100 yr/24 hr	4.14	P-6	2.14
5	Sta. 155+00 to Sta. 181+00	9.30 68.37	4.45 4.45	25 yr/24 hr 100 yr/24 hr	0.85 19.68	P-7 P-8	2.14 5.42
6	Sta. 181+00 to Sta. 197+00	23.30	2.74	100 yr/24 hr	7.63	P-9	2.55
7	Sta. 197+00 to Sta. 227+01.99	9.05	5.09	100 yr/24 hr	5.88	P-10 P-11	2.14 2.14

There are two potential pond sites within this basin. Ones site, Pond P-1, is located immediately north of the unnamed lake. The other site, Pond P-2, is located on a different parcel than Pond P-1 and lies east of the unnamed lake. The estimated pond size for this basin is 1.70 acres. Both of these pond alternatives would have an overflow structure discharging to the unnamed lake. To convey storm water to the ponds, a storm sewer pipe would have to be constructed from the roadway to the pond.

Basin 2

Basin 2 lies between Hancock Road and the western limits of Regency Hills. The contributing area consists of the roadway right-of-way and approximately 10.6 acres of offsite area north of the road. It is assumed that the Hartwood Pines development will retain the runoff from its site. The low point of the basin is in the road corridor. Therefore a viable pond site needed to be below the road elevation and off the corridor. Property that meets this requirement lies south of the road. There is only one singly owned parcel south of the road which is currently undeveloped. The hydraulically feasible location on this site for a pond is at the southwest corner of the parcel. However, the First Baptist Church of Clermont has preliminary plans for constructing a multi-use facility on the entire site.

The preliminary plans show a wet retention pond in the northwest corner of the site and a dry detention pond in the southeast corner. The estimated size of Pond P-3 for basin 2 is 2.14 acres to retain the 100 year/24 hour runoff volume from the contributing basin. Pond P-3 has been shown in the southeast corner of the site with the expectation that a joint use pond to retain the church runoff and Hartwood Marsh stormwater runoff could be developed. To convey storm water to this pond, a storm sewer pipe would need to be constructed along Hancock Road.

Basin 3

Basin 3 lies between the western edge of the Regency Hills subdivision and Sta. 142+00 along the realigned road through the Tarmac facility. The contributing drainage basin is assumed to consist only of the road right-of-way. The Tarmac sand mining operation will be discontinued at its current site and will move east of existing Hartwood Marsh Road. The current property would be developed as a residential community. The intent of the storm water management system for the future development is to incorporate the runoff from Hartwood Marsh Road into a series of interconnected ponds within the development. There are no available plans at this time showing the potential ponds within the Tarmac site. Therefore for this report, retention ponds were analyzed to retain runoff from the road only.

The basin is considered to be landlocked requiring the total retention of the runoff from 100-year/24-hour storm event. The two pond alternatives have been shown in the southwest corner of the Tarmac facility. However, they could easily be situated anywhere along the roadway, as long as the vertical alignment of the road is designed such that the storm water can be conveyed to the pond site. The estimated size of Pond P-4 is 4.4 acres. Pond P-5 is 5.15 acres and is a larger than Pond P-4 due to its triangular configuration.

Basin 4

Basin 4 is a small basin lying between the old roadway and the realigned roadway from Sta. 142+00 to Sta. 155+00. The contributing area consists of the two roadways and the undeveloped area between them. The basin is considered to be landlocked requiring the total retention of the runoff from 100-year/24-hour storm event. The only viable place for Pond P-6 is the area between the two roads. The estimated size of the pond is 2.14 acres.

Basin 5

Basin 5 lies between Sta. 155+00 and Sta. 181+00. The existing roadway drains to the low point of the road. At the low point there are two culverts, one discharging to a wetland north of the road and one discharging to a depression south of the road. The depression and the wetland are not connected by a pipe.

Two potential pond locations have been analyzed. Each pond has a different contributing drainage basin. Basin 5 drains to Pond P-7 and consists of the road right-of-way. Pond P-7 is located approximately 800 feet north of Hartwood Marsh Road and west of the existing wetland. The wetland has a hydraulic connection to Johns Lake, which has a positive outfall. The pond has been designed to attenuate the runoff between the pre-development and post development 25-year/24-hour storm event. The pond would have an outfall structure that would discharge into the wetland. This pond lies within the Lake Apopka Drainage Basin and would need to be designed to meet the SJRWMD phosphorus loads. The estimated pond size is 2.14 acres. A storm sewer pipe would need to be constructed to convey storm water to the pond.

The second pond alternative is located on the south side or the road in an existing depression. Basin 5A consists of the road right-of-way and offsite area south of the road which currently drains tot eh depression on the south side of the road. Pond P-8 is considered to be landlocked since there is no physical connection to the wetland on the north side of the road, thus requiring the total retention of the runoff from 100-year/24-hour storm event. Therefore, the estimated pond size is larger than Pond P-7 at 5.42 acres.

Basin 6

Basin 6 is located between Sta. 181+00 and Sta. 197+00. The contributing drainage basin consists of the road right-of-way and several of the lots within the Avalon Estates subdivision south of the road. The low point of the basin is at Eddy Drive. One pond alternative was analyzed for this basin. To avoid impact to the existing orange groves to the north and the homes to the south, the pond site selected is on undeveloped property, approximately 600 feet north of the road. It is shown on the east side of the property to minimize the required right of way. Situating the pond on the west side of the property , where the ground elevation is slightly lower, would increase the amount of contributing area to the pond and subsequently increase the pond size.

The basin is considered to be landlocked requiring the total retention of the runoff from 100-year/24-hour storm event. The estimated Pond P-9 size is 2.55 acres. The storm sewer conveyance system to the pond could be constructed along Eddy Drive and then along the northern edge of the orange grove.

Basin 7

Basin 7 is located between Sta. 197+00 and the County Line. The roadway east of Flynn Court drains to the northeast. However there are no potential ponds sites east of Flynn Court. The vertical road grades are conducive to convey the storm water to a pond west of Flynn Court. The contributing drainage basin consists of the road right-of-way. The low point of the basin is at northeast corner of Sadler Court and Hartwood Marsh Road.

The basin is considered to be landlocked requiring the total retention of the runoff from 100-year/24-hour storm event. Two pond alternatives were analyzed for this basin. One pond is located in the undeveloped parcel at the northeast corner of Sadler Court and Hartwood Marsh Road. The estimated area for Pond P-10 is 2.14 acres. A second pond is located northwest of the termination point of Sadler Court. Sadler Court drops considerably in elevation to the north.

At the end of the road is an existing depression. Pond P-10 is located west of this depression in an old orange grove. The pond was not located in the depression since it would have to retain all the runoff from the contributing area to the depression, resulting in a large pond. The estimated area for Pond P-11 is 2.14 acres. To convey storm water to the pond, storm sewer would have to be constructed on Sadler Court. Sadler Court is not contained in platted right-of-way. A drainage easement would be required for the storm sewer.

9.16.3 Estimated Pond Costs

The estimated right-of-way cost for each pond alternative is summarized in Table 9-4.

Table 9-4
Pond Alternative Estimated Right-of-Way Cost

Pond Alternative	Estimated Right-of-Way Cost
P-1	$185,100
P-2	$185,100
P-3	$233,000
P-4	$479,200
P-5	$560,800
P-6	$233,000
P-7	$233,000
P-8	$590,250
P-9	$277,700
P-10	$233,000
P-11	$479,200

9.17 Structures

There are no anticipated structures along the project corridor.

9.18 Special Features

There are no special features expected along the project corridor.

9.19 Access Management

The proposed access management plan, showing possible directional and full median openings, is included on the Concept Plans in Appendix A of this report. Median opening spacing was determined based on the FDOT Access Management Standards for a Class 5 roadway. This allows full median opening spacing at 1,320 feet and directional median opening spacing at 660 feet. Full median openings were placed at the following intersections:

- Danbury Mill Boulevard
- South Hancock Road
- Regency Hills Subdivision
- Lover's Lane
- Sadler Court
- Flynn Court

Additional median opening were placed throughout that corridor, following the access management standards.

The existing median opening at the western Publix driveway is proposed to be closed due to its close proximity to the signalized intersection at US 27. The eastern Publix driveway is proposed to have a directional median opening.

As future development occurs, it is recommended that those developments follow the access management plan and median spacing provided in this PD&E study.

9.20 Aesthetics and Landscaping

Specific landscape plans have not been developed; however, provisions for landscaping are included in the typical sections. As development occurs along the corridor, landscaping will typically be installed by the developer. Landscaping can be installed within the border area provided it meets the 4-foot clear zone requirement from face of curb and FDOT Index 546.

9.21 Recommended Alternative

Based on input received through the public involvement process and with consideration of estimated costs and impacts of the alternatives, it is recommended that Hartwood Marsh be widened to a four lane divided urban typical section following the preferred alignment through the Tarmac facility.

The preferred typical section for Hartwood Marsh is a four-lane divided urban typical section with two, twelve-foot (3.6 meter) travel lanes in each direction. Four-foot (1.2 meter) bicycle lanes and five-foot (1.5 meter) sidewalks are provided along both sides of the roadway. The proposed median is 22 feet (6.8 meters) in width. Storm water runoff is collected in curb inlets and piped to retention ponds. This typical section requires a total of 120 feet (36.6 meters) minimum of right-of-way.

The typical section for the South Hancock Road extension is a two-lane divided typical section. For the purposes of this study, it was assumed that the South Hancock Road extension would be built as two-lanes of a future four-lane typical section.

Concept plans for the recommended improvement alternative for Hartwood Marsh Road and South Hancock Road and South Hancock Road are included in Appendix A.

APPENDIX

Appendix A – Preferred Alternative Alignment

Appendix B – Pond Data

Appendix C – Public Involvement Data

Appendix D – Cultural Resource Assessment

Appendix E – Wetland Evaluation Report

Appendix F – Wildlife and Habitat Evaluation Report

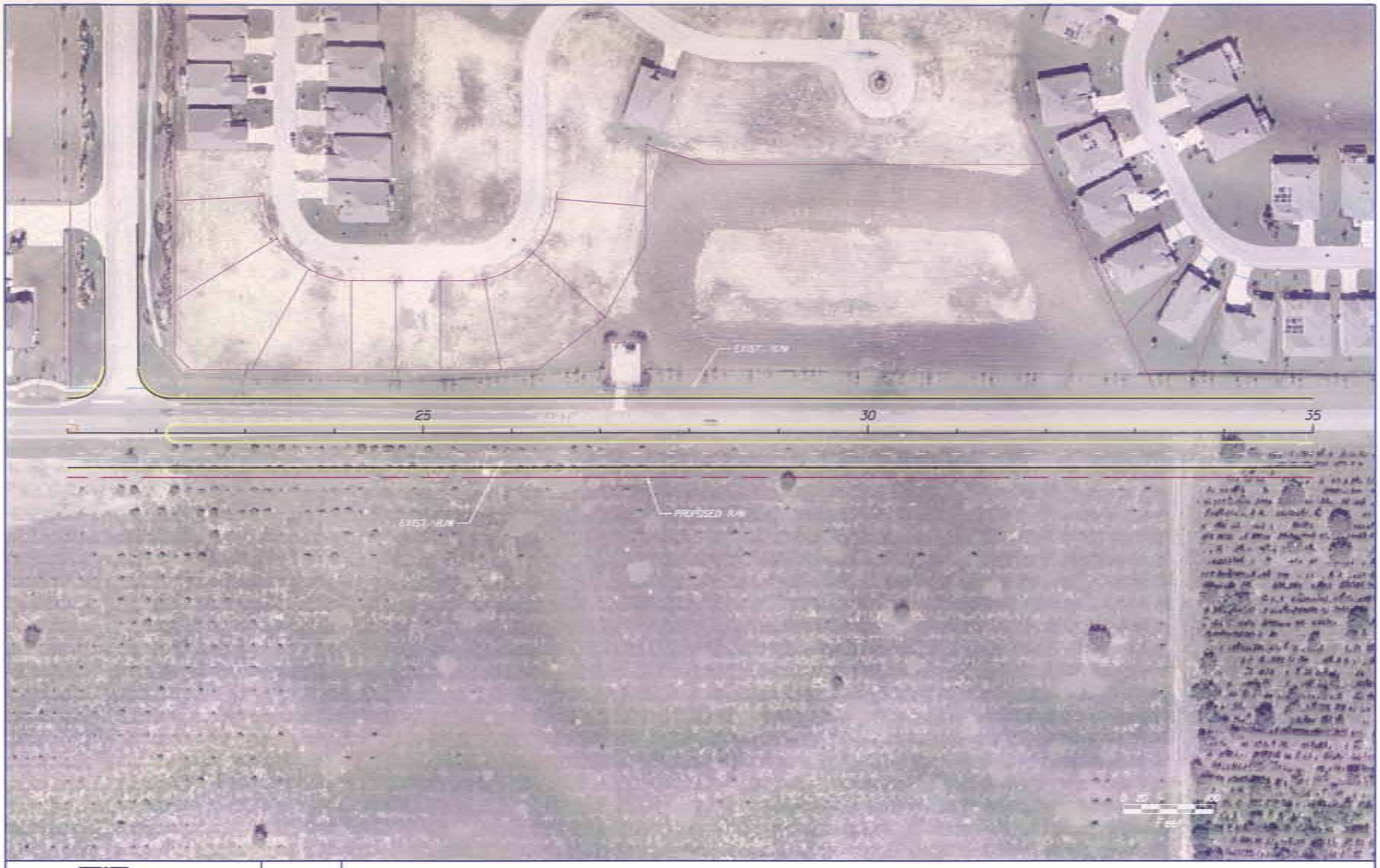
Appendix G – Contamination Screening

Appendix H – Geotechnical Data

Appendix A

Preferred Alternative Alignment

TEI Engineers & Planners	FIGURE NO. A-1	Preferred Roadway Alignment Harhwood Marsh Road PD&E Harhwood Marsh Road: US 27 to Orange County Line



TEI Engineers & Planners

FIGURE NO. A-2

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

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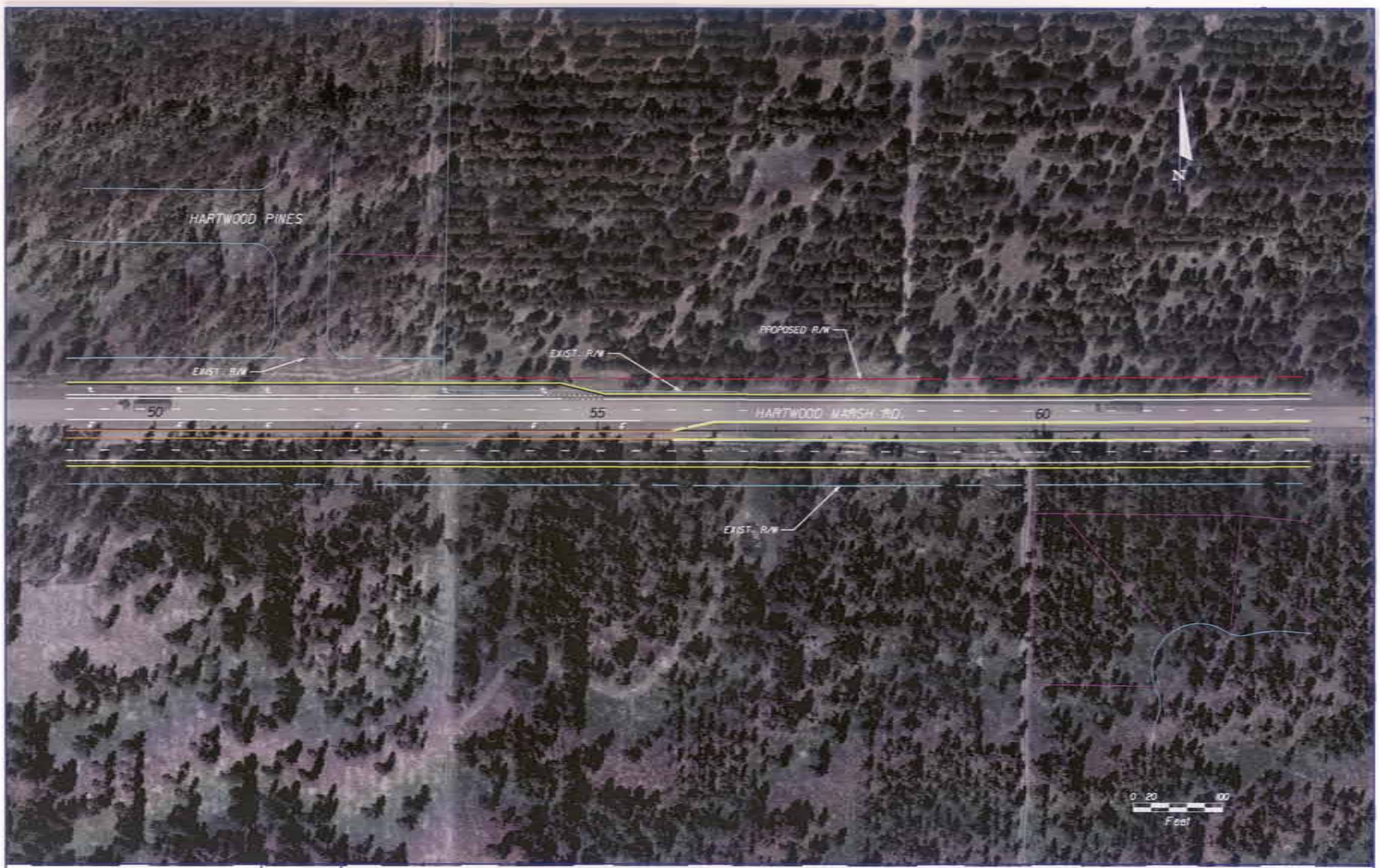
FIGURE NO.

A-3

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



TEI
Engineers & Planners

FIGURE NO.
A-4

Preferred Roadway Alignment

Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line

Engineers & Planners

FIGURE NO.

A-5

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

Engineers & Planners

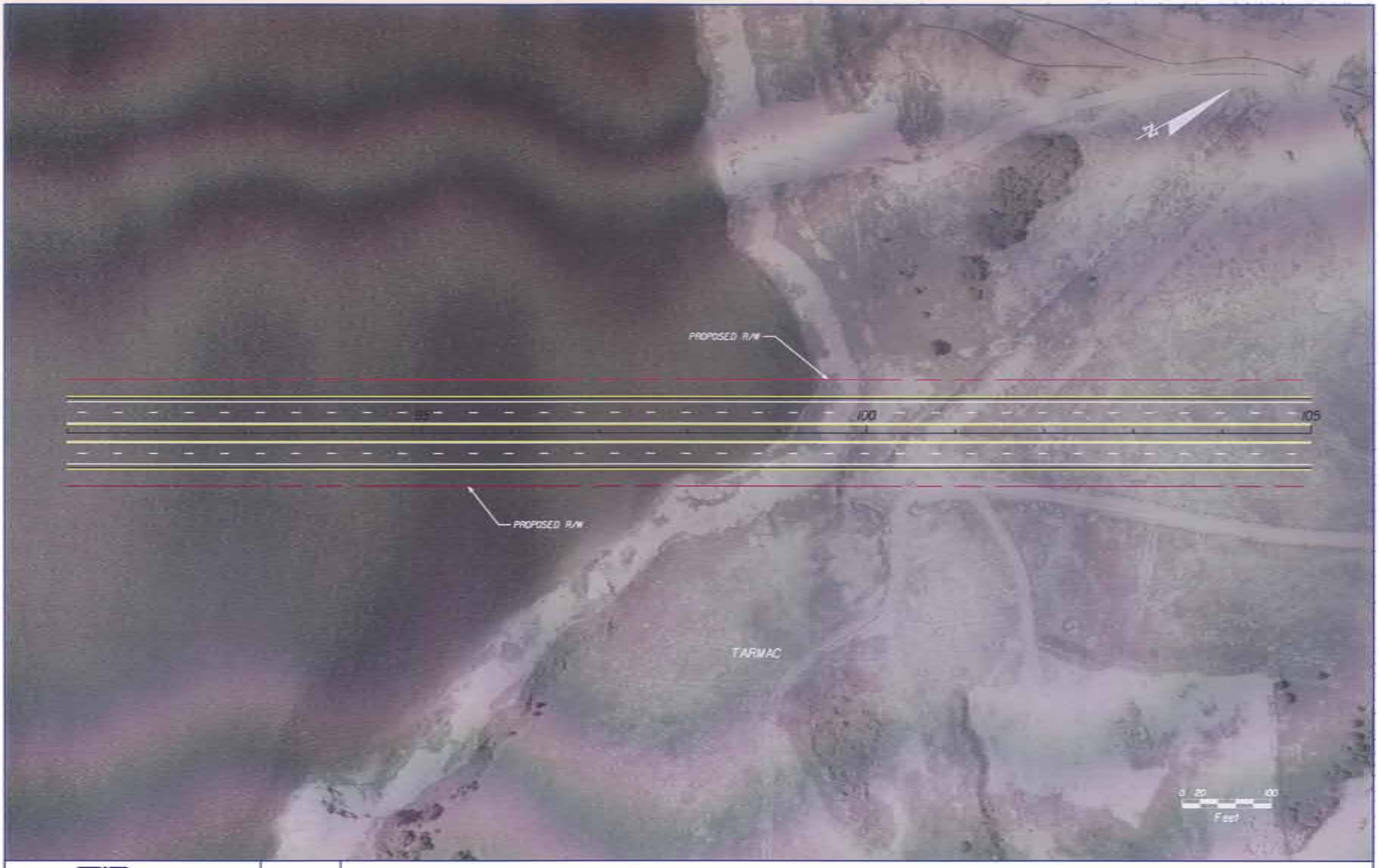
FIGURE NO.

A-6

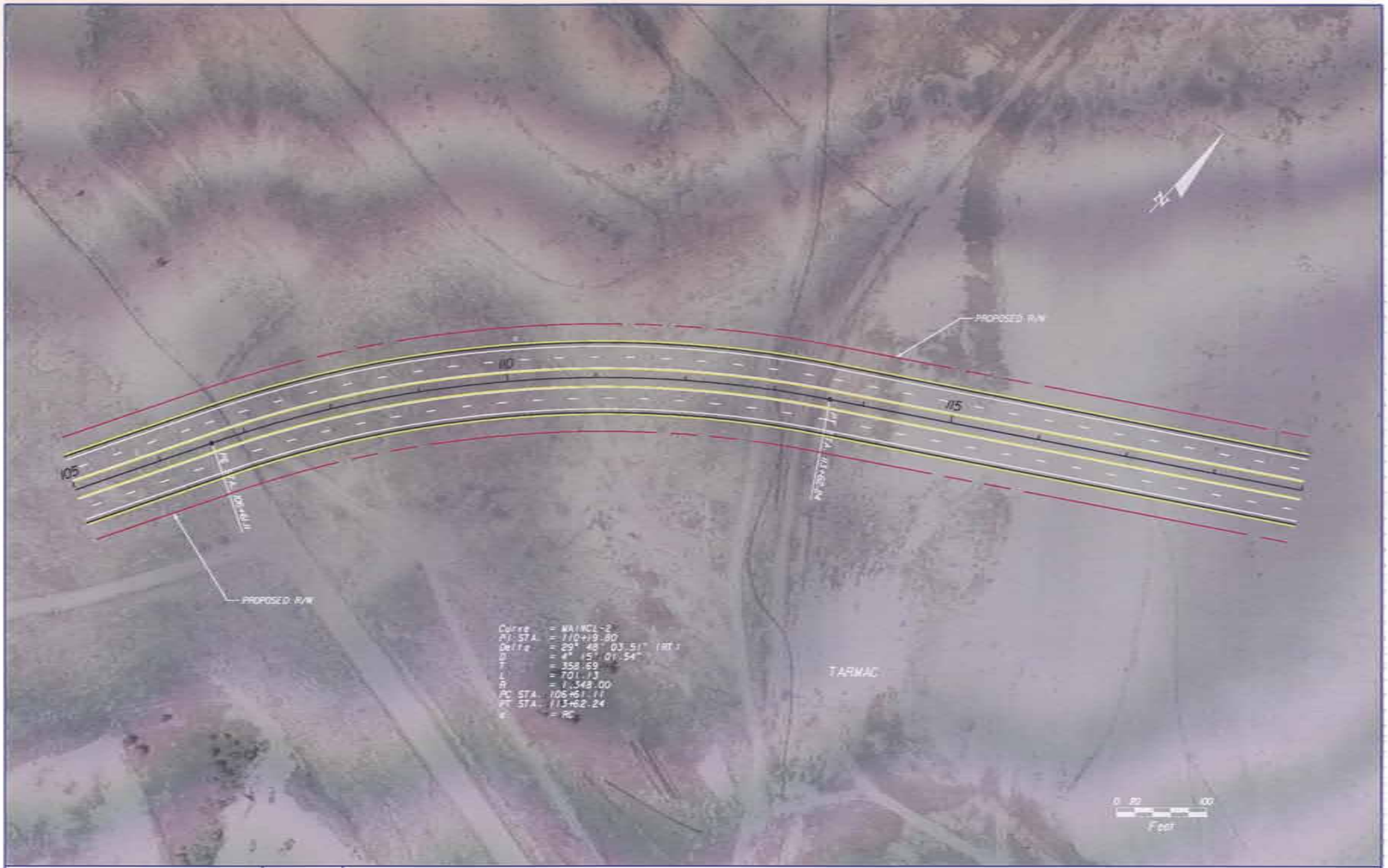
Preferred Roadway Alignment

Hartwood Marsh Road PD&E

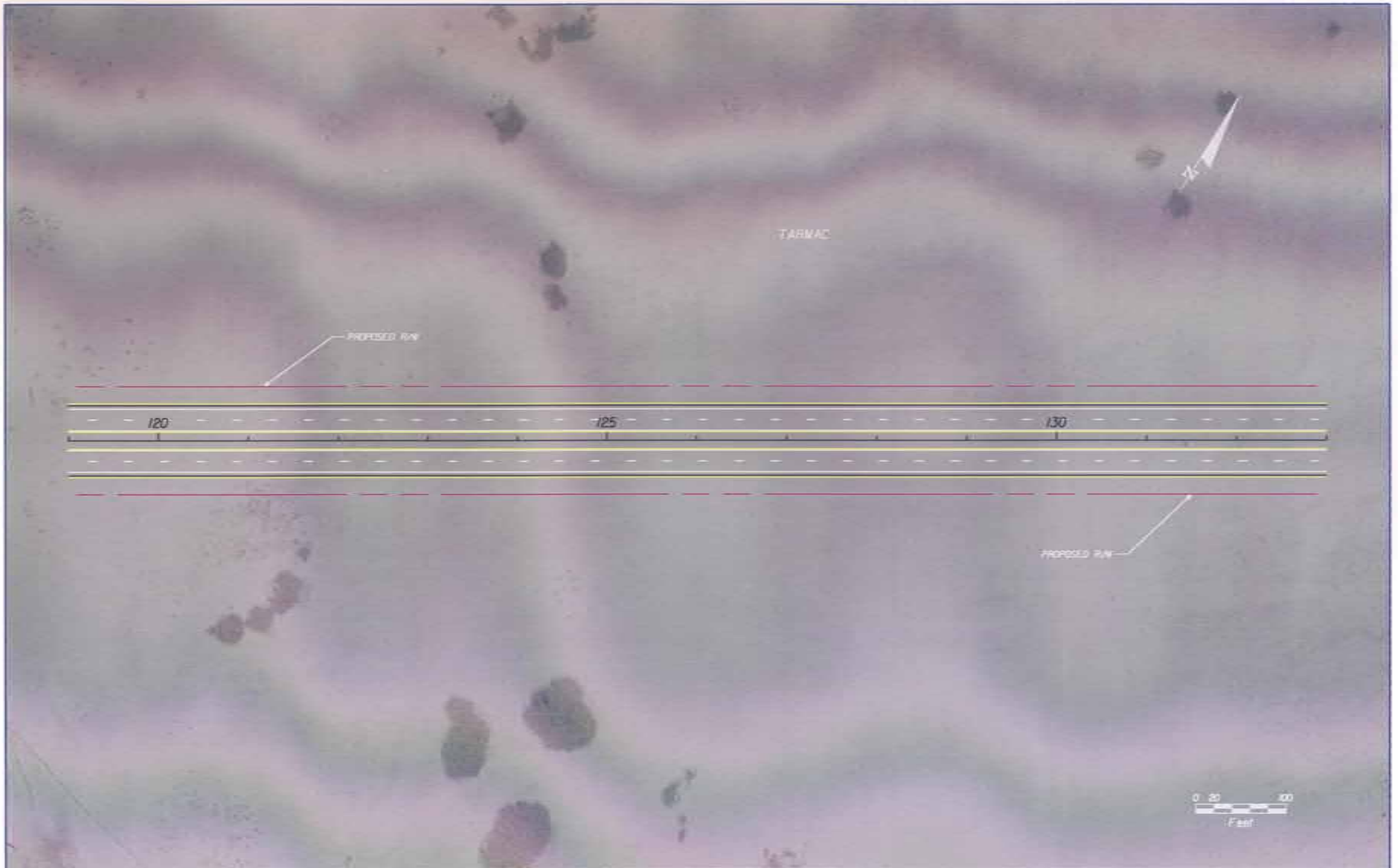
Hartwood Marsh Road: US 27 to Orange County Line



TEI Engineers & Planners	FIGURE NO. A-7	Preferred Roadway Alignment Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line



TEI Engineers & Planners	FIGURE NO. A-8	Preferred Roadway Alignment Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line



Engineers & Planners

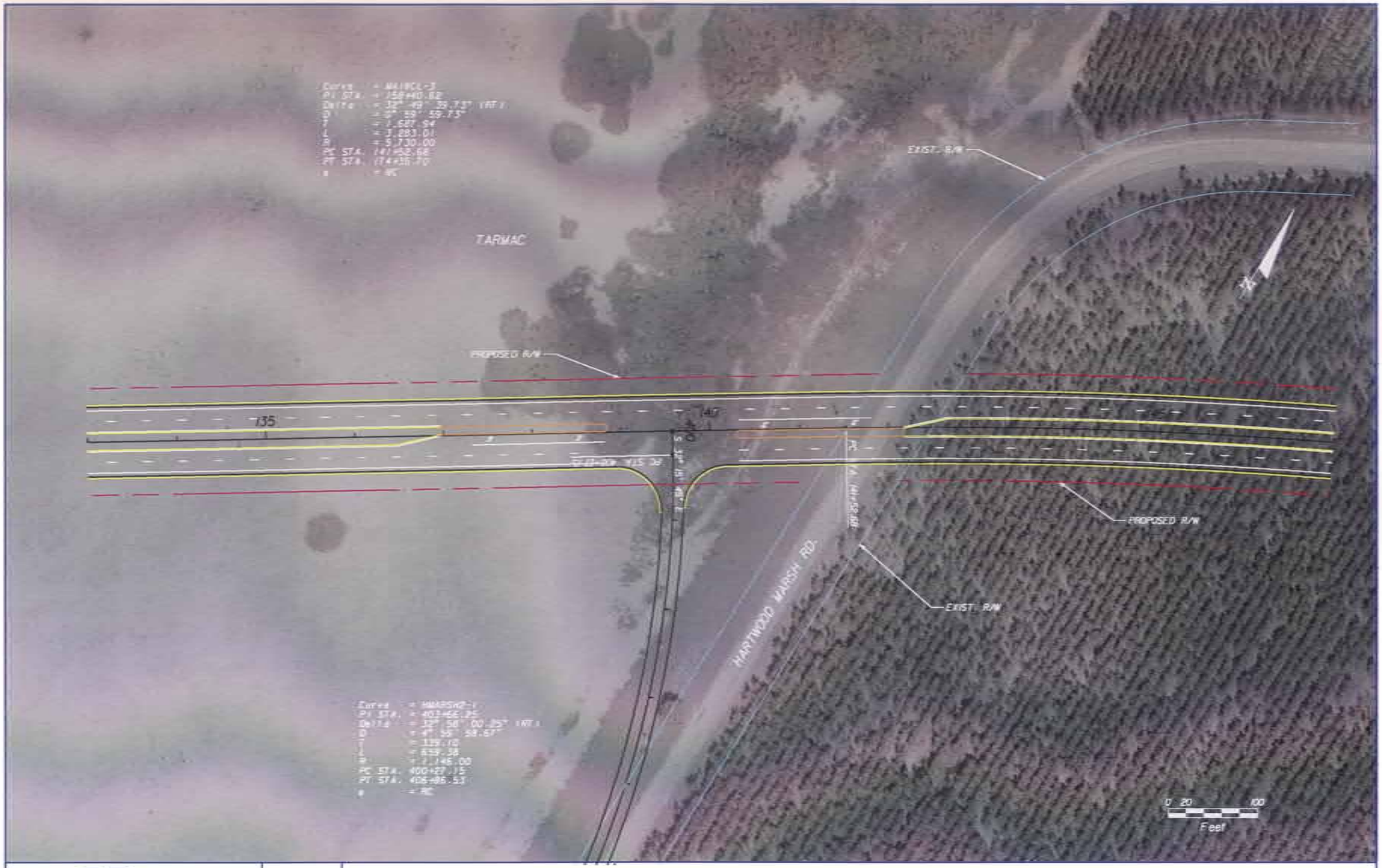
FIGURE NO.

A-9

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



TEI Engineers & Planners	FIGURE NO. A-10	Preferred Roadway Alignment Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line

TEI Engineers & Planners	FIGURE NO. A-11	Preferred Roadway Alignment Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line

Engineers & Planners

FIGURE NO.

A-12

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

Engineers & Planners

FIGURE NO.

A-13

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

Engineers & Planners

FIGURE NO.

A-14

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

Engineers & Planners

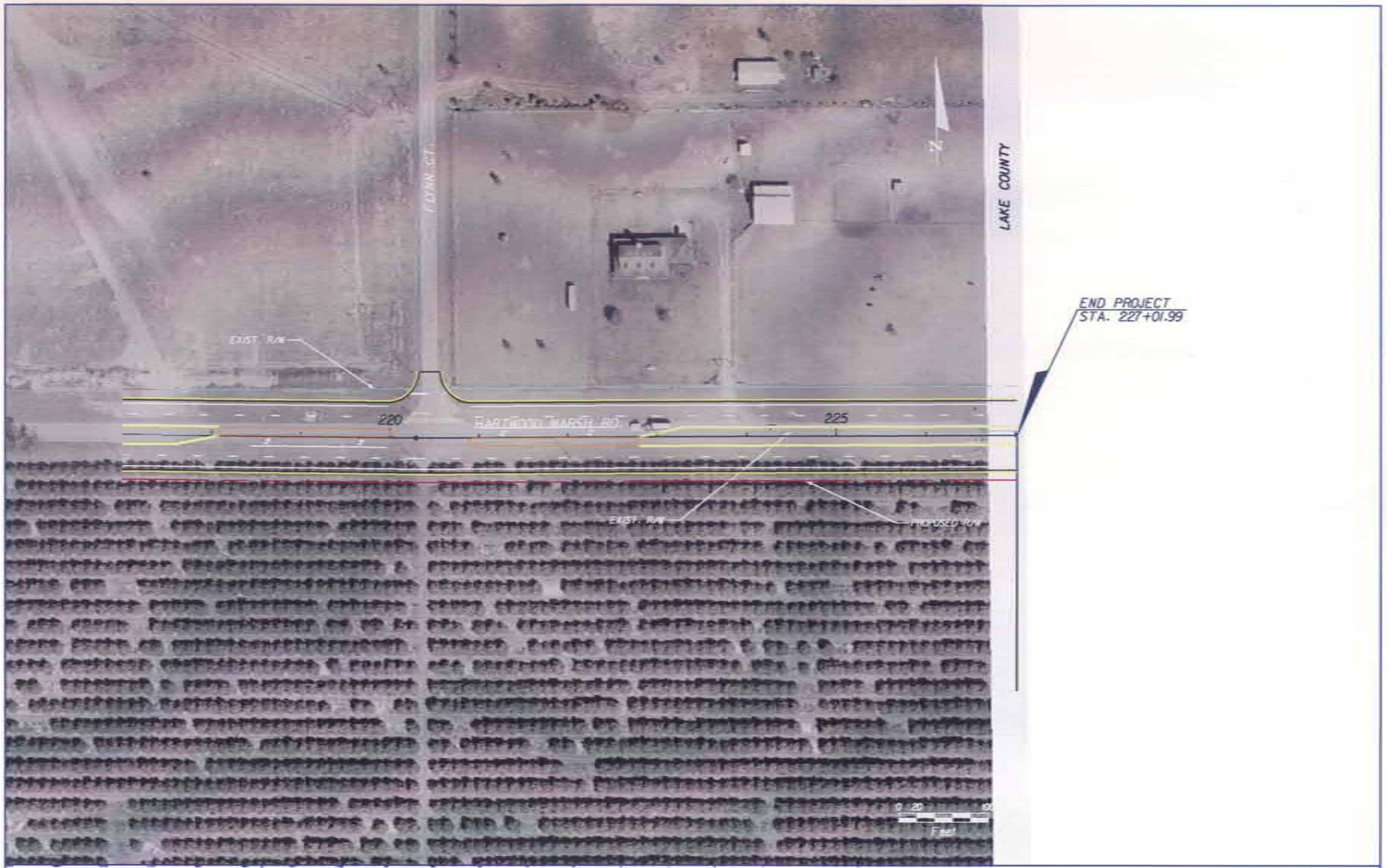
FIGURE NO.

A-15

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



Engineers & Planners

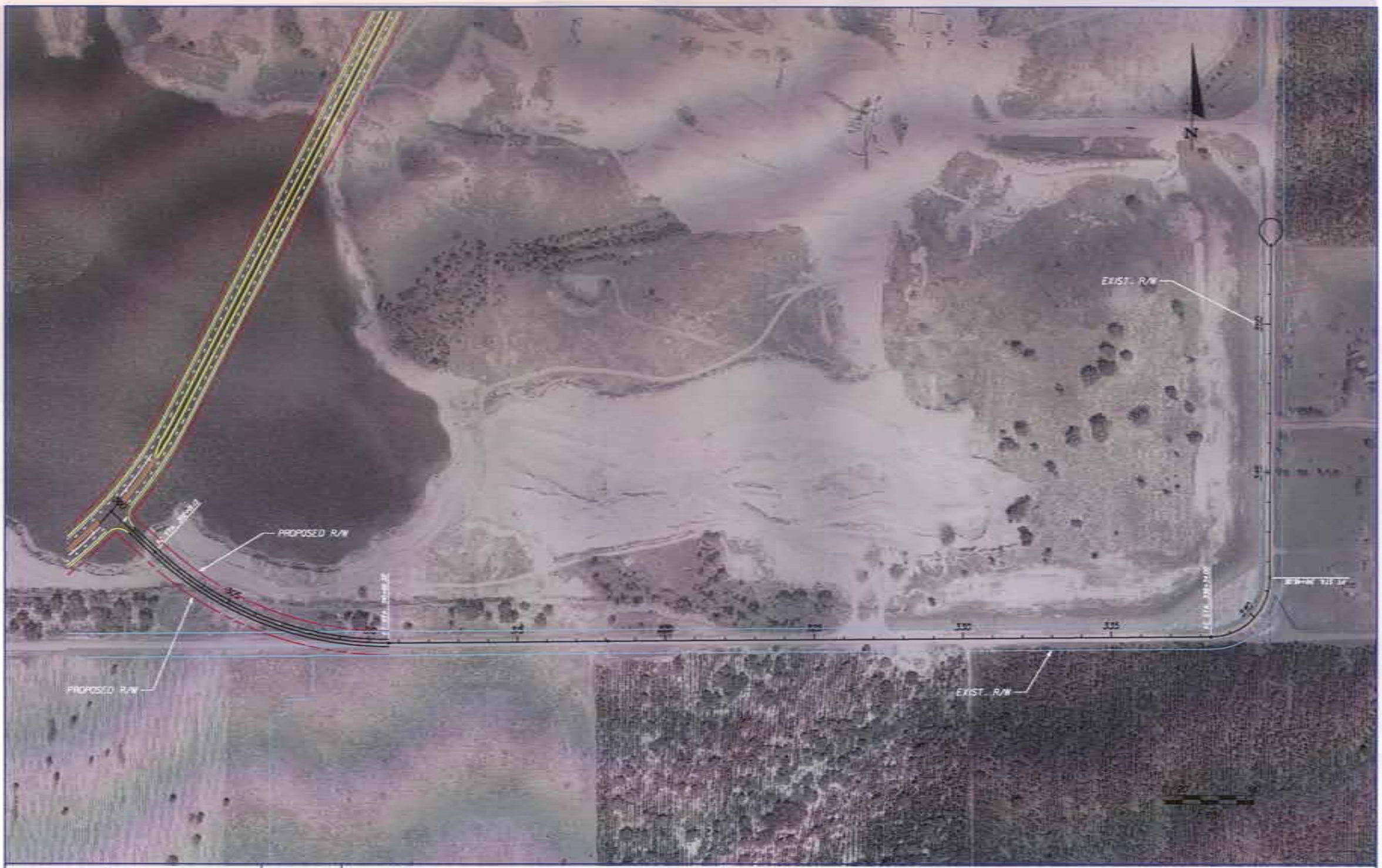
FIGURE NO.

A-16

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



Engineers & Planners

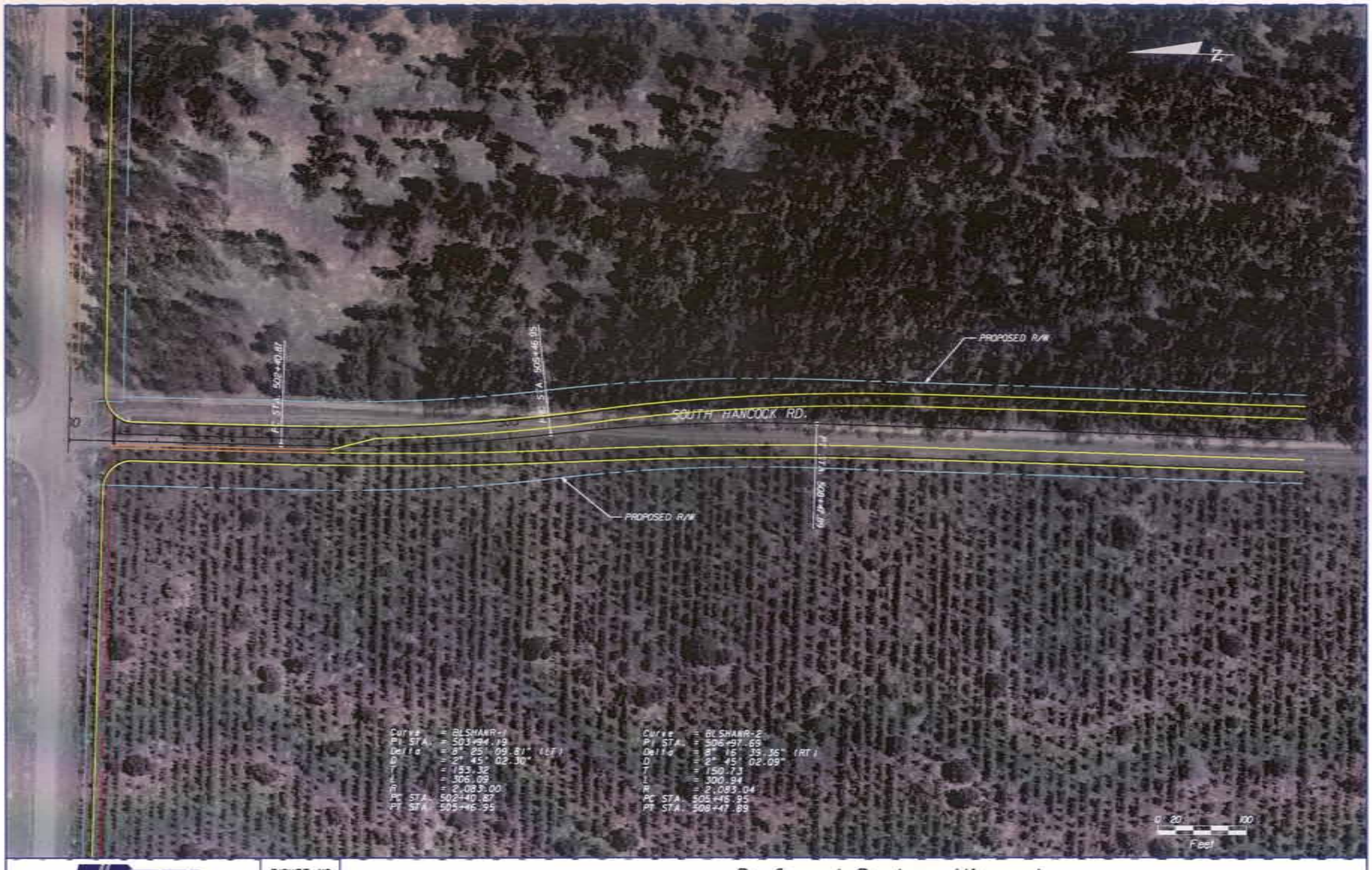
FIGURE NO.

A-17

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



Engineers & Planners

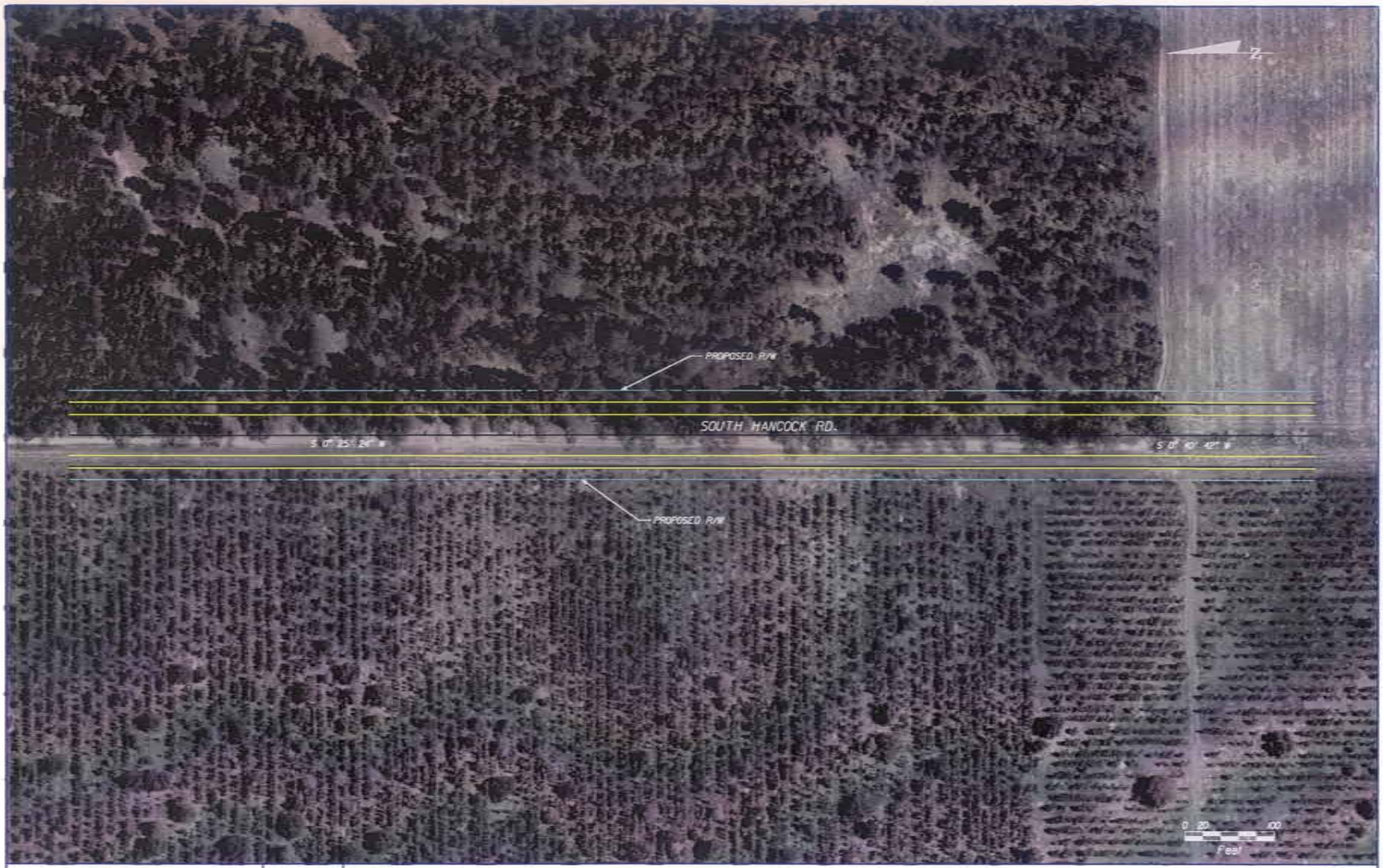
FIGURE NO.

A-18

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line



Engineers & Planners

FIGURE NO.

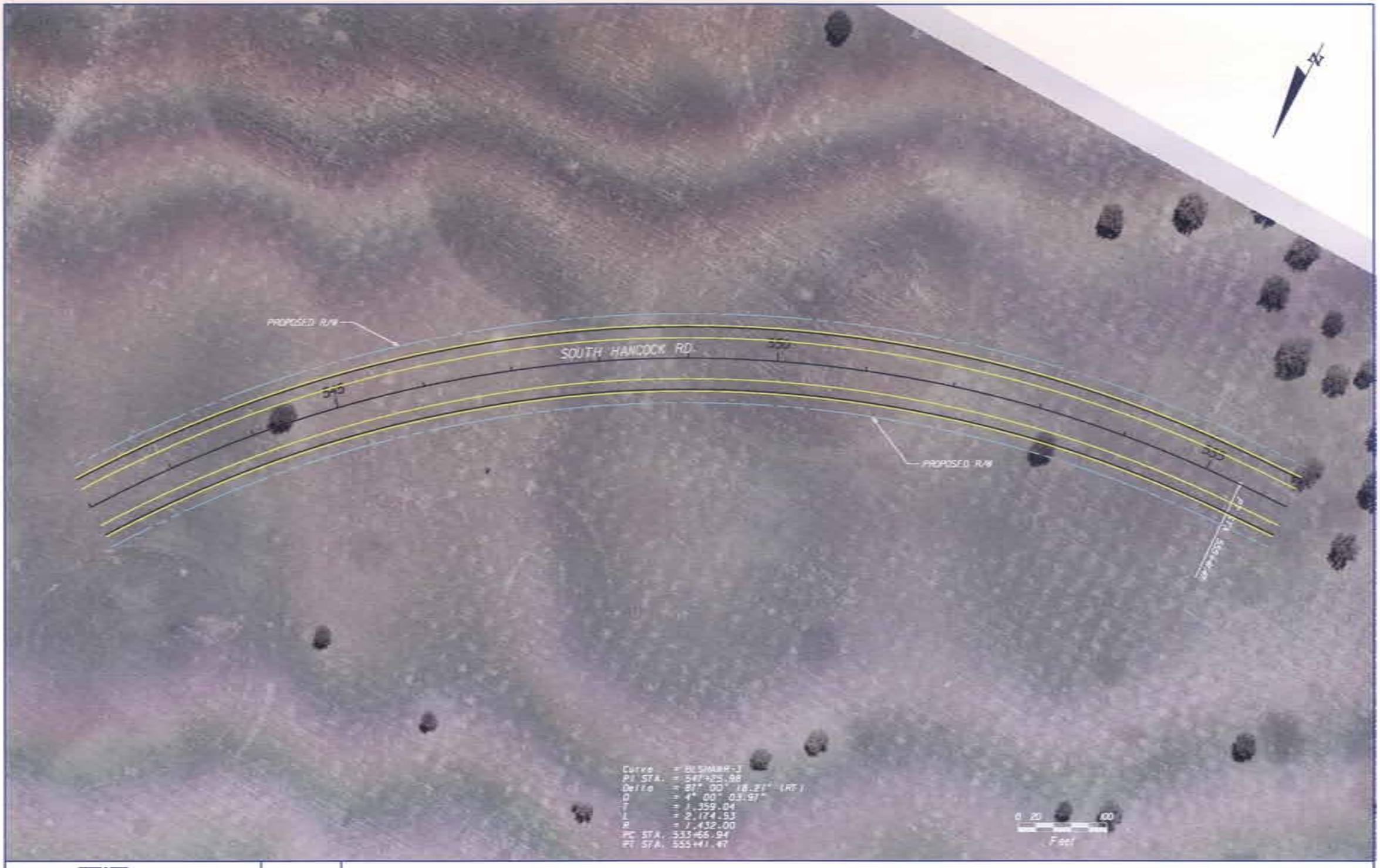
A-19

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

TEI Engineers & Planners	FIGURE NO. A-20	Preferred Roadway Alignment Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line



TEI Engineers & Planners	FIGURE NO. A-21	Preferred Roadway Alignment Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 to Orange County Line

Curve = BLSHAMR-4
PI STA. = 569+77.63
Delta = 7° 02' 26.95" (RT)
D = 9° 10' 47.12"
T = 38.40
L = 76.70
R = 624.15
PC STA. 569+39.24
PT STA. 570+15.94

TEI Engineers & Planners

FIGURE NO. A-22

Preferred Roadway Alignment

Hartwood Marsh Road PD&E

Hartwood Marsh Road: US 27 to Orange County Line

Curve = BLSHAMR-4
PI STA. = 569+77.63
Delta = 7° 02' 26.95" (RT)
D = 9° 10' 47.12"
T = 38.40
L = 76.70
R = 624.15
PC STA. 569+39.24
PT STA. 570+15.94

Curve = BLSHAMR-5
PI STA. = 572+43.64
Delta = 41° 01' 17.19" (RT)
D = 9° 24' 47.84"
T = 227.70
L = 435.78
R = 608.67
PC STA. 570+15.94
PT STA. 574+51.72

Engineers & Planners

FIGURE NO.
A-23

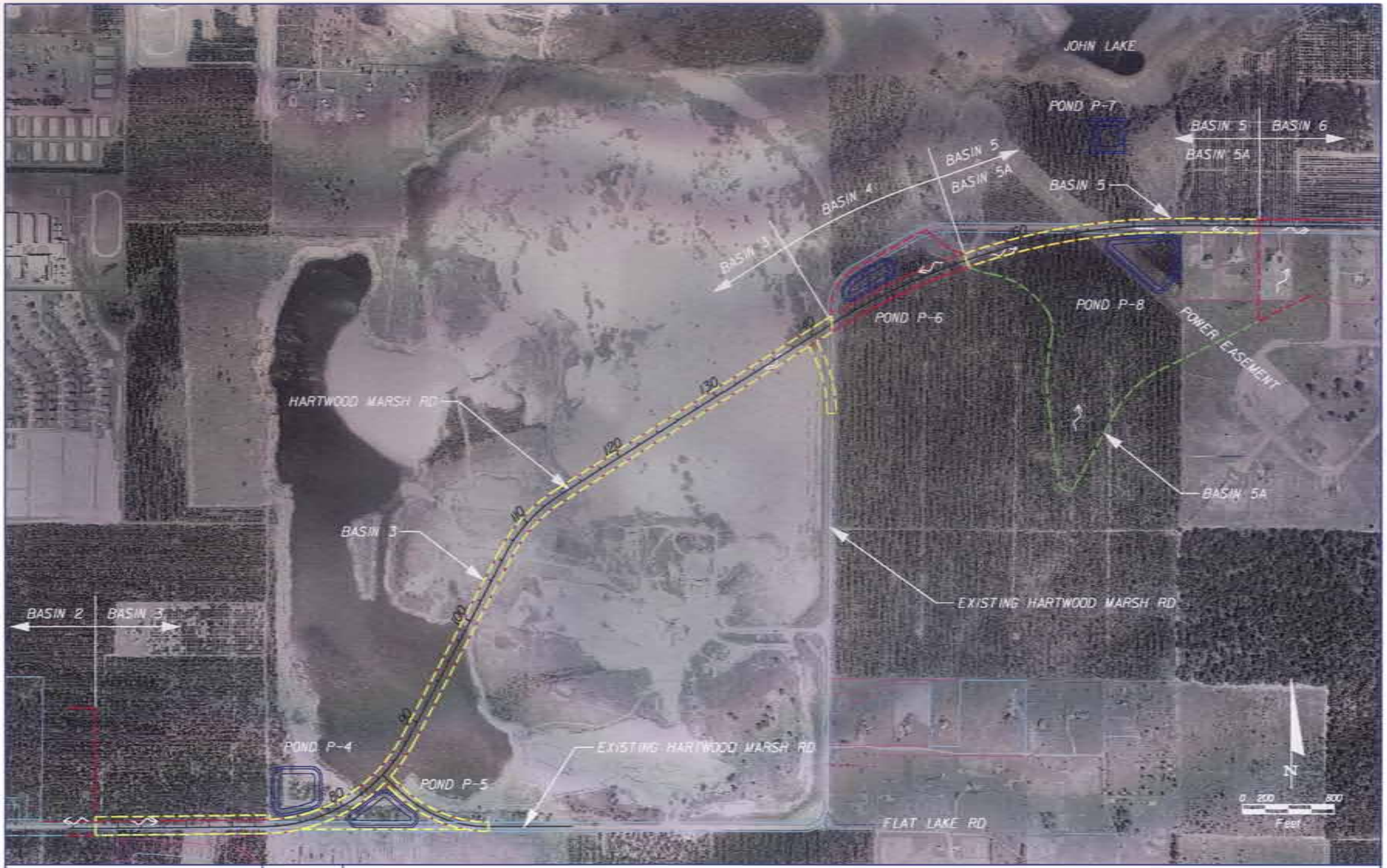
Preferred Roadway Alignment

Hartwood Marsh Road PD&E
Hartwood Marsh Road: US 27 to Orange County Line

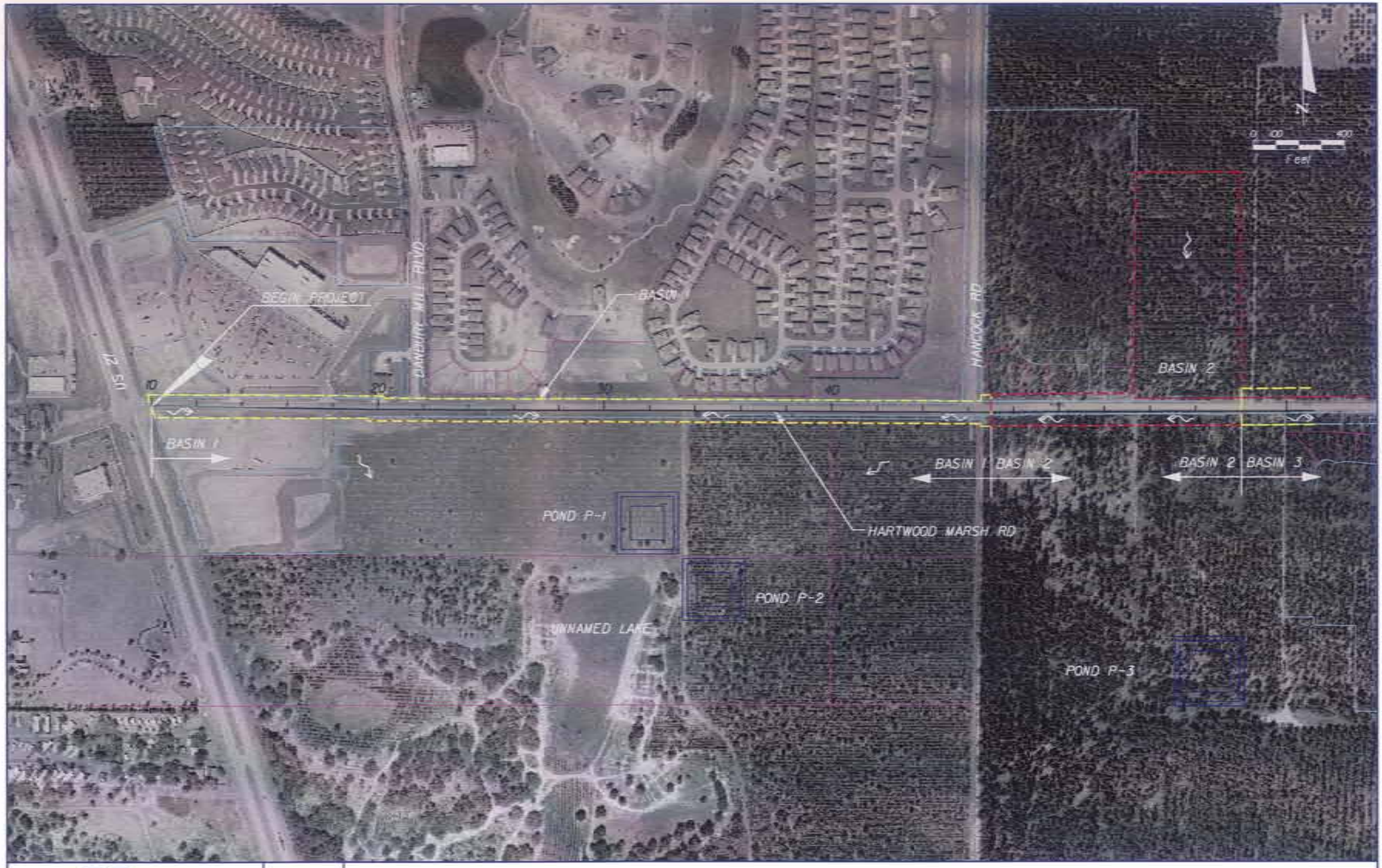
Appendix B

Pond Data

TEI Engineers & Planners	FIGURE NO. B-3	Potential Pond Sites Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 TO Orange County Line



Engineers & Planners	FIGURE NO. 8-2	Potential Pond Sites Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 TO Orange County Line



Engineers & Planners	FIGURE NO. B-1	Potential Pond Sites Hartwood Marsh Road PD&E Hartwood Marsh Road: US 27 TO Orange County Line

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	1	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Pre-Development Basin 1 Data	Checked By:	KVA	7/2/2004
Location:	STA. 10+00.00 to STA. 47+00.00	TEI Project No.:	22324.00	

BASIN 1 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	372374	8.55
Offsite	0	0.00
Pond	73984	1.70
Basin 1 Total Area =	446358	10.25

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	2.04	199.78
Pervious w/n R/W	Astatula Sand	A	39	6.51	253.89
Offsite	Astatula Sand	A	39	0.00	0.00
Pond	Astatula Sand	A	39	1.70	66.24
			Totals =	10.25	519.91
			Composite CN =		50.74

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 1 contains 2 12-ft travel lanes for a total of 24-ft per linear foot.
Using contours from GIS data and field visits, Basin 1 was determined to contain no offsite area.
Water runoff flows south to unnamed lake.

PRE-DEVELOPMENT DISCHARGE RATES

Storm Event	Discharge Rate (cfs)
10YR 24HR	10.737
25YR 24HR	20.025
25YR 96HR	30.161

Note: The above values were calculated by ICPR3.

RUNOFF VOLUME

Volume (ac-ft) = **3.798**
Calculated by ICPR

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	2	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Basin 1 Data / Pond P-1	Checked By:	KVA	7/2/2004
Location:	STA. 10+00.00 to STA. 47+00.00	TEI Project No.:	22324.00	

BASIN 1 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	372374	8.55
Offsite	0	0.00
Pond	73984	1.70
Basin 1 Total Area =	446358	10.25

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	6.33	620.15
Pervious w/n R/W	Astatula Sand	A	39	2.22	86.60
Offsite	Astatula Sand	A	39	0.00	0.00
Pond	Astatula Sand	A	39	1.70	66.24
			Totals =	10.25	772.99
			Composite CN =		75.44

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 1 contains 4 12-ft travel lanes with curb and gutter and sidewalk on both sides for a total of 74.5-ft per linear foot. Using contours from GIS data and field visits, Basin 1 was determined to contain no offsite area. Water is conveyed to Pond P-1 via storm drain pipes. Water is conveyed east from STA. 10+00.00 to STA. 33+00.00 and west from STA. 47+00.00 to STA. 33+00.00, then south to Pond P-1.

POND P-1 DATA

POND LOCATION

Utilizing contours from GIS data the pond locations are positioned to take advantage of the following characteristics; low depressions, property lines, property value, positive outfalls in vicinity, etc.

POND DESCRIPTION

Type:	Dry	Land Locked / Positive Outfall:	Land Locked
Total Pond Area:	1.70-ac	Outfall Description:	
Berm Width:	20-ft	Storm Events:	10yr24hr, 25yr24hr, 25yr96hr, 100yr24hr
Slopes:	6:1	Estimated NWL:	6-ft or deeper below ground surface
Permit Agency:	SJRWMD	Free Board:	1-ft

STAGE-STORAGE CALCULATIONS

	Elevation (ft-NGVD)	Area (ft^2)	Area (ac)	Storage Volume (ac-ft)
Contour elevation	93.00	21780	0.50	0.000
Contour elevation	94.00	25600	0.59	0.544
Contour elevation	95.00	29584	0.68	1.177
Contour elevation	96.00	33856	0.78	1.905
Contour elevation	97.00	38416	0.88	2.735
Contour elevation	98.00	43264	0.99	3.673
Contour elevation	99.00	48400	1.11	4.725
Contour elevation	100.00	53824	1.24	5.898

Note: Stage-Storage volume computed using the "average end area" Method

SJRWMD TREATMENT CRITERIA

1) (1.0"/12in/ft) x Basin Area: 0.85

2) (1.25"/12in/ft) x IMP. Area plus (0.5"/12in/ft) x Basin Area: 1.09

RUNOFF VOLUME

Volume (ac-ft) = **3.007**

Runoff Volume = Post minus Pre

Calculated by ICPR

VOLUME PROVIDED

Volume (ac-ft) = **4.725**

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	3	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Basin 1 Data / Pond P-2 (Pond P-1 Alternative)	Checked By:	KVA	7/2/2004
Location:	STA. 10+00.00 to STA. 47+00.00	TEI Project No.:	22324.00	

BASIN 1 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	372374	8.55
Offsite	0	0.00
Pond	73984	1.70
Basin 1 Total Area =	446358	10.25

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	6.33	620.15
Pervious w/n R/W	Astatula Sand	A	39	2.22	86.60
Offsite	Astatula Sand	A	39	0.00	0.00
Pond	Astatula Sand	A	39	1.70	66.24
			Totals =	10.25	772.99
			Composite CN =		75.44

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 1 contains 4 12-ft travel lanes with curb and gutter and sidewalk on both sides for a total of 74.5-ft per linear foot. Using contours from GIS data and field visits, Basin 1 was determined to contain no offsite area. Water is conveyed to Pond P-2 via storm drain pipes. Water is conveyed east from STA. 10+00.00 to STA. 34+00.00 and west from STA. 47+00.00 to STA. 34+00.00, then south to Pond P-2.

POND P-2 DATA (ALTERNATIVE TO POND P-1)

POND LOCATION

Utilizing contours from GIS data the pond locations are positioned to take advantage of the following characteristics; low depressions, property lines, property value, positive outfalls in vicinity, etc.

POND DESCRIPTION

Type:	Dry	Land Locked / Positive Outfall:	Land Locked
Total Pond Area:	1.70-ac	Outfall Description:	
Berm Width:	20-ft	Storm Events:	10yr24hr, 25yr24hr, 25yr96hr, 100yr24hr
Slopes:	6:1	Estimated NWL:	6-ft or deeper below ground surface
Permit Agency:	SJRWMD	Free Board:	1-ft

STAGE-STORAGE CALCULATIONS

	Elevation (ft-NGVD)	Area (ft^2)	Area (ac)	Storage Volume (ac-ft)
Contour elevation	93.00	21780	0.50	0.000
Contour elevation	94.00	25600	0.59	0.544
Contour elevation	95.00	29584	0.68	1.177
Contour elevation	96.00	33856	0.78	1.905
Contour elevation	97.00	38416	0.88	2.735
Contour elevation	98.00	43264	0.99	3.673
Contour elevation	99.00	48400	1.11	4.725
Contour elevation	100.00	53824	1.24	5.898

Note: Stage-Storage volume computed using the "average end area" Method

SJRWMD TREATMENT CRITERIA

1) (1.0"/12in/ft) x Basin Area: 0.85

2) (1.25"/12in/ft) x IMP. Area plus (0.5"/12in/ft) x Basin Area: 1.09

RUNOFF VOLUME

Volume (ac-ft) = **3.007**

Runoff Volume = Post minus Pre

Calculated by ICPR

VOLUME PROVIDED

Volume (ac-ft) = **4.725**

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	4	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Basin 2 Data / Pond P-3	Checked By:	KVA	7/2/2004
Location:	STA. 47+00.00 to STA. 58+00.00	TEI Project No.:	22324.00	

BASIN 2 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	145445	3.34
Offsite	461420	10.59
Pond	93025	2.14
Basin 2 Total Area =	699890	16.07

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	1.88	184.37
Pervious w/n R/W	Astatula Sand	A	39	1.46	56.85
Offsite	Astatula Sand	A	39	10.59	413.12
Pond	Astatula Sand	A	39	2.14	83.29
			Totals =	16.07	737.62
			Composite CN =		45.91

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 2 contains 4 12-ft travel lanes with curb and gutter and sidewalk on both sides for a total of 74.5-ft per linear foot. The offsite area was determined using contours from GIS data and scaling the approximate basin boundaries. Water is conveyed to Pond P-3 via storm drain pipes. Water is conveyed west from STA. 58+00.00 to STA. 47+00.00, then south to Pond P-3.

POND P-3 DATA

POND LOCATION

Utilizing contours from GIS data the pond locations are positioned to take advantage of the following characteristics; low depressions, property lines, property value, positive outfalls in vicinity, field visits, etc.

POND DESCRIPTION

Type:	Dry	Land Locked / Positive Outfall:	Land Locked
Total Pond Area:	2.14-ac	Outfall Description:	
Berm Width:	20-ft	Storm Events:	10yr24hr, 25yr24hr, 100yr24hr
Slopes:	6:1	Estimated NWL:	6-ft or deeper below ground surface
Permit Agency:	SJRWMD	Free Board:	1-ft

STAGE-STORAGE CALCULATIONS

	Elevation (ft-NGVD)	Area (ft^2)	Area (ac)	Storage Volume (ac-ft)
Contour elevation	125.00	32670	0.75	0.000
Contour elevation	126.00	37249	0.86	0.803
Contour elevation	127.00	42025	0.96	1.713
Contour elevation	128.00	47089	1.08	2.735
Contour elevation	129.00	52441	1.20	3.878
Contour elevation	130.00	58081	1.33	5.146
Contour elevation	131.00	64009	1.47	6.548
Contour elevation	132.00	70225	1.61	8.089

Note: Stage-Storage volume computed using the "average end area" Method

SJRWMD TREATMENT CRITERIA

1) (1.0"/12in/ft) x Basin Area: 1.34
2) (1.25"/12in/ft) x IMP. Area plus (0.5"/12in/ft) x Basin Area: 0.87

RUNOFF VOLUME

Volume (ac-ft) = **5.261**
Calculated by ICPR

VOLUME PROVIDED

Volume (ac-ft) = **6.548**

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	5	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Basin 3 Data / Pond P-4	Checked By:	KVA	7/2/2004
Location:	STA. 58+00.00 to STA. 142+00.00	TEI Project No.:	22324.00	

BASIN 3 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	1138407	26.13
Offsite	61589	1.41
Pond	191664	4.40
Basin 3 Total Area =	1391660	31.95

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	3.25	318.46
Pervious w/n R/W	Astatula Sand	A	39	22.88	892.50
Offsite	Astatula Sand	A	39	1.41	55.14
Pond	Astatula Sand	A	39	4.40	171.60
			Totals =	31.95	1437.70
			Composite CN =		45.00

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 3 contains 4 12-ft travel lanes with curb and gutter and sidewalk on both sides for a total of 74.5-ft per linear foot. The offsite area was determined using contours from GIS data and scaling the approximate basin boundaries. Water is conveyed to Pond P-4 via storm drain pipes. Water is conveyed east from STA. 58+00.00 to STA. 77+00.00 and west from STA. 142+00.00 to STA. 77+00.00, then northwest to Pond P-4.

POND P-4 DATA

POND LOCATION

Utilizing contours from GIS data the pond locations are positioned to take advantage of the following characteristics; low depressions, property lines, property value, positive outfalls in vicinity, field visits, etc.

POND DESCRIPTION

Type:	Dry	Land Locked / Positive Outfall:	Land Locked
Total Pond Area:	4.40-ac	Outfall Description:	
Berm Width:	20-ft	Storm Events:	10yr24hr, 25yr24hr, 100yr24hr
Slopes:	6:1	Estimated NWL:	6-ft or deeper below ground surface
Permit Agency:	SJRWMD	Free Board:	1-ft

STAGE-STORAGE CALCULATIONS

	Elevation (ft-NGVD)	Area (ft^2)	Area (ac)	Storage Volume (ac-ft)
Contour elevation	116.00	98010	2.25	0.000
Contour elevation	117.00	105625	2.42	2.337
Contour elevation	118.00	113569	2.61	4.853
Contour elevation	119.00	121801	2.80	7.555
Contour elevation	120.00	130321	2.99	10.449
Contour elevation	121.00	139129	3.19	13.542
Contour elevation	122.00	148225	3.40	16.840
Contour elevation	123.00	157609	3.62	20.351

Note: Stage-Storage volume computed using the "average end area" Method

SJRWMD TREATMENT CRITERIA

1) (1.0"/12in/ft) x Basin Area: 2.66

2) (1.25"/12in/ft) x IMP. Area plus (0.5"/12in/ft) x Basin Area: 1.67

RUNOFF VOLUME

Volume (ac-ft) = **10.088**

Calculated by ICPR

VOLUME PROVIDED

Volume (ac-ft) = **16.840**

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	6	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Basin 3 Data / Pond P-5 (Pond P-4 Alternative)	Checked By:	KVA	7/2/2004
Location:	STA. 58+00.00 to STA. 142+00.00	TEI Project No.:	22324.00	

BASIN 3 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	1138407	26.13
Offsite	61589	1.41
Pond	224441	5.15
Basin 3 Total Area =	1424437	32.70

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	3.25	318.46
Pervious w/n R/W	Astatula Sand	A	39	22.88	892.50
Offsite	Astatula Sand	A	39	1.41	55.14
Pond	Astatula Sand	A	39	5.15	200.95
			Totals =	32.70	1467.05
			Composite CN =		44.86

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 3 contains 4 12-ft travel lanes with curb and gutter and sidewalk on both sides for a total of 74.5-ft per linear foot. The offsite area was determined using contours from GIS data and scaling the approximate basin boundaries. Water is conveyed to Pond P-5 via storm drain pipes. Water is conveyed east from STA. 58+00.00 to STA. 80+00.00 and west from STA. 142+00.00 to STA. 80+00.00, then southeast to Pond P-5.

POND P-5 DATA (ALTERNATIVE TO POND P-4)

POND LOCATION

Utilizing contours from GIS data the pond locations are positioned to take advantage of the following characteristics; low depressions, property lines, property value, positive outfalls in vicinity, field visits, etc.

POND DESCRIPTION

Type:	Dry	Land Locked / Positive Outfall:	Land Locked
Total Pond Area:	2.14-ac	Outfall Description:	
Berm Width:	20-ft	Storm Events:	10yr24hr, 25yr24hr, 100yr24hr
Slopes:	6:1	Estimated NWL:	6-ft or deeper below ground surface
Permit Agency:	SJRWMD	Free Board:	1-ft

STAGE-STORAGE CALCULATIONS

	Elevation (ft-NGVD)	Area (ft^2)	Area (ac)	Storage Volume (ac-ft)
Contour elevation	116.00	54550	1.25	0.000
Contour elevation	117.00	61470	1.41	1.332
Contour elevation	118.00	68616	1.58	2.825
Contour elevation	119.00	75988	1.74	4.485
Contour elevation	120.00	83586	1.92	6.316
Contour elevation	121.00	91411	2.10	8.325
Contour elevation	122.00	99461	2.28	10.516
Contour elevation	123.00	107738	2.47	12.894

Note: Stage-Storage volume computed using the "average end area" Method

SJRWMD TREATMENT CRITERIA

1) (1.0"/12in/ft) x Basin Area: 2.73
2) (1.25"/12in/ft) x IMP. Area plus (0.5"/12in/ft) x Basin Area: 1.70

RUNOFF VOLUME

Volume (ac-ft) = **10.088**
Calculated by ICPR

VOLUME PROVIDED

Volume (ac-ft) = **10.516**

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	7	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Basin 4 Data / Pond P-6	Checked By:	KVA	7/2/2004
Location:	STA. 142+00.00 to STA. 155+00.00	TEI Project No.:	22324.00	

BASIN 4 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	156788	3.60
Offsite	198504	4.56
Pond	93025	2.14
Basin 4 Total Area =	448317	10.29

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	2.22	217.89
Pervious w/n R/W	Astatula Sand	A	39	1.38	53.66
Offsite	Astatula Sand	A	39	4.56	177.72
Pond	Astatula Sand	A	39	2.14	83.29
			Totals =	10.29	532.56
			Composite CN =		51.75

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 4 contains 4 12-ft travel lanes with curb and gutter and sidewalk on both sides for a total of 74.5-ft per linear foot. The offsite area was determined using contours from GIS data and field visits.
Water is conveyed to Pond P-6 via storm drain pipes. Water is conveyed west from STA. 155+00.00 to STA. 142+00.00, then northwest to Pond P-6.

POND P-6 DATA

POND LOCATION

Utilizing contours from GIS data the pond locations are positioned to take advantage of the following characteristics; low depressions, property lines, property value, positive outfalls in vicinity, field visits, etc.

POND DESCRIPTION

Type:	Dry	Land Locked / Positive Outfall:	Land Locked
Total Pond Area:	2.14-ac	Outfall Description:	
Berm Width:	20-ft	Storm Events:	10yr24hr, 25yr24hr, 100yr24hr
Slopes:	6:1	Estimated NWL:	6-ft or deeper below ground surface
Permit Agency:	SJRWMD	Free Board:	1-ft

STAGE-STORAGE CALCULATIONS

	Elevation (ft-NGVD)	Area (ft^2)	Area (ac)	Storage Volume (ac-ft)
Contour elevation	110.00	32670	0.75	0.000
Contour elevation	111.00	37249	0.86	0.803
Contour elevation	112.00	42025	0.96	1.713
Contour elevation	113.00	47089	1.08	2.735
Contour elevation	114.00	52441	1.20	3.878
Contour elevation	115.00	58081	1.33	5.146
Contour elevation	116.00	64009	1.47	6.548
Contour elevation	117.00	70225	1.61	8.089

Note: Stage-Storage volume computed using the "average end area" Method

SJRWMD TREATMENT CRITERIA

1) (1.0"/12in/ft) x Basin Area: 0.86
2) (1.25"/12in/ft) x IMP. Area plus (0.5"/12in/ft) x Basin Area: 0.66

RUNOFF VOLUME

Volume (ac-ft) = **4.137**
Calculated by ICPR

VOLUME PROVIDED

Volume (ac-ft) = **6.548**

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	8	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Pre-Development Basin 5 Data	Checked By:	KVA	7/2/2004
Location:	STA. 155+00.00 to STA. 181+00.00	TEI Project No.:	22324.00	

BASIN 5 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	311999	7.16
Offsite	0	0.00
Pond	93025	2.14
Basin 5 Total Area =	405024	9.30

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	1.43	140.39
Pervious w/n R/W	Astatula Sand	A	39	5.73	223.47
Offsite	Astatula Sand	A	39	0.00	0.00
Pond	Astatula Sand	A	39	2.14	83.29
			Totals =	9.30	447.14
			Composite CN =		48.09

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 5 contains 2 12-ft travel lanes for a total of 24-ft per linear foot.
Using contours from GIS data and field visits, Basin 5 was determined to contain no offsite area.
Water runoff flows north to John's Lake.

PRE-DEVELOPMENT DISCHARGE RATES

Storm Event	Discharge Rate (cfs)
10YR 24HR	7.852
25YR 24HR	15.676
25YR 96HR	24.965

Note: The above values were calculated by ICPR3.

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	9	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Basin 5 Data / Pond P-7	Checked By:	KVA	7/2/2004
Location:	STA. 155+00.00 to STA. 181+00.00	TEI Project No.:	22324.00	

BASIN 5 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	311999	7.16
Offsite	0	0.00
Pond	93025	2.14
Basin 5 Total Area =	405024	9.30

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	4.45	435.78
Pervious w/n R/W	Astatula Sand	A	39	2.72	105.92
Offsite	Astatula Sand	A	39	0.00	0.00
Pond	Astatula Sand	A	39	2.14	83.29
			Totals =	9.30	624.98
			Composite CN =		67.22

TIME OF CONCENTRATION

Tc = 14-min

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 5 contains 4 12-ft travel lanes with curb and gutter and sidewalk on both sides for a total of 74.5-ft per linear foot. Using contours from GIS data and field visits, Basin 5 was determined to contain no offsite area. Water is conveyed to Pond P-7 via storm drain pipes. Water is conveyed east from STA. 155+00.00 to STA. 170+00.00 and west from STA. 181+00.00 to STA. 170+00.00, then north to Pond P-7.

POND P-7 DATA

POND LOCATION

Utilizing contours from GIS data the pond locations are positioned to take advantage of the following characteristics; low depressions, property lines, property value, positive outfalls in vicinity, field visits, etc.

POND DESCRIPTION

Type:	Dry	Land Locked / Positive Outfall:	Positive Outfall
Total Pond Area:	2.14-ac	Outfall Description:	Lake north of Pond P-7
Berm Width:	20-ft	Storm Events:	10yr24hr, 25yr24hr, 25yr96hr
Slopes:	6:1	Estimated NWL:	6-ft or deeper below ground surface
Permit Agency:	SJRWMD	Free Board:	1-ft

STAGE-STORAGE CALCULATIONS

	Elevation (ft-NGVD)	Area (ft^2)	Area (ac)	Storage Volume (ac-ft)
Contour elevation	91.00	32670	0.75	0.000
Contour elevation	92.00	37249	0.86	0.803
Contour elevation	93.00	42025	0.96	1.713
Contour elevation	94.00	47089	1.08	2.735
Contour elevation	95.00	52441	1.20	3.878
Contour elevation	96.00	58081	1.33	5.146
Contour elevation	97.00	64009	1.47	6.548
Contour elevation	98.00	70225	1.61	8.089

Note: Stage-Storage volume computed using the "average end area" Method

SJRWMD TREATMENT CRITERIA

1) (1.0"/12in/ft) x Basin Area:	0.77
2) (1.25"/12in/ft) x IMP. Area plus (0.5"/12in/ft) x Basin Area:	0.85

POST-DEVELOPMENT DISCHARGE RATES

Storm Event	Discharge Rate (cfs)	Max. Stage (ft)
10YR 24HR	5.015	92.391
25YR 24HR	12.279	92.746
25YR 96HR	19.639	94.355

Note: The above values were calculated by ICPR3.

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	10	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Basin 5A Data / Pond P-8 (Pond P-7 Alternative)	Checked By:	KVA	7/2/2004
Location:	STA. 155+00.00 to STA. 181+00.00	TEI Project No.:	22324.00	

BASIN 5A DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	311999	7.16
Offsite	2429946	55.78
Pond	236196	5.42
Basin 5A Total Area =	2978141	68.37

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	4.45	435.78
Pervious w/n R/W	Astatula Sand	A	39	2.72	105.92
Offsite	Astatula Sand	A	39	55.78	2175.57
Pond	Astatula Sand	A	39	5.42	211.47
			Totals =	68.37	2928.74
			Composite CN =		42.84

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 5A contains 4 12-ft travel lanes with curb and gutter and sidewalk on both sides for a total of 74.5-ft per linear foot. The offsite area was determined using contours from GIS data and scaling the approximate basin boundaries. Water is conveyed to Pond P-8 via storm drain pipes. Water is conveyed east from STA. 155+00.00 to STA. 170+00.00 and west from STA. 181+00.00 to STA. 170+00.00, then south to Pond P-8.

POND P-8 DATA (ALTERNATIVE TO POND P-7)

POND LOCATION

Utilizing contours from GIS data the pond locations are positioned to take advantage of the following characteristics; low depressions, property lines, property value, positive outfalls in vicinity, field visits, etc.

POND DESCRIPTION

Type:	Dry	Land Locked / Positive Outfall:	Land Locked
Total Pond Area:	5.42-ac	Outfall Description:	
Berm Width:	20-ft	Storm Events:	10yr24hr, 25yr24hr, 100yr24hr
Slopes:	6:1	Estimated NWL:	6-ft or deeper below ground surface
Permit Agency:	SJRWMD	Free Board:	1-ft

STAGE-STORAGE CALCULATIONS

	Elevation (ft-NGVD)	Area (ft^2)	Area (ac)	Storage Volume (ac-ft)
Contour elevation	84.00	130680	3.00	0.000
Contour elevation	85.00	139876	3.21	3.106
Contour elevation	86.00	148996	3.42	6.421
Contour elevation	87.00	158404	3.64	9.950
Contour elevation	88.00	168100	3.86	13.698
Contour elevation	89.00	178084	4.09	17.671
Contour elevation	90.00	188356	4.32	21.877
Contour elevation	91.00	198916	4.57	26.323

Note: Stage-Storage volume computed using the "average end area" Method

SJRWMD TREATMENT CRITERIA

1) (1.0"/12in/ft) x Basin Area: 5.70

2) (1.25"/12in/ft) x IMP. Area plus (0.5"/12in/ft) x Basin Area: 3.31

RUNOFF VOLUME

Volume (ac-ft) = **19.684**

Calculated by ICPR

VOLUME PROVIDED

Volume (ac-ft) = **21.877**

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	11	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Basin 6 Data / Pond P-9	Checked By:	KVA	7/2/2004
Location:	STA. 181+00.00 to STA. 197+00.00	TEI Project No.:	22324.00	

BASIN 6 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	191134	4.39
Offsite	712781	16.36
Pond	110889	2.55
Basin 6 Total Area =	1014804	23.30

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	2.74	268.17
Pervious w/n R/W	Astatula Sand	A	39	1.65	64.40
Offsite	Astatula Sand	A	39	16.36	638.16
Pond	Astatula Sand	A	39	2.55	99.28
			Totals =	23.30	1070.02
			Composite CN =		45.93

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 6 contains 4 12-ft travel lanes with curb and gutter and sidewalk on both sides for a total of 74.5-ft per linear foot. The offsite area was determined using contours from GIS data and scaling the approximate basin boundaries. Water is conveyed to Pond P-9 via storm drain pipes. Water is conveyed east from STA. 181+00.00 to STA. 185+00.00 and west from STA. 197+00.00 to STA. 185+00.00, then north to Pond P-9.

POND P-9 DATA

POND LOCATION

Utilizing contours from GIS data the pond locations are positioned to take advantage of the following characteristics; low depressions, property lines, property value, positive outfalls in vicinity, field visits, etc.

POND DESCRIPTION

Type:	Dry	Land Locked / Positive Outfall:	Land Locked
Total Pond Area:	2.55-ac	Outfall Description:	
Berm Width:	20-ft	Storm Events:	10yr24hr, 25yr24hr, 100yr24hr
Slopes:	6:1	Estimated NWL:	6-ft or deeper below ground surface
Permit Agency:	SJRWMD	Free Board:	1-ft

STAGE-STORAGE CALCULATIONS

	Elevation (ft-NGVD)	Area (ft^2)	Area (ac)	Storage Volume (ac-ft)
Contour elevation	128.00	43560	1.000	0.000
Contour elevation	129.00	48841	1.121	1.061
Contour elevation	130.00	54289	1.246	2.244
Contour elevation	131.00	60025	1.378	3.557
Contour elevation	132.00	66049	1.516	5.004
Contour elevation	133.00	72361	1.661	6.592
Contour elevation	134.00	78961	1.813	8.329
Contour elevation	135.00	85849	1.971	10.221

Note: Stage-Storage volume computed using the "average end area" Method

SJRWMD TREATMENT CRITERIA

1) (1.0"/12in/ft) x Basin Area: 1.94

2) (1.25"/12in/ft) x IMP. Area plus (0.5"/12in/ft) x Basin Area: 1.26

RUNOFF VOLUME

Volume (ac-ft) = **7.634**

Calculated by ICPR

VOLUME PROVIDED

Volume (ac-ft) = **8.329**

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	12	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Basin 7 Data / Pond P-10	Checked By:	KVA	7/2/2004
Location:	STA. 197+25.00 to STA. 227+00.00	TEI Project No.:	22324.00	

BASIN 7 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	301075	6.91
Offsite	0	0.00
Pond	93025	2.14
Basin 7 Total Area =	394100	9.05

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	5.09	498.63
Pervious w/n R/W	Astatula Sand	A	39	1.82	71.12
Offsite	Astatula Sand	A	39	0.00	0.00
Pond	Astatula Sand	A	39	2.14	83.29
			Totals =	9.05	653.04
			Composite CN =		72.18

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 7 contains 4 12-ft travel lanes with curb and gutter and sidewalk on both sides for a total of 74.5-ft per linear foot. Using contours from GIS data and field visits, Basin 7 was determined to contain no offsite area. Water is conveyed to Pond P-10 via storm drain pipes. Water is conveyed east from STA. 197+25.00 to STA. 201+00.00 and west from STA. 227+00.00 to STA. 201+00.00, then north to Pond P-10.

POND P-10 DATA

POND LOCATION

Utilizing contours from GIS data the pond locations are positioned to take advantage of the following characteristics; low depressions, property lines, property value, positive outfalls in vicinity, field visits, etc.

POND DESCRIPTION

Type:	Dry	Land Locked / Positive Outfall:	Land Locked
Total Pond Area:	2.14-ac	Outfall Description:	
Berm Width:	20-ft	Storm Events:	10yr24hr, 25yr24hr, 100yr24hr
Slopes:	6:1	Estimated NWL:	6-ft or deeper below ground surface
Permit Agency:	SJRWMD	Free Board:	1-ft

STAGE-STORAGE CALCULATIONS

	Elevation (ft-NGVD)	Area (ft^2)	Area (ac)	Storage Volume (ac-ft)
Contour elevation	127.00	32670	0.75	0.000
Contour elevation	128.00	37249	0.86	0.803
Contour elevation	129.00	42025	0.96	1.713
Contour elevation	130.00	47089	1.08	2.735
Contour elevation	131.00	52441	1.20	3.878
Contour elevation	132.00	58081	1.33	5.146
Contour elevation	133.00	64009	1.47	6.548
Contour elevation	134.00	70225	1.61	8.089

Note: Stage-Storage volume computed using the "average end area" Method

SJRWMD TREATMENT CRITERIA

1) (1.0"/12in/ft) x Basin Area: 0.75

2) (1.25"/12in/ft) x IMP. Area plus (0.5"/12in/ft) x Basin Area: 0.91

RUNOFF VOLUME

Volume (ac-ft) = **5.884**

Calculated by ICPR

VOLUME PROVIDED

Volume (ac-ft) = **6.548**

BASIN DATA / POND CALCULATIONS

Road:	Hartwood Marsh Road	Sheet:	13	13
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	Basin 7 Data / Pond P-11 (Pond P-10 Alternative)	Checked By:	KVA	7/2/2004
Location:	STA. 197+25.00 to STA. 227+00.00	TEI Project No.:	22324.00	

BASIN 7 DATA

BASIN AREA COMPONENTS

Area Description	Area (ft^2)	Area (ac)
Within R/W Limits	301075	6.91
Offsite	0	0.00
Pond	93025	2.14
Basin 7 Total Area =	394100	9.05

CURVE NUMBER

Land-Use Description	Soil Name	Soil Group	CN	Area (ac)	Product
Pavement w/n R/W			98	5.09	498.63
Pervious w/n R/W	Astatula Sand	A	39	1.82	71.12
Offsite	Astatula Sand	A	39	0.00	0.00
Pond	Astatula Sand	A	39	2.14	83.29
			Totals =	9.05	653.04
			Composite CN =		72.18

BASIN DESCRIPTION

Within the Right-of-Way limits Basin 7 contains 4 12-ft travel lanes with curb and gutter and sidewalk on both sides for a total of 74.5-ft per linear foot. Using contours from GIS data and field visits, Basin 7 was determined to contain no offsite area. Water is conveyed to Pond P-11 via storm drain pipes. Water is conveyed east from STA. 197+25.00 to STA. 208+00.00 and west from STA. 227+00.00 to STA. 208+00.00, then north to Pond P-11.

POND P-11 DATA (ALTERNATIVE TO POND P-10)

POND LOCATION

Utilizing contours from GIS data the pond locations are positioned to take advantage of the following characteristics; low depressions, property lines, property value, positive outfalls in vicinity, field visits, etc.

POND DESCRIPTION

Type:	Dry	Land Locked / Positive Outfall:	Land Locked
Total Pond Area:	2.14-ac	Outfall Description:	
Berm Width:	20-ft	Storm Events:	10yr24hr, 25yr24hr, 100yr24hr
Slopes:	6:1	Estimated NWL:	6-ft or deeper below ground surface
Permit Agency:	SJRWMD	Free Board:	1-ft

STAGE-STORAGE CALCULATIONS

	Elevation (ft-NGVD)	Area (ft^2)	Area (ac)	Storage Volume (ac-ft)
Contour elevation	153.00	32670	0.75	0.000
Contour elevation	154.00	37249	0.86	0.803
Contour elevation	155.00	42025	0.96	1.713
Contour elevation	156.00	47089	1.08	2.735
Contour elevation	157.00	52441	1.20	3.878
Contour elevation	158.00	58081	1.33	5.146
Contour elevation	159.00	64009	1.47	6.548
Contour elevation	160.00	70225	1.61	8.089

Note: Stage-Storage volume computed using the "average end area" Method

SJRWMD TREATMENT CRITERIA

1) (1.0"/12in/ft) x Basin Area: 0.75

2) (1.25"/12in/ft) x IMP. Area plus (0.5"/12in/ft) x Basin Area: 0.91

RUNOFF VOLUME

Volume (ac-ft) = **5.884**

Calculated by ICPR

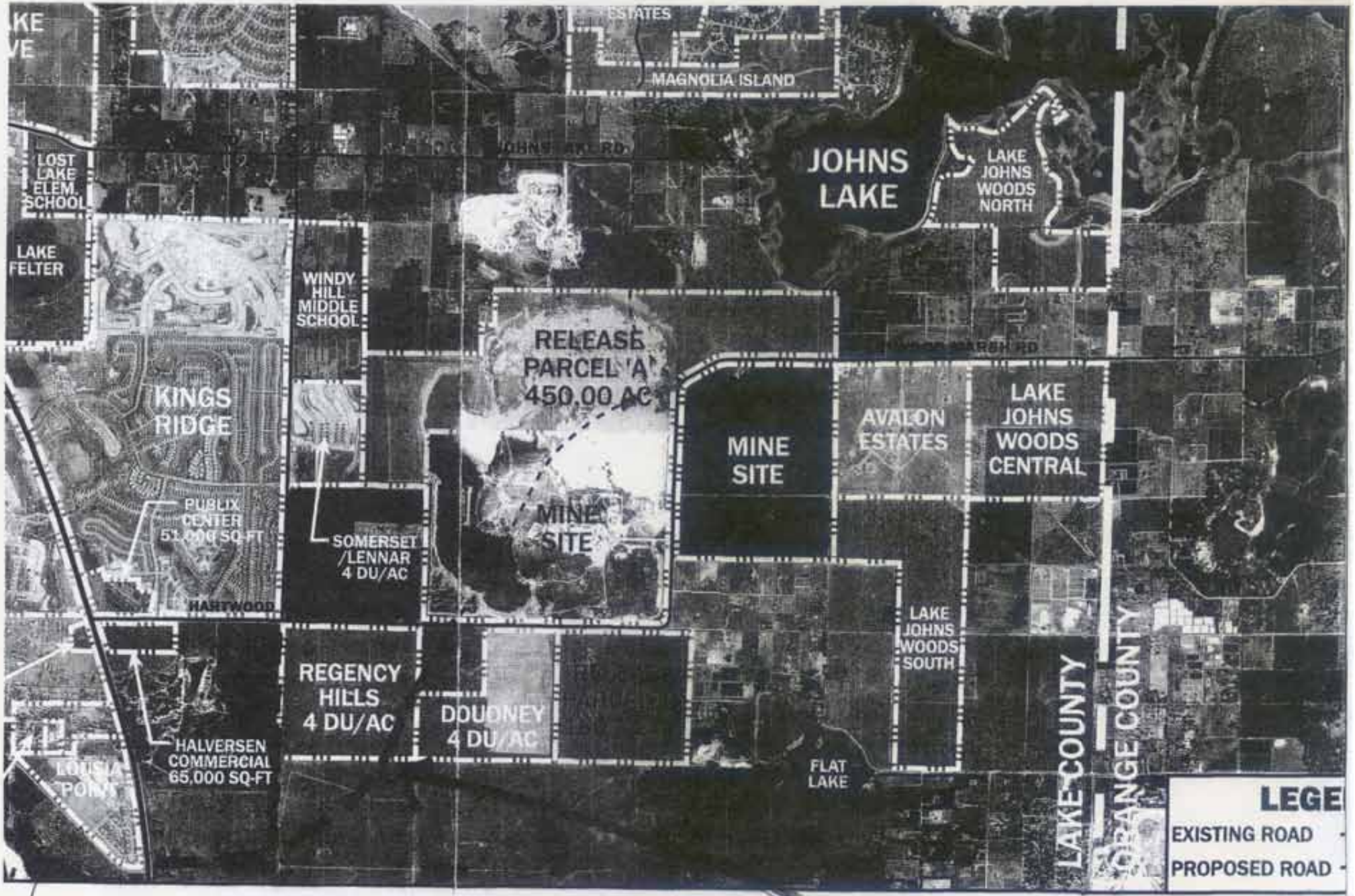
VOLUME PROVIDED

Volume (ac-ft) = **6.548**

ICPR RESULTS / VOLUME REQUIREMENTS

Road:	Hartwood Marsh Road	Sheet:	1	1
County:	Lake, FL	Prepared By:	MAB	1/15/2004
Description:	ICPR Results	Checked By:	KVA	7/2/2004
		TEI Project No.:	22324.00	

BASIN	BASIN AREA (ac)	STORM EVENT	RUNOFF VOLUME (in)	RUNOFF VOLUME (ac-ft)	DISCHARGE RATE (cfs)
Pre-Dev. Basin 1	10.25	10YR 24HR	1.538	1.313	10.737
(Pond P-1, Pond P-2)		25YR 24HR	2.645	2.259	20.025
		25YR 96HR	4.448	**3.798**	30.161
Basin 1	10.25	10YR 24HR	3.890	3.322	0.797
(Pond P-1, Pond P-2)		25YR 24HR	5.550	4.739	3.408
		25YR 96HR	7.970	**6.806**	29.911
Basin 2	16.07	10YR 24HR	1.147	1.536	N/A
(Pond P-3)		25YR 24HR	2.107	2.821	N/A
		100YR 24HR	3.929	**5.261**	N/A
Basin 3	31.95	10YR 24HR	1.077	2.867	N/A
(Pond P-4)		25YR 24HR	2.007	5.343	N/A
		100YR 24HR	3.789	**10.088**	N/A
Basin 3 Alt.	32.70	10YR 24HR	1.066	2.905	N/A
(Pond P-5)		25YR 24HR	1.992	5.428	N/A
		100YR 24HR	3.767	**10.265**	N/A
Basin 4	10.29	10YR 24HR	1.624	1.393	N/A
(Pond P-6)		25YR 24HR	2.760	2.367	N/A
		100YR 24HR	4.823	**4.137**	N/A
Pre-Dev. Basin 5	9.30	10YR 24HR	1.320	1.023	7.852
(John Lake)		25YR 24HR	2.348	1.819	15.676
		25YR 96HR	4.052	**3.140**	24.965
Basin 5	9.30	10YR 24HR	3.053	2.366	5.015
(Pond P-7 -> John Lake)		25YR 24HR	4.567	3.539	12.279
		25YR 96HR	6.835	**5.296**	19.639
Basin 5 Alt.	68.37	10YR 24HR	0.915	5.213	N/A
(Pond P-8)		25YR 24HR	1.774	10.107	N/A
		100YR 24HR	3.455	**19.684**	N/A
Basin 6	23.30	10YR 24HR	1.149	2.231	N/A
(Pond P-9)		25YR 24HR	2.109	4.094	N/A
		100YR 24HR	3.932	**7.634**	N/A
Basin 7	9.05	10YR 24HR	3.553	2.679	N/A
(Pond P-10)		25YR 24HR	5.160	3.890	N/A
		100YR 24HR	7.804	**5.884**	N/A
Basin 7 Alt.	9.05	10YR 24HR	3.553	2.679	N/A
(Pond P-11)		25YR 24HR	5.160	3.890	N/A
		100YR 24HR	7.804	**5.884**	N/A



LAKE SHORE DRIVE

EXISTING DEVELOPMENT MAP
LAKE COUNTY, FLORIDA
MARCH 18, 2002

ALT. HARDWOOD MARSH

PDA Professional Design As
Engineers, Planners and Landscape
3165 McCrory Place, Suite 100
Orlando, FL 32803
Ph: (
Fax: (

Appendix C

Public Involvement Data

Hartwood Marsh Road

Project Development & Environment tudy

TEI Engineers & Planners

Public Workshop

13600 Caspian Lane
Clermont, Florida
6:00 p.m. to 8:00 p.m.

Sept. 25, 2003

Please Sign In

(Please print clearly to be added to the mailing list)

Name	Address	Affiliation
FRED MAY	4221 Kingsley St	Kings Ridge
Sy HOLZMAN	4243 NEWLAND ST	KINGS RIDGE
John Grayford	17330 Hartwood Marsh Rd	Hartwood Marsh
RICHARD THOMAS	4388 SAMBOURNE ST.	KINGS RIDGE
Steven Calderaro	17410 Hartwood Marsh Rd	Avalon Estates
DALE AND ALICE DICKEY	530 BROOKWOOD Blf, Clermont	CONCERNED CITIZEN
Bob Pool	1464 E... Ave Clermont FL	LC BCC
Gail Ash	3912 Payton Ct.	Kings Ridge/Clermont City Council
BILL MARTY	4396 SAMBOURNE ST	KINGSRIDGE
Barry Brown	1143 Linden St	City of Clermont
Louis STONE	16661 VISTA BLVD	VISTA'S

Hartwood Marsh Road

Project Development & Environment tudy

Public Workshop

13600 Caspian Lane
Clermont, Florida
6:00 p.m. to 8:00 p.m.

TEI Engineers & Planners

Please Sign In

(Please print clearly to be added to the mailing list)

Sept. 25, 2003

Name	Address	Affiliation
John Marmak	123 Sinclair / Tavares	Lake Co Public Works
Curt Henschel	14203 Max Hooks Rd	City of Clermont
Len Hamel	2242 Belsfield Circle	Clermont
Kitty Ray Harrison	4332 Hammersmith	Clermont
Pat Burgos	107 N. Lake Ave Tavares 32778	Lake Co. Water Authority
Larry Guerini	4383 Sambourne St	Kings Ridge
Brenda & Ernie Brewbaker	11634 Sadler Ct Wintergarden	
Ann Dugee	389 Division St Clermont	
Ramo & Dolores Perfetto	2182 Burley Ave. Clermont	
Ron Mariano	13724 Calle De Oro Ct Clermont	Vistas
Bright Conley	11400 Lovers Lane WG, FL	
John O'Connor	14049 Vista Del Lago Blvd	Vistas

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

Project Development & Environment Study

From U.S. 27 to the Lake/Orange County Line

September 25, 2003 – 6:00 to 8:00 p.m.

Thank you for attending this Public Information Workshop to review the plans for the Hartwood Marsh Road Project Development & Environment Study. Lake County seeks your comments and concerns regarding these improvements. Please take a few minutes to complete this form before leaving this workshop.

1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

2. Did you receive a copy of the project flyer? _____

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: hans STENG

Organization: _____

Address: 10601 VISTA DEL SOL CIR.

Phone: CLERMONT FL. 34711
352-243-1590

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

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1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

2. Did you receive a copy of the project flyer? No

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: Von Misamore

Organization: Vistas Home Owners

Address: 13724 Calle De Ora Ct. Clermont 34711

Phone: 352-243-1787

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

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1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

Recreational Trail from 27 going east - wider than a 5 foot sidewalk - (Center Lake) Sarmack owners + VP Richard Gonzalez were interested in a nice trail through their property and hoped other properties would hook up

2. Did you receive a copy of the project flyer? At the door

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: Ann Dupre

Organization: Former Clermont Council Member

Address: 389 Division St Clermont FL 34711

Phone: 352-394-3184

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

Project Development & Environment Study

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1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

CONSIDERATIONS SHOULD BE MADE FOR:
- TAKING HEIGHT OF ROAD TO LOWER LEVEL ESPECIALLY FROM SOUTH HANCOCK TO REGENCY HILLS. TOO MANY BLINDSPOTS FOR STOPPING DISTANCE.
- LANDSCAPING OF MEDIANS
- ADDING REST FACILITIES FOR BICYCLISTS & PEDESTRIANS
- TURNING LANES INTO SUBDIVISION

2. Did you receive a copy of the project flyer? YES

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: MARK FAGAN

Organization: HOMEOWNER @ REGENCY HILLS

Address: 2806 IMPERIAL POINT TERRACE

Phone: 352-242-0380

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

Project Development & Environment Study

From U.S. 27 to the Lake/Orange County Line

September 25, 2003 – 6:00 to 8:00 p.m.

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1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

Can a wall be put up for the noise to the homeowners? We don't hardly hear our T.V. now. Jake Brakes wake you up @ 5:30 – 6:00 going to Sanford, even windows Rattle. Please

2. Did you receive a copy of the project flyer? Yes

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: Kelly Hanson

Organization: Kings Ridge Resident

Address: 4332 Hammersmith Dr.

Phone: 352-243-4376

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

Project Development & Environment Study

From U.S. 27 to the Lake/Orange County Line

September 25, 2003 – 6:00 to 8:00 p.m.

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1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

Bike Trail attached to road lanes.

I cannot agree with Mr. John Brown 's reasoning for attaching the bike lanes to the road surface. The automobile accident with a bike is more serious than a bike accident with a pedistern, and all bikes should stop before crossing any roadway intersection. I wonder how many accidents have been caused by bikiclyelist riding on the road instead of a bike trail.

HARTWOOD MARSH from Hancock to U.S.Hwy 27

The section of Hartwood Marsh road from Hancock to US Hwy 27. I questioned if the right away would allow the 110 foot four Lane Road without reducing the parking area's in the strip malls on each side of the proposed widening Hartwood Marsh Road. Will it accommadate decelration lanes for turning right in to Publix's when travelling west from Hancock?

Road South from HARTWOOD MARSH to U.S. Hwy 27, East of Hancock.

What is the objection for building a road south to Hwy 27 east of Hancock Road? What is the gain of carrying Hartwood Marsh four lanes from Hancock to U.S. Hwy 27, where if they cross U.S. Hwy 27 they cross into the residental neighborhood on the west side of U.S. Hwy 27?

2. Did you receive a copy of the project flyer? YES

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: LEONARD A. HAMEL P.E.

Organization: PRESIDENT, HUNTINGTON, HOMEOWNERS ASSOC. KINGS RIDGE

Address: 2242 BELSFIELD CIRCLE, CLERMONT, FL. 34711

Phone: 352-241-0368 E-MAIL HAMELINKR@AOL.COM

Members of the Project Team can be contacted by calling or writing to the following:

Len & Joanne Hamel
2242 Belsfield Circle
Kings Ridge
Clermont, Florida 34711

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

Project Development & Environment Study

From U.S. 27 to the Lake/Orange County Line

September 25, 2003 – 6:00 to 8:00 p.m.

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1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

The homes at Avalon Estates whose driveways exit and enter onto the road need a paved center turn lane instead of a grass median.
I do not wish to have to make U-turns into oncoming traffic because a median blocks my way.

2. Did you receive a copy of the project flyer? Yes

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: Steven Calderaro

Organization: Avalon Estates

Address: 17410 Hartwood Marsh Rd

Phone: 407-905-0019

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

Copy: Original sent via E-mail on 10/16/03

To: John Moore, P.E.
TEI Engineers and Planning
300 Primera Blvd. Suite 200
Lake Mary, Floirda 32746

Re: P.D.&E Survey for Hartwood Marsh Road
from U.S. 27 east to the Lake/Orange County Line

Comments and facts submitted by Gerard J. Turner at Public Hearing Workshop held on September 25th, 2003.
My name is Gerard J. Turner and I submit this paper on behalf of myself and my wife, Lorrine who live at 4322 Hammersmith Drive, Clermont, Florida 34711. Our rear property line abuts the existing Hartwood Marsh Road and is located on the north side of said roadway between Danbury Mill Road to the west and Hancock Road to the east. Out lot is part of the Kings Ridge at Clermont development.

My comments are divided into three parts:
First: Existing and proposed alternative east west access to U. S. 27.

i) S.R. 50 lies three miles north of Kings Ridge and connects U.S. 1 on the east with U.S. 41 (Tamiami Trial on the west. It is a major connector highway and as of this writing is being widened by at least two additional traffic speed lanes.

ii) Jon's Lake Road - 1 mile north of Kings Ridge currently completed from U.S. 27 to Hancock Road.

iii)Proposed Citrus Tower Boulevard or southern extension which will cross both S.R. 50 and U.S. 27 (just north of the Kings Ridge Property Line) to its south westerly terminus of Lake Shore Drive. We have been told by the County this roadway will be in place within the next two (2) years. I anticipate much traffice will be diverted both north/east south and west from and to S.R. 50 and U.S.27. This will be a major access and connector road for the proposed Super Walmart Store at Lost Lake.

iv) Southern extension of Hancock Road from the existing intersection at Hancock and Hartwood Marsh Road to U.S.27 on the south. This will also be a shortcut for traffic travelling north and south between U.S. 27 and S.R. 50.

v) East/west Expressway. Since the planned extension of this expressway (from its present terminus in Orange County to U.S. 27) has not been set we believe i t will be somewhere south of Hartwood Marsh Road, i.e. it maybe as close as two miles south at/or near Bradshaw Road or just a few miles further south. In any event this Expressway when completed will be the main east/west highway linking South west Lake County and East Orange County and the 408 Expressway. The Expressway Authority is being quite myopic by saying it has not plans for such expansion. It is my belief they will start said expansion within 5 years time

Is it really necessary therefore to spend millions of dollars on existing Hartwood March Road between U.S. 27 and Hancock Road when there will eventually constructed east/west connector roads constructed within the time window of 5 to 7 years?

Second; When Lennar Corporation was initally planning the Kings Ridge development Hartwood Marsh Road was a lazy country roadway. So too when we first purchased our lot five years ago. A great deal has happend since then. So, if it is determined that Hartwood Marsh Road improvement should extend to a four lane road certain safeguards and noise abatement procedures should be included in your analysis and recommendations to the county. Since our property and several of our neighbor's

property lines abut Hartwood Marsh Road between Danbury Mill Road and Hancock Road NOISE abatement and reduction can be partially achieved by separating our property from Hartwood Marsh Road by either a high berm or noise reduceing wall. In all previous discussions with Lake County representatives especially the county ...engineering department it was contemplated that if the berm proves impossible then a sound reducing wall at least 8 to 10 feet high as measured fromthe Crown of the new road would be the best alternative. We are counting on Lake County to follow through with the construction of this wall. However, if nothing is done than we believe our property's market value could suffer significantly solely due to the increased noise resulting from widening Hartwood Marsh Road between Danbury Mill Road and the Hancock Road intersection. This is referred in the law of real property as " Governmental Inverse Condemnation"

We therefore urge that effective noise reduction measures be taken by the County if it elects to widen Hartwood Marsh Road to four lanes.

Third: Speed Limit Design: This is a very important issue to be addressed by T.E I.....

.. in its recommendation to Lake County. With shopping centers on the north and south side of existing Hartwood Marsh Road just east of U.S. 27 and Clermont Fire Station No. 2 located on the northwest corner of the intersection of Hartwood Marsh Road and Danbury Mill Road traffic travelling in either direction should be restricted to a maximum of 25 mph. For the area of the propsed road from Danbury Mill Road to and from Hancock Road and Hartwood Marsh Road to the east (approximately 2/5th of a mile) the maximum speed limit should be set at 30 mph. Several reasons for this speed limit are proferred:

i) A traffic light is proposed at the Hancock Road and Hartwood Marsh Road to be installed shortly. Therefore deceleration from the present speed limit of 45 mph would of necessity have to begin at Danbury Mill Road on the west to the Hancock Road traffic light itself on the east due to the location of the Clermont Fire Station and the traffic generating from both the Publix Shopping Center and the Royal Oak Shopping Area on the south side of Hartwood Marsh Road.

ii) We understand that located at the southeast corner of the Hancock Road/Hartwood Marsh Road intersection the Baptist Church is building a major campus for its members. We heard there will eventually be a school built there. Therefore, to insure the safety of the persons coming to and from the church and its other facilities and school the speed limit west of Hancock should also be not greater than 30 mph.

The above are my comments on the widening of Hartwood Marsh Road. Please include these in the data bank T.E.I is assembling for the P.D.& E. Stu0dy for Hartwood Marsh Road.

Respectfully submitted

Gerard J Turner
Florida Bar No. 0129880
Telephone No. 352 243-3080

PS

I was surprised and disappointed that you did not tape our comments and data at the Public Hearing held on September 25th, 2003. I urge you do so at all future meetings.

GJT

cc: Noble Olasimba
Lake CountyProject Manager
Engineering and Planning
123 Sinclair Ave
Tavares, Florida 32778

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

Project Development & Environment Study

From U.S. 27 to the Lake/Orange County Line

September 25, 2003 – 6:00 to 8:00 p.m.

Thank you for attending this Public Information Workshop to review the plans for the Hartwood Marsh Road Project Development & Environment Study. Lake County seeks your comments and concerns regarding these improvements. Please take a few minutes to complete this form before leaving this workshop.

1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

A. GOOD PRESENTATION ON 9.25.03 !

B. PLEASE CORRECT PROJECTED TOTAL LOTS IN KINGSRIDGE TO 2007. LENNAR HOMES WILL VARIFY THIS. THIS WILL EFFECT YOUR DAILY TRIP PROJECTIONS

C. NOISE IS A VERY BIG ISSUE. TRUCK NOISE STARTS AT 4:00 AM M.THRU SAT.

D. SIDEWALKS ARE ~~CERTAINLY~~ CERTAINLY NOT NEEDED PAST THE NORTHERN TIP OF HARDWOOD MARSH.

OVER →

2. Did you receive a copy of the project flyer? YES

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: DON APPENZELLER

Organization: KINGSRIDGE / CAMBRIDGE HOMEOWNERS BD. MEMBER

Address: 4219 KINGSLEY ST. CLERMONT, FL. 34711

Phone: 352-241-8889 (HOUSE BACKS UP TO INTERSECTION OF HARDWOOD. MARSH HAS HANDICAP-)

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

E. MANY OF US STILL BELIEVE THAT THE PLANNED 4 LANE EAST-WEST (NOT TOLL) FEEDER SHOULD BE 1 OR 2 MILES SOUTH OF THE PRESENT HARDWOOD MARSH ROAD FROM FIRST NORTH TURN (TRAVELING EAST) SEE ATTACHED PLAN. A NEW DEVELOPMENT COULD THEN RESPOND TO THE NEW ROAD.

27

NEW 4 LANE HARDWOOD MARSH RD

LEVEL AREA OF 27

TEI Engineers & Planners

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1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

First & foremost we do not want this road changed. This was promised to be a rural area. Local real estate people have lied to many residents buying on Hartwood Marsh by telling them it would remain "country" & that the sand company would close. Build a connector further south. It will be used more further south & won't disrupt lives over

2. Did you receive a copy of the project flyer? _____

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: Susan Ufuson

Organization: _____

Address: PO Box 770997

Phone: Winter Garden, FL 34777-0997

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Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

2. Knowing of course that the Lake Co. Commission cares not one bit about my #1 suggestion & knowing full well we will contribute to the Sprawl Twins' (Rodes & Stivender) retirement fund, we have the following suggestions for HM Road:

1. NO, I repeat, no sidewalks. City people move out there to get away from the city & now they want to turn it into a city. No sidewalks

2. 45 mph. speed limit. Everyone will then go 55 & that's fast enough. We used to be able to cross this road, now it's far too dangerous. Many of us have horses & we like to cross the road sometimes. Keep the limit @ 45

3. Ban trucks over 10 Tons except the Local grove owner Trucks and Tarmac trucks (Build Tarmac another road out to Hwy. 50) Many trucks speed, pass in double yellow areas, are seriously overloaded and are not policed. There is no law enforcement by Orange or Lake County on HM road.
* (Once in while Orange County does monitor)

4. Provide large berms to keep down noise.

* - Also, regarding the trucks: they throw their flat tires out all along the roadway. Quite a few are inexperienced drivers who turn their trucks over & dump loads of sand. One lost control, hit a power pole & knocked out our electricity. These incidents happen several times a year. If Stoneybrook can keep the trucks out we can too. It is enforceable!

5. Keep the road to the least width. I'm not giving up any more of my property as I had to give an extra 25 feet to Lake County when I bought the place 13 years ago. No More.

6. I was also disturbed that at the meetings hosted by TEI that when the question was asked as to whether notes were being taken &/or comments recorded, two of the TEI staff immediately said "YES" & "NO" at the same time. This worries me that not all of the residents concerns will be noted.

It was noted that the majority of people want the road further South.

And please, no more subdivisions or Churches for this area —— Like I know they will listen to that suggestion!!

Hartwood Marsh Road

Project Development & Environment Study

Engineers & Planners

Public Workshop

13600 Caspian Lane
Clermont, Florida
March 2, 2004
6:00 p.m. to 8:00 p.m.

Please Sign In

(Please print clearly to be added to the mailing list)

Name	Address	Affiliation
[illegible]	1354 Vista del Lago Blvd	
JACK + GLENDA O'CONNOR	14049 VISTA DEL LAGO BLVD	RESIDENT
John Dormer	11555 FLYNN CT.	Resident
Maury Boyd	PO BOX 979 OAKLAND FL	owner of property on Hartwood Marsh Rd
LAWRENCE FRICK	13717 VIA ROMA CIRCLE CLERMONT FL	RESIDENT
Bridget Conley	11400 LOVERS LANE WINTER GARDEN, FL 34787	

Hartwood Marsh Road

Project Development & Environment Study

TEI Engineers & Planners

Public Workshop

13600 Caspian Lane
Clermont, Florida
March 2, 2004
6:00 p.m. to 8:00 p.m.

Please Sign In

(Please print clearly to be added to the mailing list)

Name	Address	Affiliation
Gail Ash	3912 Payton Ct. Clermont	Resident
Bob Watson	12536 Lake Ridge Clermont	Resident
Ramo Perfetto	2182 Burley Ave Clermont	"

Hartwood Marsh Road

Project Development & Environment Study

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March 2, 2004
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Engineers & Planners

Please Sign In

(Please print clearly to be added to the mailing list)

Name	Address	Affiliation
Keith Truin	640 Dixie Ave Clermont FL 34711	Clermont
ROSLYN FISHKIN	2315 Edmonton Ct	Clermont
EARL KLADKE	2312 EDMONTON CT	CLERMONT
Ron + Linda Varhol	10211 Bonita Ct.	Clermont
Tina Capriotti	13520 Sierra Ct	Clermont.
Van Missimore	Kings Vistas	Clermont
WILLIAM HENNING	2305 TWICKENHAM COURT CLERMONT, FL. 34711	CLERMONT, KINGS RIDGE
CHARLES E. BOWLING	411 HAMPDEN DR CLERMONT 34711	KING'S RIDGE
Len Hamel	2242 Bakefield Circle Clermont FL 34714	Kings Ridge
Larry Guerrini	4352 SANDBOURNE ST CLERMONT	Kings Ridge.
[illegible]	1415 FLAT LAKE RD CLERMONT	FLAT LAKE HEIGHTS
[illegible] + Jerry Cooper	4124 Kingsley St Clermont	Kings Ridge

Hartwood Marsh Road

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Engineers & Planners

Please Sign In

(Please print clearly to be added to the mailing list)

Name	Address	Affiliation
Ray & Judy Goodgame	2118 St Ives Ct Clermont 34711	
CHARLES HEISE	17132 HARTWOOD MARSH	
KATHARINA F STEED	HARTWOOD MARSH RD	
Lorraine Jerry Turner	Hammock Ridge	34711 Resident
Michelle & Jeff Starkey	11545 Sadler Ct.	
Tom Barnett	4375 Sambourne St	34711 Kings Ridge
Ted Berlette	10930 Vista Del Sol Cir	34711 Vistas HOA
GREG RHODES	10308 Calle de Flores	34711 VISTAS
PHIL & MADELIENE COLE	4394 SAMBOURNE ST	KINGS RIDGE
Richard W. Thomas	4388 Sambourne ST	Kings Ridge
FRED L MAY	4221 Kingsley ST	Kings Ridge
DON APPENZELLER	4219 KINGSLEY ST	KINGS RIDGE

Hartwood Marsh Road

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TEI Engineers & Planners

Please Sign In

(Please print clearly to be added to the mailing list)

Name	Address	Affiliation
JOHN MARCINIAK	123 N Sinclair / Tavares	LAKE CO PUBLIC WORKS
Mary B. Eddy	11845 Eddy Dr Winter Garden	resident
Brent Lacy	33 E. Pine St. Orlando 32801	Glatting Jackson
MARK FLAHAN	286 IMPERIAL POINT TERR.	RESIDENT
Bob Pool	1464 East Ave - Clermont	LCBCC
John + Peri Pyles	17201 Hartwood LP.	
BARBARA & BILL MARTY	4396 SAMBOURNE ST	KING'S 4065
John Grayford	17330 Hartwood Marsh	Resident
Susan Yawn	17921 Marsh Rd	Resident
LOUIS STONE	16601 VISTA DEL SOL	RESIDENT
Miles & Nancy Hensley	16710 Marsh Rd Clermont	Resident

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

Project Development & Environment Study

From U.S. 27 to the Lake/Orange County Line

March 2, 2004 – 6:00 to 8:00 p.m.

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1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

The 22ft Median is much too wide - the large Conserve Pipe is on the North of Marsh. It ends at our grove - Eddy Drive + 5 rows West.

2. Did you receive a copy of the project flyer? Yes, please -

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: Mary B Eddy

Organization: live on Marsh at Eddy Drive

Address: 11845 Eddy Dr Winter Garden, FL 34787

Phone: 407-656 2080

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

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From U.S. 27 to the Lake/Orange County Line

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1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

- PLEASE MAKE SURE "REGENCY HILLS" HAS A FULL MEDIAN TO TURN WEST ONTO HARTWOOD MARSH.
- CONCERNED ABOUT BUS STOPS, WILL THERE BE CROSSWALKS @ REGENCY HILLS.

2. Did you receive a copy of the project flyer? YES.

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: MARK FAGAN

Organization: _____

Address: 2806 IMPERIAL POINT TERRACE

Phone: 352-242-0380

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

Engineers & Planners

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1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

We live off this street & the point of the traffic is overwhelming. Our concern is what is going around the development of King Ridge for sound barrier.

2. Did you receive a copy of the project flyer? NO

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: PHIL & MADELIENE COLE

Organization: (KINGS RIDGE RESIDENT)

Address: 4394 SAMBOURNE ST.

Phone: 352-243-3907

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

Project Development & Environment Study

From U.S. 27 to the Lake/Orange County Line

March 2, 2004 – 6:00 to 8:00 p.m.

Thank you for attending this Public Information Workshop to review the plans for the Hartwood Marsh Road Project Development & Environment Study. Lake County seeks your comments and concerns regarding these improvements. Please take a few minutes to complete this form before leaving this workshop. SORRY I DID NOT LEAVE THIS AT THE MEETING.

1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

GOOD PRESENTATION. AND VERY GOOD VISUALS - THE LARGE MAPS ON DISPLAY WERE VERY INFORMATIVE AND EASY TO UNDERSTAND. WE KNOW YOU CANNOT SATISFY EVERYONE IN A PROJECT SUCH AS THIS. THE DESIGN PRESENTED WOULD BE A GREAT IMPROVEMENT. IF THEY WERE AVAILABLE, SOME 8½ x 11 TYPE PRINTS OF THE PROPOSED DESIGNS WOULD BE NICE TO HAVE TO DISCUSS WITH OUR NEIGHBORS HERE AT KING'S RIDGE. THANKS, Chuck Bowling

2. Did you receive a copy of the project flyer? YES

3. Please provide your name and address below if you would like to be on the project mailing list to receive additional information about this project.

B
Mr. Charles Edgar Bowling
4111 Hammersmith Dr
Clermont, FL 34711-6984

If additional room is needed for your comments, please use the back of this form.

Name: CHARLES E. BOWLING

Organization: KING'S RIDGE DEVELOPMENT

Address: 4111 HAMMERSMITH DR. CLERMONT, FL 34711

Phone: (352) 241-8424

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

Colleen Jarrell

From: John Moore
Sent: Tuesday, March 02, 2004 1:01 PM
To: Colleen Jarrell
Subject: FW: hartwwod marsh study hearing

-----Original Message-----
From: Momcat4769@aol.com [mailto:Momcat4769@aol.com]
Sent: Tuesday, March 02, 2004 12:49 PM
To: jmoore@tei-us.com; nolasimbo@co.lake.fl.us
Subject: hartwwod marsh study hearing

Gentlemen:

I am writing this e-mail because I will be unable to attend tonight's hearing and have a few thoughts to pass on.

I live in Kings Ridge at 4243 Newland Street. I and several of my neighbors have serious concerns about the study format and the failure to include us more in the process, as we were lef to believe we would be. It appears that when you talk about the recommended alternative, you are merely talking about the lane-structure and do not care to consider alternative pathways other than Hartwood Marsh Road going east from U.S. 27. Not only that, but the map on your redent flyer is so out of proportion as to be extremely confusing. I really do not know what *Orange Mountain* (noted on U.S. 27 north of the proposede roadway) is. Further, Hancock Road is not drawn through to connect with Hartwood Marsh Road, even though it currently does intersect. Your plan also ignores a proposal and offer of land to realign Hartwood Marsh Road at the sand mine complex.

I think it is very narrow thinging to make a determination on widening a road that, under present circumstances, will not flow evenly into another 4-lane road. The fact that Orange Coiunty seems unprepared to widen that section of Marsh Road between the Orange-Lake County line and Avalon Road is troublesome in that you will have a higher speed road with 4 lanes than shrinking into a twisting, 2-lane road. This appears to be a road map for problems in the not too distant future.

But, aside from that aspect of the roadway, I'd like to focus on the noise and pollution concerns that will directly affect my neighbors who live along Hartwood Marsh Road between U.S. 27 and Hancock Road. In the past, we have expressed our concerns about noise and pollution and have sought assurances that sound abatement devices might be installed. In fact, at a very early meeting, we were assured sound abatement elements would be included, but at later meetings, it was something tro be determined.

As a suggestion, I offer the following. Instead of considering the typical sound concrete or other man-made abatement structures, why not consider planting a row of cedar trees. These grow tight and tall and would provide a better barrier for both noise and pollution. Further, these trees require minimal maintenance. And, after all, even with a man-made barrier, there would have to be plantings on both sides to soften the appearance.

I would hope that either or both of you will try to include those of us who live adjacent to Hartwood Marsh Road as your efforts go forward. We have a great deal to offer.

Sincerely,

Sy Holzman
4243 Newland Street
Clermont, FL 34711-9701
352-243-3817

GERARD J. TURNER, ESQ
ATTORNEY-AT-LAW
4322 HAMMERSMITH DRIVE
CLERMONT, FLORIDA 34711
TEL. NO 352 243-3080

March 5th, 2004

John Moore, P.E.
TEI Engineering & Planning
300 Primera Blvd. Suite 200
Lake Mary, Florida 32746
And
Mr. Noble Olasimbo, AICP
Lake County Public Works
123 N. Sinclair Avenue
Tavares, Florida 32778

Re: P D & E Study for
Hartwood Marsh Road

Dear Messers Moore & Olasimbo

Let me begin by thanking Mr. Olasimbo and his staff for permitting me to review the TEI P D & E Report dated January, 2004 at his office last Monday (March 1st). It was very helpful in preparing me for comments I submitted in person at the Public Hearing on the following day.

I will now address the Report and the presentation John Moore made at the hearing last Tuesday.

My first comment relates to a statement in the Report itself to the effect that "no dwelling is in close proximity of the (Hartwood Marsh) roadway corridor" This is completely in error. I ask you both to view the area north of the proposed corridor between Danbury Mill road eastward to the Hancock Road intersection. Several residences are in very close proximity to the said corridor, including the undersigned's home. I suggest you make such correction in your Report before it is submitted to the County Commission for consideration later this month.

Next, are my concerns set out in my letter of October 16, 2003, which are reiterated herein again and made a part hereof. A copy of said letter is attached as Exhibit "A" to be incorporated as part of the record at the March 2nd, 2004 Public Hearing.

I saw no mention in your report of a possible future East/West Expressway extension to be constructed south of Hartwood Marsh Road. Such expressway would connect the Orange County terminus of the existing expressway to U S 27. I feel this should have been included in your study as an alternate east-west connector corridor serving south Lake County.

I was pleased to see you based your Report on BUILD 2 Traffic Scenario incorporating the SOCTAS and FSUTMS models. Those models demonstrate there will be a massive future increase in vehicular traffic between Hancock Road and Route U S 27. The projections in your traffic report show the count over the years will increase at least five-fold. Noise decibels will also increase, maybe even geometrically over the same period. Therefore, I was disappointed you did not address the Noise Abatement Wall issue. Instead you left it to the County to decide on whether to construct such a wall between Danbury Mill Road and Hancock Road, especially when you consider the cost of building the corridor is estimated to be in excess of 19 million dollars. Why not include the cost of the Wall now since there is no doubt it will be needed. Unless such Wall is an integral part of the final corridor I believe the homeowners may have a potential inverse condemnation claim against the County.

I also feel the drainage issue, especially south of Typical Categories 3 and 4 has not been fully explored in your Report.

I plan to address all these issues at the Lake County Commission meeting when your Report will come up for review. I also will urge the County not to start construction of the Project until and unless Orange County comes aboard and agrees to complete that portion of the corridor east of the Orange County Line to Avalon Road.

Thank you.

Respectfully submitted,

Gerard J. Turner
Florida Bar #0129880

Sent E-mail 10/16/03 via MSMail 10/17/03

To: John Moore, P.E.
TEI Engineers and Planning
300 Primera Blvd. Suite 200
Lake Mary, Floirda 32746

Re: P.D.&E Survey for Hartwood Marsh Road
from U.S. 27 east to the Lake/Orange County Line

Comments and facts submitted by Gerard J. Turner at Public Hearing Workshop held on September 25th, 2003.
My name is Gerard J. Turner and I submit this paper on behalf of myself and my wife, Lorrine who live at 4322 Hammersmith Drive, Clermont, Florida 34711. Our rear property line abuts the existing Hartwood Marsh Road and is located on the north side of said roadway between Danbury Mill Road to the west and Hancock Road to the east. Out lot is part of the Kings Ridge at Clermont development.

My comments are divided into three parts:
First: Existing and proposed alternative east west access to U. S. 27.

i) S.R. 50 lies three miles north of Kings Ridge and connects U.S. 1 on the east with U.S. 41 (Tamiami Trial on the west. It is a major connector highway and as of this writing is being widened by at least two additional traffic speed lanes.

ii) Jon's Lake Road - 1 mile north of Kings Ridge currently completed from U.S. 27 to Hancock Road.

iii)Proposed Citrus Tower Boulevard or southern extension which will cross both S.R. 50 and U.S. 27 (just north of the Kings Ridge Property Line) to its south westerly terminus of Lake Shore Drive. We have been told by the County this roadway will be in place within the next two (2) years. I anticipate much traffice will be diverted both north/east south and west from and to S.R. 50 and U.S.27. This will be a major access and connector road for the proposed Super Walmart Store at Lost Lake.

iv) Southern extension of Hancock Road from the existing intersection at Hancock and Hartwood Marsh Road to U.S.27 on the south. This will also be a shortcut for traffic travelling north and south between U.S. 27 and S.R. 50.

v) East/west Expressway. Since the planned extension of this expressway (from its present terminus in Orange County to U.S. 27) has not been set we believe i t will be somewhere south of Hartwood Marsh Road, i.e. it maybe as close as two miles south at/or near Bradshaw Road or just a few miles further south. In any event this Expressway when completed will be the main east/west highway linking South west Lake County and East Orange County and the 408 Expressway. The Expressway Authority is being quite myopic by saying it has not plans for such expansion. It is my belief they will start said expansion within 5 years time

Is it really necessary therefore to spend millions of dollars on existing Hartwood March Road between U.S. 27 and Hancock Road when there will eventually constructed east/west connector roads constructed within the time window of 5 to 7 years?

Second; When Lennar Corporation was initally planning the Kings Ridge development Hartwood Marsh Road was a lazy country roadway. So too when we first purchased our lot five years ago. A great deal has happend since then. So, if it is determined that Hartwood Marsh Road improvement should extend to a four lane road certain safeguards and noise abatement procedures should be included in your analysis and recommendations to the county. Since our property and several of our neighbor's

EXHIBIT "A"

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We therefore urge that effective noise reduction measures be taken by the County if it elects to widen Hartwood Marsh Road to four lanes.

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.. in its recommendation to Lake County. With shopping centers on the north and south side of existing Hartwood Marsh Road just east of U.S. 27 and Clermont Fire Station No. 2 located on the northwest corner of the intersection of Hartwood Marsh Road and Danbury Mill Road traffic travelling in either direction should be restricted to a maximum of 25 mph. For the area of the propsed road from Danbury Mill Road to and from Hancock Road and Hartwood Marsh Road to the east (approximately 2/5th of a mile) the maximum speed limit should be set at 30 mph. Several reasons for this speed limit are proferred:

i) A traffic light is proposed at the Hancock Road and Hartwood Marsh Road to be installed shortly. Therefore deceleration from the present speed limit of 45 mph would of necessity have to begin at Danbury Mill Road on the west to the Hancock Road traffic light itself on the east due to the location of the Clermont Fire Station and the traffic generating from both the Publix Shopping Center and the Royal Oak Shopping Area on the south side of Hartwood Marsh Road.

ii) We understand that located at the southeast corner of the Hancock Road/Hartwood Marsh Road intersection the Baptist Church is building a major campus for its members. We heard there will eventually be a school built there. Therefore, to insure the safety of the persons coming to and from the church and its other facilities and school the speed limit west of Hancock should also be not greater than 30 mph.

The above are my comments on the widening of Hartwood Marsh Road. Please include these in the data bank T.E.I is assembling for the P.D.& E. Stu0dy for Hartwood Marsh Road.

Respectfully submitted

Gerard J Turner
Florida Bar No. 0129880
Telephone No. 352 243-3080

PS

I was surprised and disappointed that you did not tape our comments and data at the Public Hearing held on September 25th, 2003. I urge you do so at all future meetings.

GJT

cc: Noble Olasimba
Lake CountyProject Manager
Engineering and Planning
123 Sinclair Ave
Tavares, Florida 32778

PMC PINELOCH MANAGEMENT CORPORATION

March 4, 2004

Mr. John Moore, P.E.
Consultant Project Manager
TEI Engineers and Planners
300 Primera Boulevard, Suite 300
Lake Mary, Florida 32746

Re: Hartwood Marsh PD & E Study

Dear Mr. Moore:

As property owners with significant assets along the Hartwood Marsh Road Corridor, including the TARMAC mines and other lands, we are very interested in the study, design and ultimate construction of this much needed transportation improvement project. We appreciate your efforts to inform the public regarding the status of the study to date and the recommendations that have now been identified. However, my attendance at your public meeting on March 2, 2004 did generate a series of questions that were not answered or that the answers were not clear. I would appreciate a specific response to each of those questions listed below.

1. **Has the proposed Kings Ridge expansion, adding over 1200 residential units, been included in the traffic projections and access plans for the Hartwood Marsh Road improvements?**

2. **Will the proposed extension of Hartle Road through the Kings Ridge expansion area be added to the improvement plans and was it considered in the traffic estimates and distribution of project traffic?**

3. **Can the proposed alignment of Hartwood Marsh Road be adjusted to eliminate the acquisition of the yet unmined TARMAC parcel property located at the eastern end of the "new alignment" area? Can it be reduced?**

4. **If the alignment in the area described in Question 3 cannot be adjusted, what is the proposed use of the remnant parcel created by the new alignment and the old Hartwood Marsh Road? It does not appear that all of the property will be used for stormwater pond(s). Will the entire remnant be acquired as part of the project? Can one of the other ponds (P5A, P5B or P6) be located there? Can this area be considered for joint use by private development?**

P.O. Box 568367 • Orlando, FL 32856-8367 • 102 W. Pineloch Street • Suite 10 • Orlando, FL 32806-6133
(407) 859-3550 • FAX (407) 650-0303

5. **What is the level of flexibility in the location of the connector roads that will provide access to segments of the old Hartwood Marsh Road alignment?**

6. **Is there a signal proposed for the Hartwood Marsh Road/Hancock Road intersection as part of this project?**

7. **What is the actual design schedule for the project? What is the funding status and source for design and construction?**

8. **What are the right-of-way and construction costs estimated for the project and more specifically, what is the estimate for right-of-way acquisition from the TARMAC/Center Lake Mine Properties?**

9. **Although not of major concern to our group, where would the potential noise abatement walls in the western end of the project be located within the 100-foot right-of-way? There does not appear to be adequate room for these elements in the proposed typical section.**

Please provide answers to these questions at your first opportunity. I am available and willing to meet with your project team to discuss any of the issues associated with this project as they affect the property we own along the corridor.

Sincerely,

Richard L. Gonzalez
Vice President

Cc: Ms. Cecilia Bonifay, Esq.

TEI
Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

Project Development & Environment Study

From U.S. 27 to the Lake/Orange County Line

March 2, 2004 – 6:00 to 8:00 p.m.

Thank you for attending this Public Information Workshop to review the plans for the Hartwood Marsh Road Project Development & Environment Study. Lake County seeks your comments and concerns regarding these improvements. Please take a few minutes to complete this form before leaving this workshop.

1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

The road does not need a 22' median. This unnecessarily takes property from property owners on Marsh Rd. For years Marsh Rd. Travelers (residents) have shared this road with bicyclists who do not live on or near Marsh Rd. Under the proposed alternative the bicyclists are being accomodated more than the residents! They get a bicycle path and →

2. Did you receive a copy of the project flyer? yes

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: Ms. Susan Yawn

Organization: PO Box 770997

Address: Winter Garden, FL 34777

Phone: 407-656-9754

Members of the Project Team can be contacted by calling or writing to the following:

TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

I lose my entrance to my home. I will have to turn right each time and go to Flynn Ct. to make a U-Turn in order to go East. This is unfair. I'm not making u-turns. You must propose that truck traffic be routed to Hwy. 50. The noise is very disruptive. They throw flat tires all over the road. They rattle the windows in our homes. This happens 24 hours a day. They speed & drive recklessly! There is no law enforcement on this road & there never has been. Even the dump trucks pass in no passing zones unless you are driving at 60 mph.

Comments made at the first public meeting made no impact whatsoever on your recommended alternative, I doubt these will either. It appears to be a "done deal" regardless of resident concerns. Various law firms are contacting us hoping to represent us in this project so that we are treated fairly and don't lose everything, especially our property values. I believe that unless the County is willing to listen to us we will have to resort to the lawyers.

Engineers & Planners

PUBLIC INFORMATION WORKSHOP COMMENT SHEET

Hartwood Marsh Road

Project Development & Environment Study

From U.S. 27 to the Lake/Orange County Line

March 2, 2004 – 6:00 to 8:00 p.m.

Thank you for attending this Public Information Workshop to review the plans for the Hartwood Marsh Road Project Development & Environment Study. Lake County seeks your comments and concerns regarding these improvements. Please take a few minutes to complete this form before leaving this workshop.

1. Please share your ideas concerning the project plans for Hartwood Marsh Road:

3.10.04 - THANKS FOR THE INFORMATIVE MTG on March 2, 2004. WE WHO LIVE ALONG HARWOOD MARSH RD. (I LIVE AT CORNER OF HANCOCK & HARDWOOD) CONTINUE TO BE CONCERNED ABOUT NOISE, NOW & AFTER PROPOSED IMPROVEMENTS. THRU TRUCKS on HARWOOD AND THOSE TURNING TO AND FROM HANCOCK ARE CREATING A VERY HIGH NOISE LEVEL. WE UNDERSTAND THAT AS A PART OF THE ACTUAL → (OVER PLEASE)

2. Did you receive a copy of the project flyer? YES

3. Please provide your name and address below if you would like to receive future information about this project.

If additional room is needed for your comments, please use the back of this form.

Name: DONALD E. APPENZELLER

Organization: KINGS RIDGE, CLERMONT

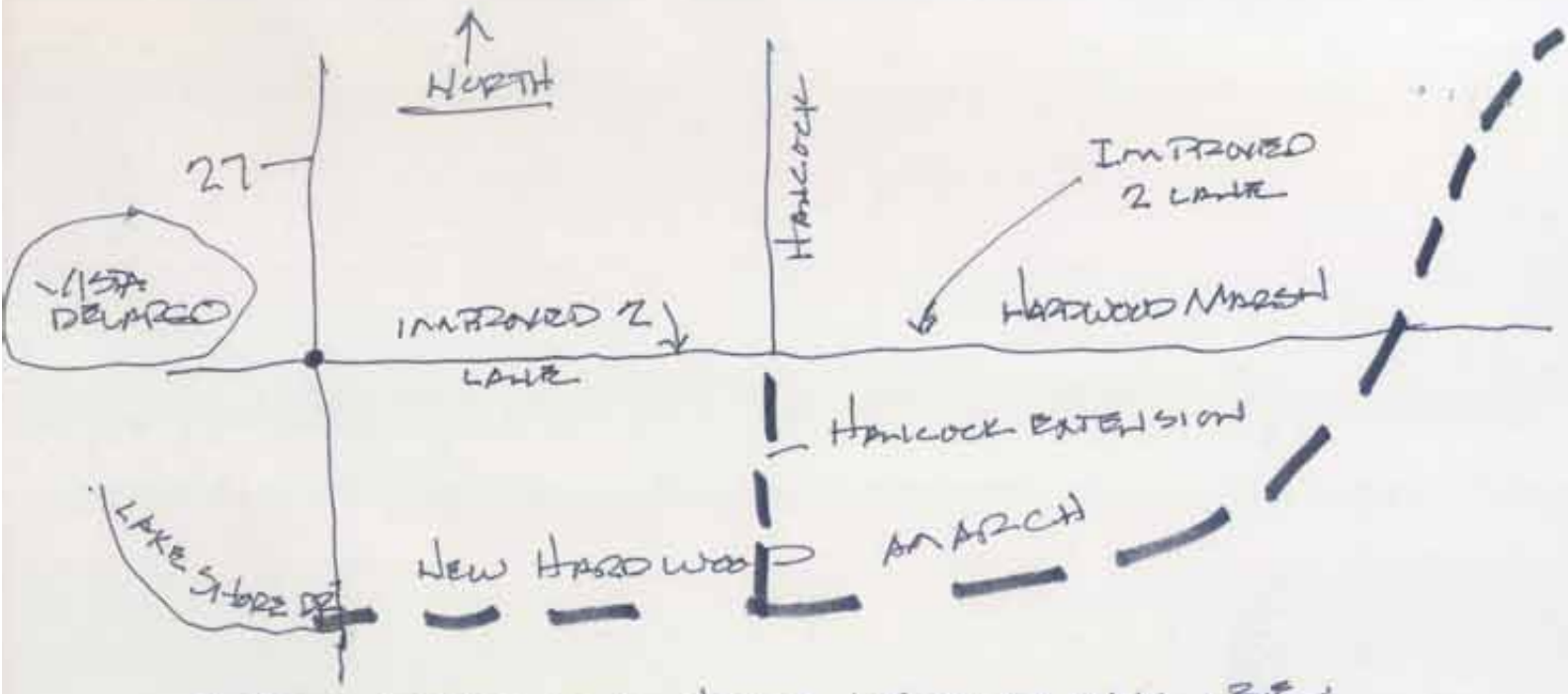
Address: 4219 KINGSLEY ST. CLERMONT, FL. 34711 (HOUSE BACKS UP TO HARDWOOD MARSH & HANCOCK RD.)

Phone: 352-241-8889

Members of the Project Team can be contacted by calling or writing to the following:

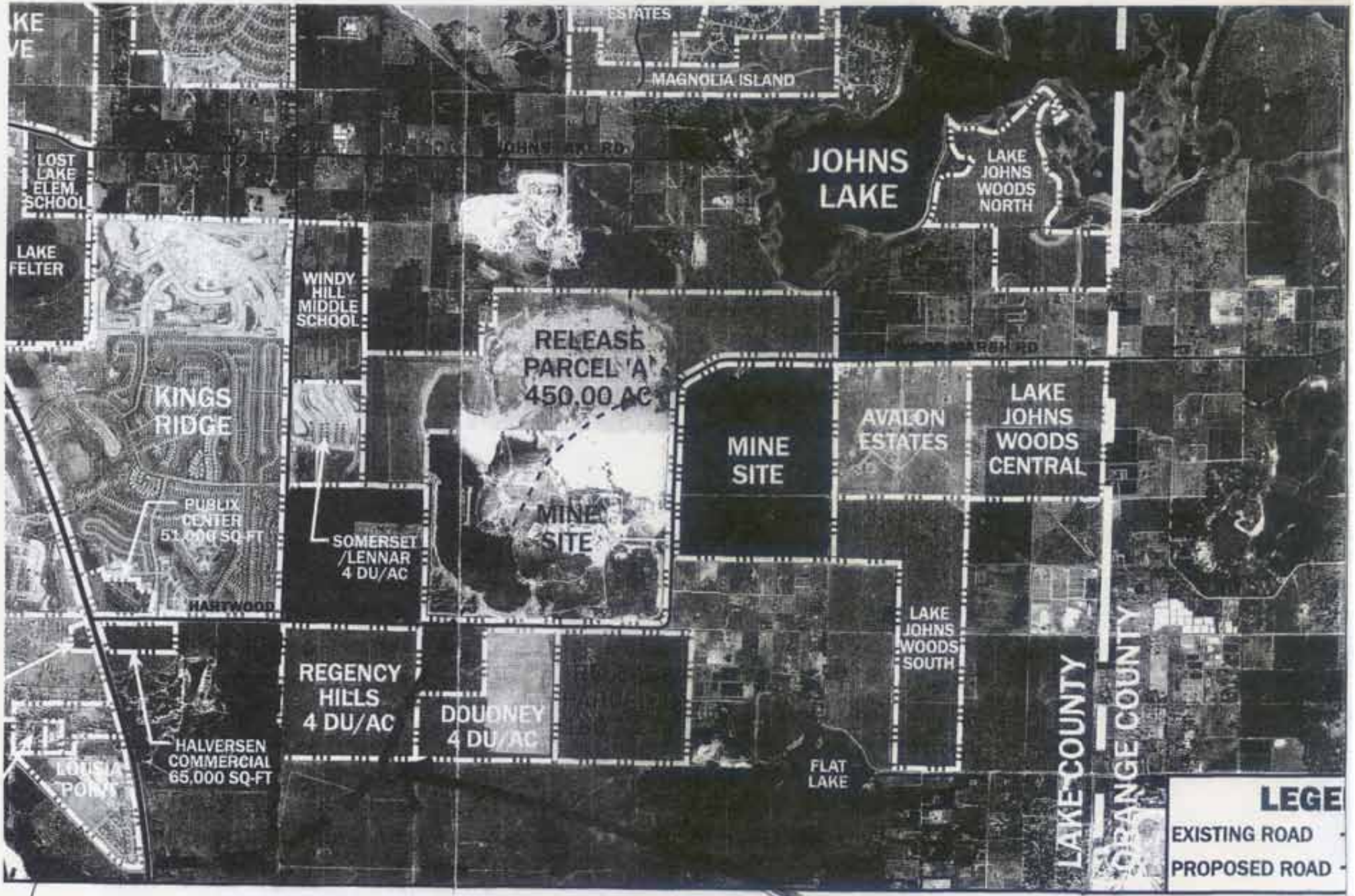
TEI Engineers and Planners
Attention: Colleen Jarrell
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746
Phone: (407) 805-0355 Fax: (407) 805-0227 E-Mail: cjarrell@tei-us.com

cc: MR. BUD POOL



DESIGN PROCESS, NOISE LEVELS WILL BE MEASURED. WE ALSO UNDERSTAND THAT ALONG SOME SECTIONS OF HARDWOOD, NOISE ABATEMENT MAY NOT BE WORTHWHILE OR PRACTICAL AS THE EXISTING & PROBABLY NEW ROAD LEVEL IS & WILL BE CONSIDERABLY BELOW THE LEVEL OF ADJOINING HOME SITES. HOWEVER CLOSER TO THE INTERSECTION OF HANCOCK RD. WHERE THE ROAD & HOME SITE LEVELS ARE CLOSER TO BEING EQUAL, AND THE NOISE IS GREATER BECAUSE OF VEHICLES STARTING & STOPPING, SOMETHING MUST BE DONE ABOUT THE NOISE.

ALSO, CONCERNING ANOTHER MATTER WHICH WE KNOW IS NOT A PART OF YOUR STUDY, MANY OF US OUR WONDERING WHY, CONCERNING THE PROBLEM OF HARDWOOD MARCH TRAFFIC PASSING THRU VISTA DELARCO, IT WOULD NOT BE MORE PRACTICAL TO PLAN THE NEW HARDWOOD MARSH ROAD AS SHOWN IN THE ABOVE DRAWING? A COPY OF THESE COMMENTS IS BEING FORWARDED TO COMM. POOL.



LAKE SHORE DRIVE

EXISTING DEVELOPMENT MAP
LAKE COUNTY, FLORIDA
MARCH 18, 2002

ALT. HARDWOOD MARSH

PDA Professional Design As
Engineers, Planners and Landscape
3165 McCrory Place, Suite 100
Orlando, FL 32803
Ph: (
Fax: (

Appendix D

Cultural Resource Assessment

CULTURAL RESOURCE ASSESSMENT
HARTWOOD MARSH ROAD
LAKE COUNTY, FLORIDA

Prepared for:

TEI ENGINEERS & PLANNERS
300 Primera Blvd., Suite 200
Lake Mary, FL 32746
(407)805-0355

Prepared by:

Martin F. Dickinson, RPA
Lucy B. Wayne, Ph.D., RPA
SOUTHARC, INC.
3700 NW 91st St., Suite D300
Gainesville, FL 32606
(352)372-2633

December 31, 2003
284-03-01

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LIST OF FIGURES

1.0 INTRODUCTION

Lake County is planning improvements to Hartwood Marsh Road from U.S. 27 to the Lake/Orange County line (Figure 1). A cultural resources survey and assessment was required as part of the Project Development and Environment Study (PD&E). The survey was to comply with Chapters 267 and 373 *Florida Statutes*, Florida's Coastal Management Program, and implementing regulations for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*. The project engineers, TEI Engineers & Planners, contracted with SouthArc, Inc. to provide the required services. A preliminary reconnaissance of the road corridor was completed in November, 2003 by Martin F. Dickinson, RPA, President of SouthArc. A field survey was conducted in December, 2003 under the direction of Brian Parker, RPA with Mr. Dickinson as Principal Investigator. Project documentation was completed that same month by Lucy B. Wayne, Ph.D., RPA, Vice President of SouthArc.

The corridor is located in an area of sandy hills and former citrus groves running east approximately 5 miles from U.S. 27 to the County line. A check with the Florida Master Site File indicated that the closest recorded site was located along the east side of U.S. 27 approximately 1/4-mile south of the junction with Hartwood Marsh Road. This site was identified as a prehistoric lithic scatter on the north side of a wetland. Small sites such as this are common in this area. Archival research did not indicate any potential historic properties within or adjacent to the corridor. Based on an evaluation of the environmental data and the reconnaissance survey, it was determined that the well-drained areas close to potential water sources had the best potential for small prehistoric sites. The balance of the corridor was considered to have a low potential for sites. As a result of this evaluation, a stratified survey approach was utilized, following the guidelines of the Florida Division of Historical Resources (FDHR). Testing was conducted at 25, 50 and 100 meter intervals based on the stratification. Subsurface testing was supplemented by surface inspection of areas of good ground exposure.

No prehistoric or historic resources were identified during the survey. One Herty cup fragment was recovered, indicating the past naval stores exploitation of the area. In the opinion of the project archaeologists, the proposed road improvements will not impact significant archaeological or historical resources which might be eligible for the *National Register*. No further research is recommended prior to construction.

□

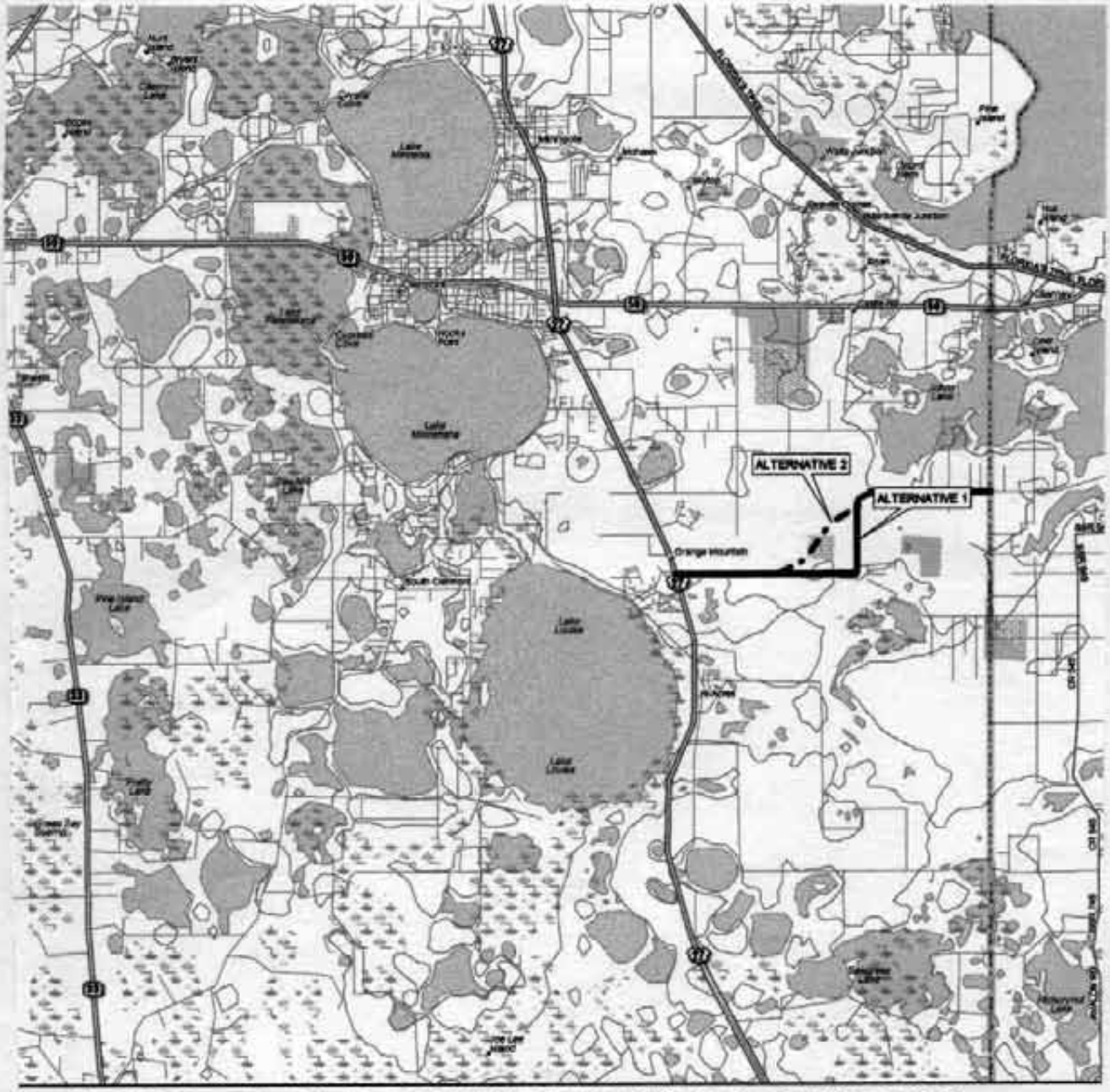

FIGURE 1. PROJECT LOCATION, HARTWOOD MARSH ROAD, LAKE COUNTY, FLORIDA

SouthArc, Inc.

2.0 ENVIRONMENTAL SETTING

Hartwood Marsh Road traverses Sections 1, 2, 9, 10 and 11 of Township 23 South, Range 26 East of eastern Lake County (Figure 2). U.S. Highway 27 forms the western limit of the corridor, and the Lake/Orange County line forms the eastern limit. The majority of the corridor follows existing roads. One alternative is situated in the center of the corridor (Figure 2), providing a more direct connection between the southern and northern legs of the corridor. This alternative traverses an area containing an existing sand mine. Johns Lake to the north of the eastern end of the corridor and Lake Louisa west of the western end of the corridor are the closest major water bodies. A series of smaller wetland/lakes is located south of the west end and at Flat Lake in the center of corridor (Figure 2).

The lakes and ponds adjacent to the corridor would have been the primary natural water sources. The water levels in these lakes fluctuate, forming prairies around the edges of the larger lakes and throughout the area of the smaller lakes during low water periods. The area south of Johns Lake contains two small ponds which may connect to the lake during periods of very high water. In fact, the 1928 soils survey shows both ponds as part of the lake (Taylor *et al.* 1928). In a 1941 photograph, the ponds, wetlands and prairies associated with the lakes were all isolated (USDA 1941). It is obvious that both ponds went dry during the recent drought; both now contain clear water with aquatic vegetation, but do not contain mosquito fish. No larger fish were observed breaking the surface. Lake Louisa has a similar situation with two ponded areas and a dry prairie within 300 meters of the west end of the alignment. The area of wetlands and ponds south of the center of the corridor probably functions in the same manner.

The project is located within the Gap portion of the Lake Wales Ridge in the Central Lake District physiographic region. This is an area of eroded sandhills with underlying limestone solution formations. These hills are considered to be residual sandhills, relict beach ridges and paleo sand dune fields. Native vegetation would have been the xeric longleaf pine-turkey oak community (Brooks 1981). Elevations within the project tract range from 100 feet in the low areas to approximately 196 feet at the eastern end (USGS 1980).

Soils within the corridor fall into the Astatula-Apopka association of well to excessively drained sands on ridges interspersed with lakes, ponds and depressions (USDA 1972). The dominant soil within the corridor is Astatula sand, particularly Astatula sand, dark surface, 5-12 % slope (Figure 3). The area immediately south of Johns Lake contains small segments of Orlando fine sand, Placid and Myakka sands, 0-2 % slope and Lake sand, 0-5 % slope (USDA 1975).

Astatula sands are excessively drained upland soils formed from relict marine sands. This soil supports the longleaf pine-turkey oak natural vegetation community, with variations based on the degree of slope. This community includes longleaf and sand pines, turkey and scrub oaks, sawpalmetto, rosemary, pricklypear cactus and native grasses. Lake sand is also a well to □

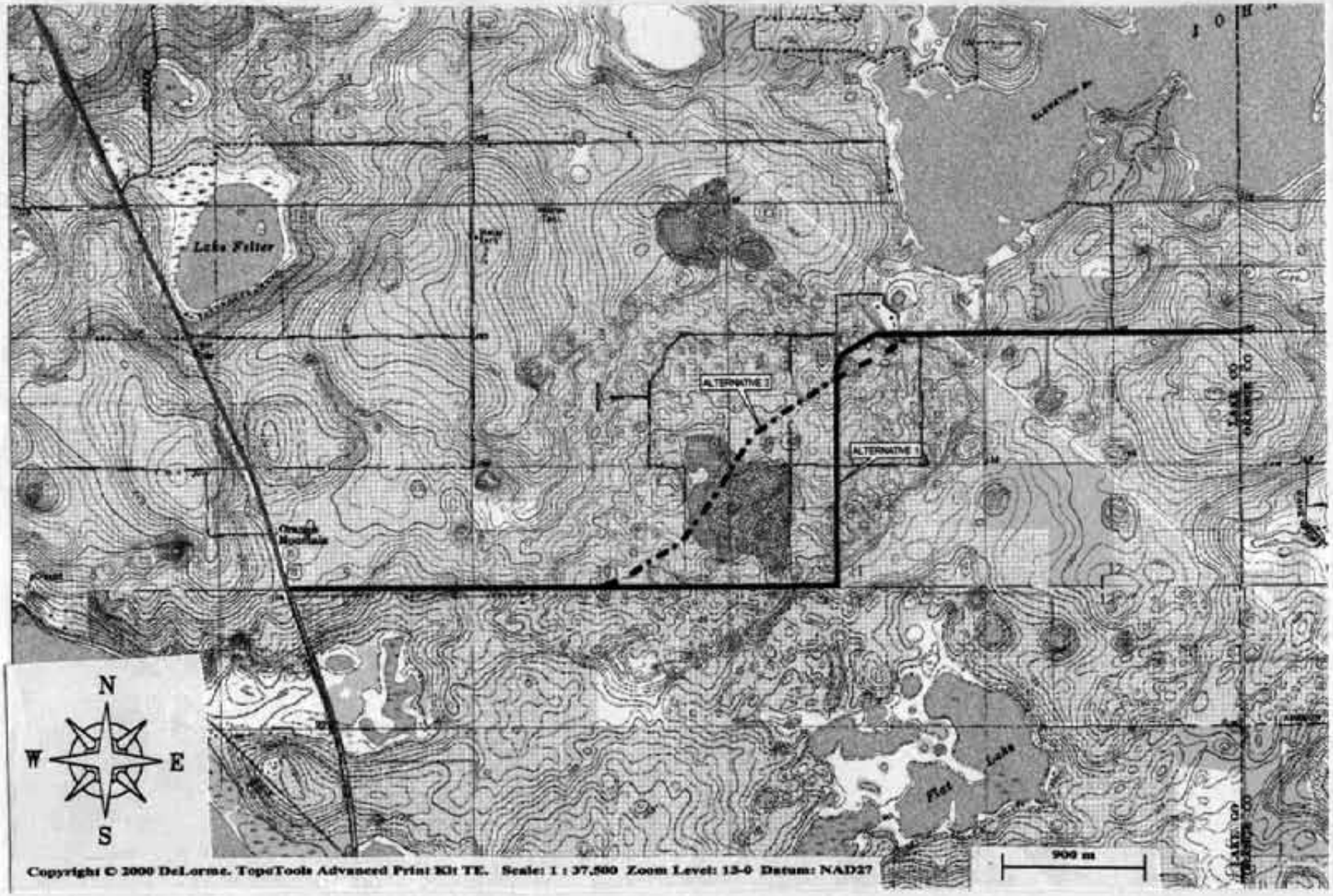

FIGURE 2. TOPOGRAPHIC MAP, HARTWOOD MARSH ROAD, LAKE COUNTY, FLORIDA

SOURCES: DELORME 2000; USGS 1980

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Archaeological and
Historical Services

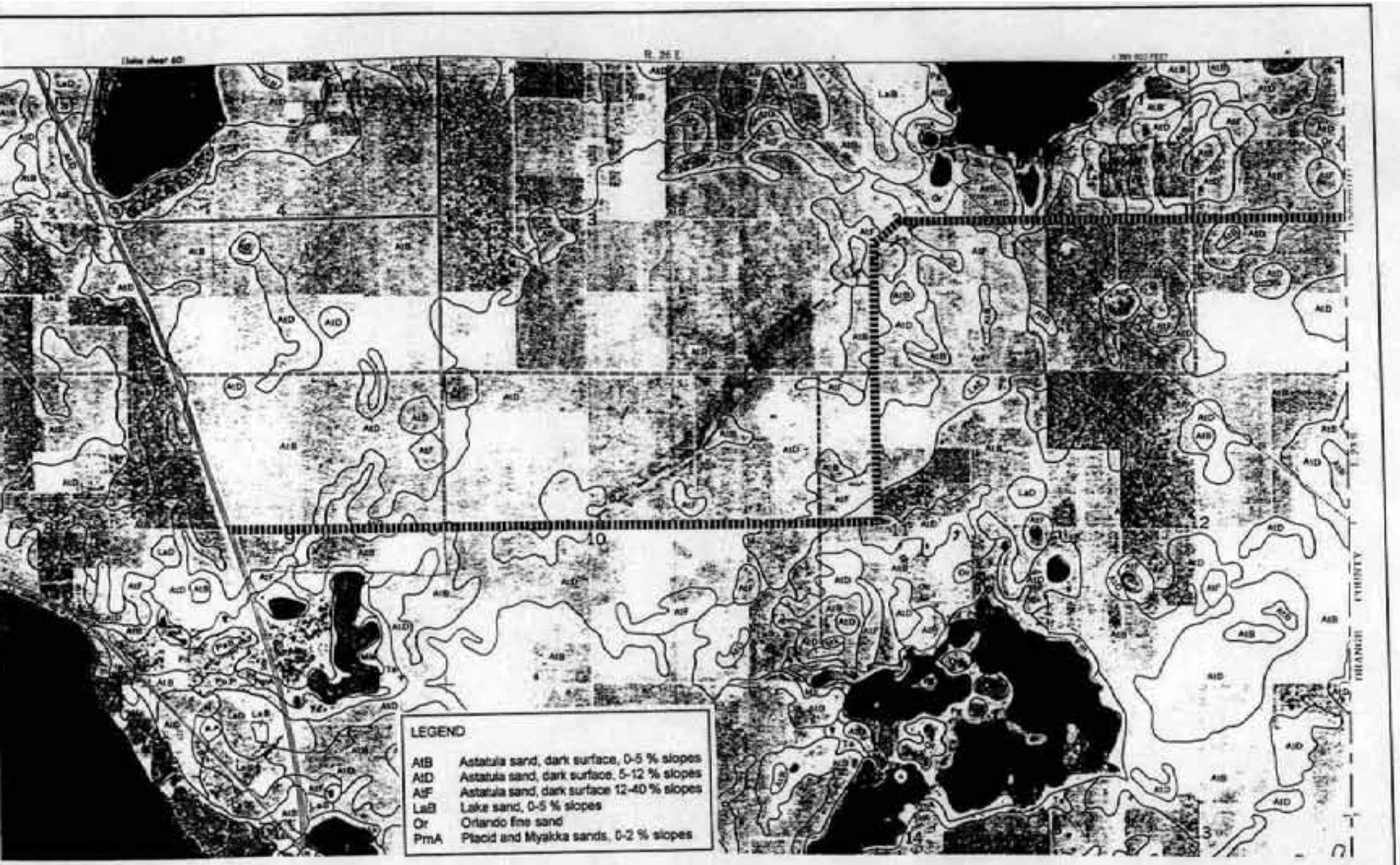

FIGURE 3. SOILS MAP, HARTWOOD MARSH ROAD, LAKE COUNTY, FLORIDA

SOURCE: USDA 1975

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Archaeological and Historical Services

excessively well drained soil found in nearly level to gently sloping areas of uplands. Like Astatula sands, excessively-drained Lake and well-drained Orlando sands support the longleaf pine-turkey oak vegetation community. Placid and Myakka soils are found in marshy depressions and are considered to be very poorly drained. Vegetation consists of wetland grasses (USDA 1975).

The high pine sandhills and longleaf pine-turkey oak communities provided a relatively limited resource base for prehistoric inhabitants of this area. Although deer do frequent these areas, they are comparatively sparse. The majority of the vertebrate species are small, consisting of birds, mice, squirrels, pocket gophers, snakes and gopher tortoises. The gopher tortoise would have been the primary subsistence resource in this environment. The nearby lakes would have been a more important resource base, providing amphibians, birds, small mammals such as raccoons and opossums, reptiles, fish, deer, freshwater shellfish and bear (Myers and Ewel 1990).

Land use within the project tract has been limited to logging, naval stores and agricultural activities, primarily citrus cultivation. The 1928 soil survey shows the eastern mile of the alignment as a trail, but no other cultural activity (Taylor *et al.* 1928). A subsequent aerial photograph shows cultural activity limited to dirt roads on the quarter-section lines of Section 1 and the trail shown in 1928 at the east end. The area had been logged for longleaf pine, leaving scattered live and turkey oaks. Logging roads were visible in the photograph and the western third of the alignment had recently burned at the time of the photograph (USDA 1941). The primary activities shown on modern topographic maps and aerial photographs (Figures 2 and 4) are the sand mine on the north side of the center of the corridor and development along U.S. 27 and the county line at the east and west ends of the corridor. Houses now present along the alignment are modern in origin (less than 50 years old). The area remains largely rural in nature, dominated by citrus groves, planted sand pine and the sand mine (Figure 5). Adjacent areas are being developed into residential communities with golf courses.

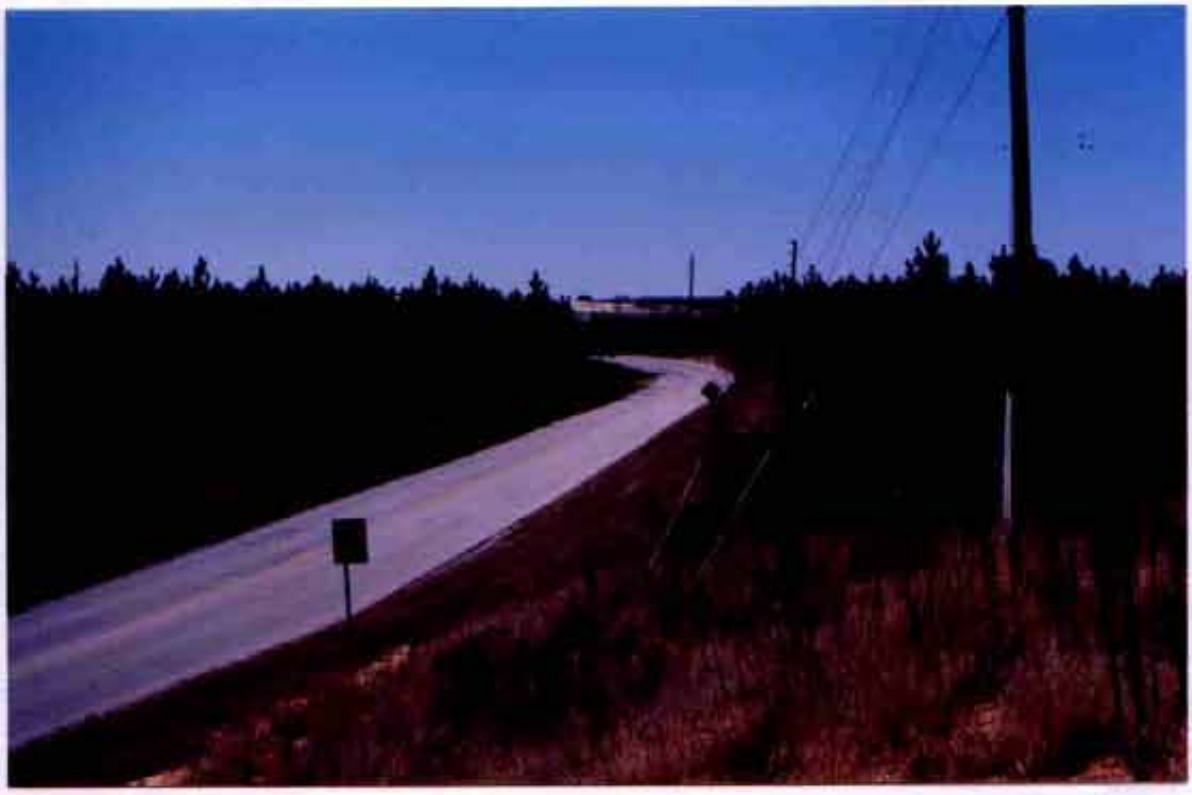
FIGURE 4. AERIAL PHOTOGRAPH, HARTWOOD MARSH ROAD, LAKE COUNTY, FLORIDA

SOURCE: USGS 1990

SouthArc, Inc.

Archaeological and Historical Services

LOOKING EAST FROM WEST END OF NORTH SEGMENT



LOOKING SOUTH/SOUTHWEST FROM WEST END OF NORTH SEGMENT

FIGURE 5. REPRESENTATIVE PHOTOGRAPHS, HARTWOOD

SouthArc, Inc.

3.0 CULTURAL HISTORY

Florida has been divided into a number of prehistoric cultural regions based on differences in the nature of the sites and the artifacts within each region. The project corridor is located within the East and Central Lake Region as defined by Milanich and Fairbanks (1980). Although discussions of this region emphasize the St. Johns River basin and the coastal zone, the basic cultural sequence for the Central Lake area is very similar. Lake County lies on the western edge of this region and was probably also subject to diffusion from the Gulf Coastal Region to the west, and perhaps the North Central region. Cultural differences between the regions are not readily apparent until the middle to late prehistoric periods. The basic Native American cultural sequence for Lake County is:

Paleoindian	10,000 to 8,000 B.C.
Early Archaic	8,000 to 5,000 B.C.
Middle Archaic	5,000 to 3,000 B.C.
Late Archaic/Mt. Taylor	3,000 to 2,000 B.C.
Late Archaic/Orange	2,000 to 1,000 B.C.
Transitional	1,000 to 500 B.C.
St. Johns I	500 B.C. to A.D. 800
St. Johns II	A.D. 800 to 1565
St. Augustine	A.D. 1565 to 1715
Seminole	A.D. 1715 to 1842

The historic period is considered to have begun with European contact in the early 16th century. This period overlaps with the St. Augustine and Seminole Indian occupations.

3.1 Paleoindian, 10,000 to 8,000 B.C.

Florida was initially occupied by man as early as 10,000 B.C. At that time, the climate was cooler and drier, and the shorelines extended much farther out due to lower sea levels. The land supported Pleistocene megafauna such as the giant ground sloth and mastodon, as well as large herd animals. The remains of these animals have been found in association with the distinctive fluted projectile points made by the Paleoindians (Waller and Dunbar 1977).

Paleoindians led a nomadic existence based on hunting and gathering, particularly of the large fauna of the period. The majority of the sites identified with this period have been found at river crossings; they probably represent hunting or kill sites where the animals came for water (Rayl 1974). Paleoindian cultural remains are limited and consist primarily of projectile points and other lithic tools, although wooden artifacts have been recovered from wet sites (Clausen *et al*. 1979). The potential for location of Paleoindian sites within the project tracts is limited due to the lack of major water sources during this period.

3.2 Early to Middle Archaic, 8,000 to 3,000 B.C.

At the end of the Pleistocene period, around 8,000 B.C., Florida became warmer and wetter. Most of the megafauna were extinct and the large herd animals had migrated to the north. Sea level had risen to approximately present heights. During this period hunting of small game animals, fishing, and gathering of botanical resources became more important to human subsistence patterns (Milanich 1978). This shift is marked by a corresponding change in the artifact assemblage, identified as the Archaic cultural period (Milanich and Fairbanks 1980).

The Archaic Indians relied on exploitation of a variety of resources on a seasonal basis. Wild nuts such as hickory and acorns assumed a greater importance in the diet, and freshwater snails began to appear in large amounts in the faunal assemblages. It is likely that the Archaic Indians gathered in larger groups at certain times of the year to intensively exploit specific resources. At other times, they probably broke up into small bands or family groups dispersed throughout the region. Archaic sites include villages, camps, kill sites, and quarries. The artifact assemblage is characterized by a larger number and variety of lithic tools, often more crudely worked than the preceding Paleoindian materials. Bone and shell tools are also common in this period (Milanich and Fairbanks 1980).

The Early Archaic is defined by stemmed points such as Arredondos and Hamiltons, as well as bipointed bone points, barbed bone points, fish hooks, atlatl weights and socketed antler handles (Milanich and Fairbanks 1980). The discovery of a cemetery at the Windover site in Brevard County provides the first evidence of burial ceremonialism; midden burials are also known for this period (Goggin 1952).

Burial ceremonialism increased during the Middle Archaic. Sites of this period included inland small camp or hunting sites, as well as large central-based sites marked by thousands of pieces of lithic debitage and tools. Artifacts include large stemmed projectile points such as the Florida Archaic Stemmed variety, drilled stone beads, atlatl weights and a variety of other lithic tools and debitage.

3.3 Late Archaic, 3,000 to 1,000 B.C.

The Late Archaic, beginning about 3,000 B.C., marks the beginning of cultural regionalization in Florida (Milanich 1994). Based on the known sites for the period, occupation of the interior highland forests was rather limited, while coastal occupation was extensive. The East and Central Lakes Region sites from this period, known as the Mt. Taylor period, are marked by intensive exploitation of shellfish, particularly the small freshwater *Viviparus georgianus*, which forms colonies in the quiet waters of sloughs, creeks, lakes, ponds and springs (Cumbaa 1976). The middens also contain areas of fused crushed shell which probably represent hearths. In addition to Archaic stemmed points, sites included a variety of bone and shell tools, steatite bannerstones (atlatl weights) and other lithic tools. Although midden burial continued to be utilized, recent research at the Tomoka Mounds and Midden site in Volusia County indicates that mound burial probably began during this period (Piatek 1992).

Between 2,000 and 1,000 B.C., an important change occurred in the cultural pattern. The Indians of this Late Archaic or Orange period began to produce crude, fiber-

tempered pottery using a slab construction technique. The appearance of pottery may indicate a more sedentary occupation pattern. In support of this change in pattern, villages which may have been occupied year-round have been identified with this period. Subsistence was still based on hunting-gathering and sites are located in proximity to specific resource bases (Milanich and Fairbanks 1980).

3.4 Transitional, 1,000 to 500 B.C.

The period between 1,200 and 500 B.C. is referred to as a Transitional period. It marks the change from fiber-tempered, slab-construction pottery to sand or untempered wares with coil construction. A probable population increase and increased interaction between cultural groups also may have occurred during this period. During this time occupation shifted to the coastal regions, with only short-term usage of the interior portions of Florida.

The Transitional is marked primarily by ceramic changes rather than shifts in subsistence or settlement patterns. In fact, there is so little change in this short period, that Milanich (1994) proposes dropping the term and assigning sites to either the preceding Orange or the St. Johns I periods.

3.5 St. Johns I, 500 B.C. to A.D. 800

The Late Archaic to Transitional periods marked the beginnings of cultural diversity in Florida. Following the Transitional period, the study area is classified as falling into the St. Johns cultural group of the East and Central Lake Region, although it probably did receive influences from adjacent regions to the north and west. The regions shared similar settlement patterns and resource utilization during the St. Johns I era; there is also evidence of interaction between the regions as evidenced by the presence of cultural materials from both regions in Lake County sites.

The St. Johns cultural tradition represents a very long, slowly changing tradition within East and Central Florida. This tradition dates from 500 B.C. to A.D. 1565, but has been subdivided based on changes in site and artifact patterns. The St. Johns Indians occupied the coastal regions, particularly the St. Johns River Basin. Shellfish were a dominant part of the subsistence pattern and coastal sites are marked by the presence of large shell middens and mounds. Inland areas were utilized on a seasonal basis. Artifact assemblages are distinguished by the presence of the chalky paste St. Johns ceramics, the result of using clays containing sponge spicules (Milanich and Fairbanks 1980). Decoration consisted of incising and check stamping. John Goggin (1952:68, 70) neatly summarized the St. Johns culture as "a pottery using, mound building, semi-sedentary complex probably with agriculture," marked by "constant trade and interchange with neighboring northern and western cultures."

St. Johns I is marked by the presence of mound burials and increased occupation of the lower St. Johns River basin (Goggin 1952; Milanich and Fairbanks 1980). This period has been divided into three subperiods, St. Johns I, Ia and Ib. The St. Johns I subperiod (500 B.C. to A.D. 100) is characterized by the dominance of St. Johns Plain ceramics in the village areas and the presence of Dunns Creek Red slipped wares, particularly in burials. Mounds also contain Deptford pottery characteristic of North

Central Florida. Less common artifacts reflect the influence of the Hopewellian-Yent complex from the Gulf Coast and northwestern Florida; this includes quartz plummets, clay elbow pipes, mica and galena fragments and a few copper ornaments (Goggin 1952).

St. Johns Ia (A.D. 100 to 500) has more elaborate burial ceremonialism with an increase in elbow pipes, mica and galena, shell gorgets, clay and copper ornaments, and stone pendants and beads. Village pottery continued to be dominated by St. Johns Plain wares, often with tetrapods, with Dunns Creek Red, and occasional Deptford, Swift Creek and Weeden Island ceramics from the north and west in mounds. Other artifacts include shell celts, stone hones, worked fossil bone, hammerstones, mica and possible shell bannerstones (Goggin 1952).

St. Johns Ib (A.D. 500 to 800) shows an increase in Weeden Island influences from the north and west, although village pottery continued to be dominated by St. Johns Plain wares. Clay elbow pipes and mica continue to be used during this subperiod (Goggin 1952).

3.6 St. Johns II, A.D. 800 to 1565

By about A.D. 800, the St. Johns cultural group in the East and Central Lakes Region had gradually evolved into the period identified as St. Johns II. The distinguishing feature of St. Johns II sites is the presence of check-stamped ceramics, as well as an increased use of burial mounds. The latter part of the St. Johns II period also began to reflect the influence of the Southeastern Ceremonial Complex associated with the Mississippi Valley and northwestern Florida. This complex includes the presence of ceremonial objects in burials and is believed to reflect an increased emphasis on social status and ranked chiefdoms (Milanich and Fairbanks 1980).

Like St. Johns I, this period is divided into subperiods based on changes in the sites and artifact assemblages. St. Johns IIa (A.D. 800 to 1300) is marked by an increase in the use of burial mounds and the appearance of St. Johns Check Stamped wares. Weeden Island pottery from the north and west continued to appear in mounds (Milanich and Fairbanks 1980).

St. Johns IIb (A.D. 1300 to 1513) sites begin to display Mississippian influences from the northwest in the presence of ceremonial mound centers with Southeastern Ceremonial cult motifs and copper items in the mounds. In addition to the ubiquitous St. Johns Check Stamped pottery, there are some Fort Walton and Safety Harbor ceramics, indicating contact with the Indians of the west coast. Artifacts include simple stamped or scored ceramics, occasional cob-marked sherds, sherd-tempered ceramics, stone celts, small triangular points, clay effigies, and a variety of stone, bone and shell tools and ornaments (Goggin 1952). At the time of European contact, the St. Johns cultural group was organized in hereditary chiefdoms and priesthoods (Milanich and Fairbanks 1980).

St. Johns IIc (A.D. 1513 to 1565) is the period of European contact, marked by the presence of trade goods in sites. The population suffered severe reductions due to the introduction of European diseases, slavery and warfare. At the time of European contact, Milanich identified the Indians of the area around Lake Apopka and Lake Harris as the

chiefdom of Urriparacoxi, who exacted tribute from the Ucita of Tampa Bay. He suggests that this group controlled the area from the Withlacoochee River south to Osceola County. The Acuera group of the Timucuan people were also noted in the vicinity of Lake Harris (Milanich 1995). The Timucua were described as agriculturalists who grew corn, beans, and tobacco, but also relied heavily on hunting, fishing and gathering of wild plant foods. Social organization was based on ranked clans headed by chiefs, and polygamy was common. The people were described as tall and often tattooed. Extensive rituals were practiced in association with warfare and burial (Milanich and Fairbanks 1980).

3.7 St. Augustine Period, A.D. 1565 to 1715

European contact would result in the virtual destruction of the Native Americans of Florida within a hundred-year period, primary due to the introduction of new diseases. Native ways of life were altered through the introduction of European goods and agricultural practices. The native religious practices were largely supplanted by the introduction of Catholicism through the Spanish mission system. Native ceramics of the contact period also reflect European influences, particularly in their shapes. These ceramics are identified primarily as the San Marcos type in East and Central Florida (Milanich and Fairbanks 1980).

Relatively little is known of the Central Lakes period during this period. Since this region was dominated by Timucuans who relied primarily on hunting and gathering rather than agriculture, the mission system was largely unsuccessful and contact was minimal (Milanich 1995). But the combination of disease and English raids of the early 18th century led to the depopulation of Florida.

3.8 Seminole, A.D. 1715 to 1842

After 1715, the Spaniards began to encourage Creek Indians from Georgia and Alabama to migrate to Florida, where they became known as the Seminole, based on the Spanish *cimarrone* or wild one (Milanich 1978; Fairbanks 1978). Once settled in Florida, the Indians made major changes in their subsistence and settlement patterns. Creek towns were permanent settlements with central squares flanked by ritual buildings. Subsistence was based on horticulture. In Florida, the Indians became heavily dependent on the herds of feral Spanish cattle. Settlement became diffuse and consisted of small farmsteads loosely associated as towns. There was little interaction with the Spaniards and few Spanish goods appear on Seminole sites (Milanich and Fairbanks 1980).

During the early 19th century, the increasing pressure from American settlers from Georgia and the Carolinas led to the First Seminole War of 1818 and the cession of Florida to the United States in 1819 (Milanich and Fairbanks 1980).

The 1823 Treaty of Moultrie Creek forced the Seminoles into a reservation in North Central Florida; this reservation included much of Marion and Sumter Counties. The restricted size and different resources of the reservation lands, combined with a reduction of the trade goods the Indians had begun to acquire during the British and Second Spanish periods, led to an increase in Indian raids for cattle and horses. At the same time, the Indians were harboring runaway slaves. These factors, combined with the

increased pressure for land from the American settlers, led to the Second Seminole War of 1835 to 1842 (Fairbanks 1978).

Historian Mahon (1985) says that the Alachua Seminole moved to the Lake County area after the Treaty of Moultrie Creek, where the principal town became Okihumpky. His map places this town about half way between Lake Griffin and the Withlacoochee River on or near the Ft. Brooke Road (Mahon 1985). During the Second Seminole War, a number of outposts and highways were established in Central Florida, including Fort Mason on the eastern shore of Lake Eustis (Kennedy *et al.* 1929). However, the majority of the war activity occurred north and west of the project area. By the end of the Second Seminole War, the Indians were forced to migrate further south to the Everglades, or were removed to the Indian territory in Oklahoma. At that time, Central Florida was opened to new settlement by planters from the southern United States.

3.9 Historic Period, A.D. 1565 to present

The initial European contact with Central Florida was probably the DeSoto expedition, which passed through portions of nearby Sumter County. However, during the first Spanish period, Central Florida remained largely in the hands of the Indians. The Spaniards established a series of missions between St. Augustine and Tallahassee. Portions of the inland area were also used as cattle ranches, particularly the vicinity of Paynes Prairie in Alachua County. The Spanish presence in Florida is marked by occasional Spanish artifacts in the Indian sites. No permanent interior settlements were established, although a series of large land grants was issued.

During the British Period from 1763 to 1783, there was some increase in trade with the Seminoles, but little or no attempt to settle the interior of the state. It was not until the Second Spanish period, 1784 to 1819, that the white man's presence became significant in Central Florida. During this period, Americans from Georgia and the Carolinas began to come to Florida, sometimes in search of runaway slaves among the Seminoles, and at other times in search of new cotton lands. Hostilities with the Indians culminated in the First Seminole War in 1818. Spain's inability to govern the territory led to its cession to the United States in 1819 (Tebeau 1971).

After becoming American territory, Florida rapidly received an influx of land-hungry settlers intent on establishing cotton plantations in Central Florida. A series of small towns, beginning with Micanopy in southern Alachua County, were established with surrounding farms and plantations. This settlement was only briefly slowed by the Second Seminole War of 1836 to 1842 (Tebeau 1971).

The Armed Occupation Act of 1842 provided homestead allotments in Florida and was instrumental in encouraging settlement of this region. The earliest settlements were in the vicinity of Leesburg and Tavares. The first settlement in the vicinity of the project corridor did not occur until 1862, when James Anderson established a farm south of South Clermont. In 1874, Herring Hooks acquired "Hooks Point" and adjacent lands on Lake Minnehaha. Although he resided in Okahumpka, several of his children

homesteaded his new lands in the Clermont area, raising truck crops and citrus (Kennedy *et al.* 1929).

In 1884, Herring's son, T. J. Hooks, became the agent for Florida Land and Colonization Company, an English syndicate which owned 20,000 acres in south Lake County. Hooks arranged the sale of several hundred acres to a group of New Jersey businessmen who incorporated as the Clermont Improvement Company. The Company platted the city of Clermont and began to aggressively market parcels of land in the area. This began a period of growth in the area, which included extension of the Florida East Coast Railroad to provide shipping for the booming tomato business in the region (Kennedy *et al.* 1929).

Although the freezes of 1895 and 1896 destroyed both citrus and tomato crops, it was only a temporary setback. By the end of the century, naval stores had also become an important industry in this region. One of the major figures in this industry in the area was D. G. Crenshaw from Columbia, SC. By 1898, Crenshaw owned several thousand acres near Lake Louisa, where he erected a mill on the shore of the lake. In addition to timber and naval stores, Crenshaw raised cotton, sugarcane, corn and vegetables. Crenshaw subsequently sold much of his property to E. E> Edge, who organized Edge Dowling Lumber Company (Kennedy *et al.* 1929). The project area has remained in citrus and planted pine, with a large sand mine in the north center of the corridor.

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4.0 PROJECT METHODOLOGY

The project methodology can be divided into three major tasks: (1) background research, (2) field survey, and (3) analysis and documentation.

4.1 Background Research

Background research is designed to develop a cultural history for the project area and to determine whether there are any previously known archeological or historic sites in proximity to the project tract. This information helps define the potential for site location within the property, which in turn is utilized to design the field survey.

The initial task in background research was to contact the Florida Master Site File (FMSF) to determine whether there were any previously known sites and to discuss the proposed methodology. Aerial photography, topographic maps, and historic data were reviewed to delineate the environmental character of the tract and identify potential historic sites. Previous surveys in the vicinity were reviewed to determine archaeological site distribution patterns. Finally, in-house materials of SouthArc, Inc. were utilized to develop the cultural history of the project area. These materials included journal articles and books on Florida archeology. No informants were consulted for this project.

4.2 Field Survey

An initial reconnaissance survey was completed in order to verify the environmental data and identify any obvious cultural resources. Information from this reconnaissance was used in conjunction with the background research to stratify the project corridor for the subsequent Phase I survey.

Based on the location pattern for known sites in the area, prehistoric Native American sites tend to be located on relatively level well-drained soils within 200 meters of potential water sources. While the project tract soils are generally well-drained, much of the land is over 200 meters from potential water sources and frequently characterized by steep slopes. In addition, the sandhill vegetation community has relatively limited resources for prehistoric utilization. On the other hand, Johns Lake, Lake Louisa and Flat Lake would provide reasonable resource bases within an accessible range. As a result, the tract was considered to have a medium to low potential for containing prehistoric sites. As previously noted, historic utilization was limited to timber, naval stores and citrus cultivation.

As a result of this evaluation, subsurface testing was stratified based on distance from potential water sources and slope. Highly disturbed areas were excluded from testing. Areas of reasonably well drained soils with 0-5 % slope within 200 meters of a possible water sources were classified as having the highest site potential. Areas of poorer soils within 200 meters of water and all areas between 200 to 300 meters of water were classified as medium potential. The balance of the corridor was classified as low potential. Subsurface testing was conducted at 25-meter intervals in higher potential areas (primarily along the south side of Johns Lake) and medium potential areas were

tested at 50-meter intervals. The balance of the corridor was judgmentally tested, usually at 100-meter intervals (Figure 6).

Test units were 50 centimeters (cm) square and one meter deep, subsurface conditions permitting. Units were excavated by nature soil strata and all soil was screened through 1/4-inch hardware cloth. Field notes recorded unit location, soil stratigraphy, presence/absence of artifacts, dominant vegetation, and proximity to cultural or natural features. Shovel test units were supplemented by surface inspection of areas of good ground exposure.

4.3 Analysis and Documentation

Project analysis consisted of correlation of the field data with the background information to produce this report and the Florida Master Site File Survey Record Log (Appendix). All project records are curated at SouthArc, Inc.

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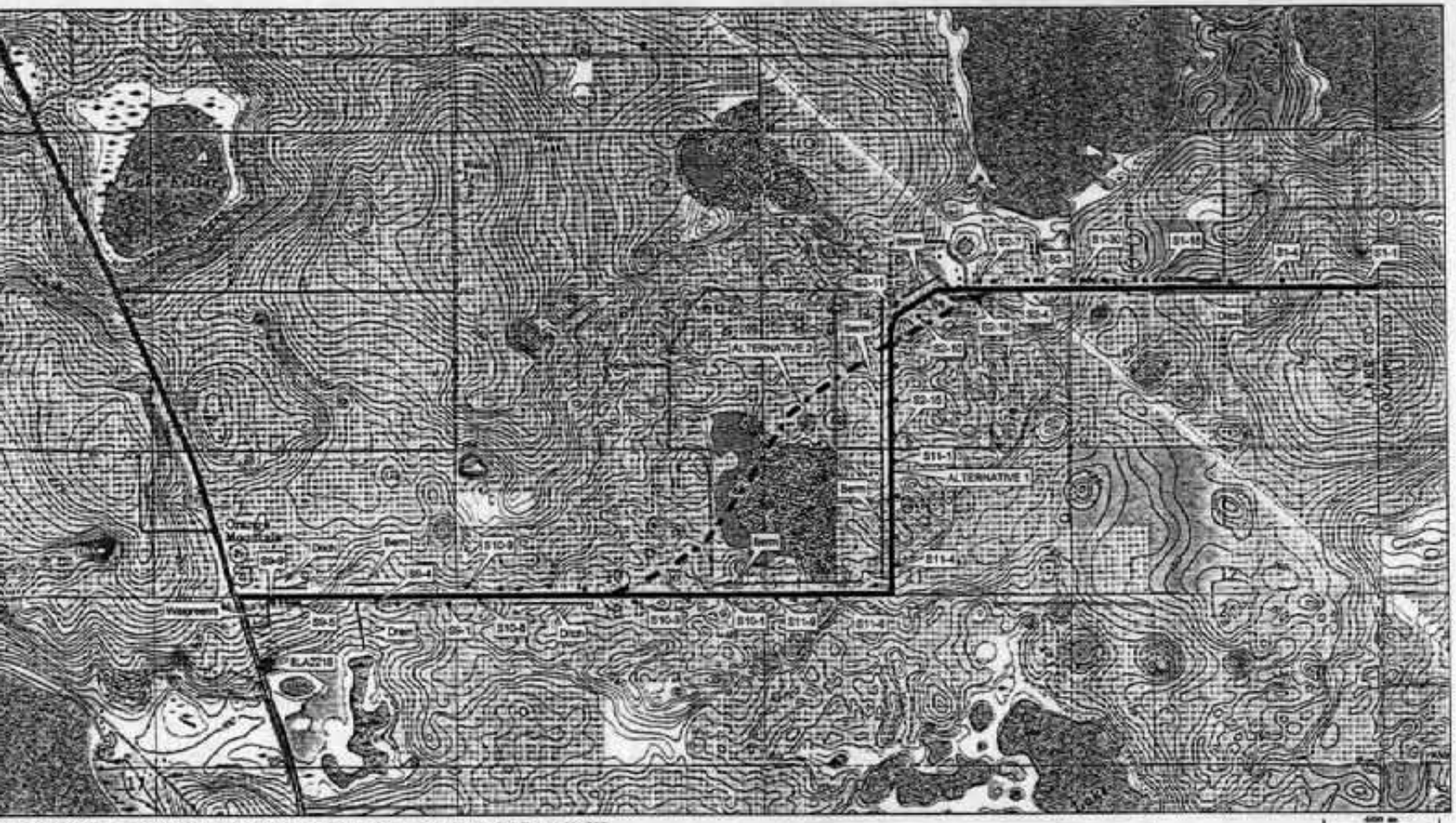

LEGEND

○ TEST UNIT
S10-3 TEST UNIT IDENTIFICATION

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W E
S

RE 6. LOCATION OF TEST UNITS, HARTWOOD MARSH ROAD, LAKE COUNTY, FLORIDA

SouthArc, Inc.
Archaeological and Historical Services

5.0 RESULTS AND CONCLUSIONS

The closest previously identified archaeological or historical sites is 8LA2216, located on the east side of US 27 south of the junction with Hartwood Marsh Road (Figure 6). This site was identified as a small prehistoric lithic scatter, a typical site type for this region. Background research and the reconnaissance survey indicated that there were no potential historic sites or structures along the corridor.

A total of 74 shovel tests were placed within the corridor (Figure 6). The standard soil profile consisted of approximately 20 centimeters of brown sand over yellow brown sand. One unit in Section 1 in the east end of the corridor yielded a Herty cup fragment consistent with naval stores exploitation in this area. A nearby unit yielded a single fragment of burned clear bottle glass--probably of recent origin.

None of the existing structures along the corridor meet the age requirement for historic properties (50+ years). None appear to have any architectural, engineering or historic importance.

5.1 Recommendations

In the opinion of the project archaeologists, the proposed road improvements will not impact any archaeological or historic resources which are significant or eligible for the *National Register of Historic Places*. We recommend that no further research be require prior to construction.

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7.0 UNANTICIPATED DISCOVERIES AND FLORIDA LAW

Due to the local nature of land use decisions, historic preservation laws are predominately enforced by state and local governments. The Florida legislature has enacted laws pertaining to unmarked human burials, intending that "all human burials and human skeletal remains be accorded equal treatment and respect based upon common human dignity without reference to ethnic origin, cultural background, or religious affiliation."[1] This section discusses some of the laws which may apply in the event that certain unanticipated discoveries are encountered.

Applicable Florida Law

The mandates of Florida Statutes (Chapter 872, *Offenses Concerning Dead Bodies And Graves*) apply when human skeletal remains, human burial, or associated burial artifacts have been or are discovered "upon or within any public or private land in the state, including submerged lands."[2] An "unmarked human burial"[3] is statutorily defined as:

> "any human skeletal remains or associated burial artifacts", or
>
> "any location, including any burial mound or earthen or shell monument, where human skeletal remains or associated burial artifacts are discovered or believed to exist on the basis of archaeological or historical evidence, excluding any burial marked or previously marked by a tomb, monument, gravestone, or other structure or thing placed or designed as a memorial of the dead."

Duty to Immediately Cease Activity

Upon discovery of an unmarked human burial, other than during an archaeological excavation authorized by the state or an educational institution, "all activity that may disturb the unmarked human burial shall cease immediately, and the district medical examiner shall be notified. Such activity shall not resume unless specifically authorized by the district medical examiner or the State Archaeologist."[4] Thus, when an unmarked human burial is encountered, the contractor must notify the district medical examiner and cease all work in the vicinity, and should protect the area from further spoliation. SouthArc recommends covering the find with plastic sheeting or tarps, marking the location, and preventing further disturbances to the immediate area. Such discoveries should be

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1 FLA STAT. § 872.05 (1) (Unmarked Human Burials; Legislative Intent) 2002.

2 *Id.* (stating "This section applies to all human burials, human skeletal remains, and associated burial artifacts not otherwise protected under chapter 497 or other state law").

3 *Id.* § 2(f).

4 *Id.* § 2(b) (providing the "District medical examiner is a person appointed under F.S. § 406.06, §406.15, or §406.17"; and § 2(e), stating "State Archaeologist" means the person employed by the Division of Historical Resources of the Florida Department of State pursuant to §267.031(6)).

immediately reported to SouthArc at (352) 372-2633). SouthArc will respond to such calls and initiate the necessary actions to comply with Chapter 872.

Duty to Notify Authorities

Florida law imposes a mandatory duty to notify local law enforcement authorities of site disturbance. "Any person who knows or has reason to know that an unmarked human burial is being unlawfully disturbed, destroyed, defaced, mutilated, removed, excavated, or exposed shall immediately notify the local law enforcement agency with jurisdiction in the area where the unmarked human burial is located."[5] Upon inspection, "any law enforcement agency that finds evidence that an unmarked human burial has been unlawfully disturbed shall notify the district medical examiner."[6]

Procedures Following the Discovery of an Unmarked Human Burial

Jurisdiction and duties of the district medical examiner (DME) are described at §872.05 (4)(a). Note: this section does not apply to an archaeological excavation authorized by the state or an educational institution.[7] Initially, the DME shall assume jurisdiction over, and responsibility for, such unmarked human burial if he or she"

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5 *Id.* (3)(a).

6 *Id.* (3)(b).

7 See §872.05 (5) (Discovery of an Unmarked Human Burial During an Archaeological Excavation).

determines that the unmarked human burial may be involved in a legal investigation, or

represents the burial of an individual who has been dead less than 75 years

After receiving notification of the unmarked human burial, the DME has 30 days to determine if he or she shall maintain jurisdiction or refer the matter to the State Archaeologist. If the unmarked human burial is determined not to be involved in a legal investigation and represents the burial of an individual who has been dead 75 years or more, the DME will notify the State Archaeologist.

Duties of the State Archaeologist

Upon receiving notice from the DME, the Division of Historical Resources of the Department of State ("Division") may assume jurisdiction over and responsibility for the unmarked human burial pursuant to §872.05(6).[8] This process is typically to initiate efforts to properly protect the burial, human skeletal remains, and associated burial artifacts. If the Division assumes jurisdiction, "the State Archaeologist shall consult a human skeletal analyst who shall report within 15 days as to the cultural and biological characteristics of the human skeletal remains and where such burial or remains should be held prior to a final disposition."[9]

The State Archaeologist must make "reasonable efforts to identify and locate persons who can establish direct kinship, tribal, community, or ethnic relationships with the individual or individuals whose remains constitute the unmarked human burial."[10] If possible, he or she "shall consult with the closest related family member or recognized community leaders, if a community or ethnic relationship is established, in determining the proper disposition of the remains found in the unmarked human burial."[11]

Ownership of A Historical, Archaeological, or Significant Unmarked Human Burial

The State Archaeologist is required to determine whether the unmarked human burial is historically, archaeologically, or scientifically significant. If the burial is deemed significant, re-interment may not occur until the remains have been examined by a human skeletal analyst designated thereby. Frequently, no links to family or the community can be identified. Under Florida law, this occurs when the State Archaeologist "is unable to establish a kinship, tribal, community, or ethnic relationship with the unmarked human burial, determine the proper disposition of the burial and consult with persons with relevant experience, including:

(1) a human skeletal analyst,
(2) two Native American members of current state tribes recommended by the Governor's Council on Indian Affairs, Inc., if the remains are those of a Native American,

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8 *Id.* (6).
9 *Id.* (4)(c).
10 *Id.* (6)(b).
11 *Id.*

(3) two representatives of related community or ethnic groups if the remains are not those of a Native American, or

(4) an individual who has special knowledge or experience regarding the particular type of the unmarked human burial."[12]

If the State Archaeologist finds that an unmarked human burial is historically, archaeologically, or scientifically significant and if the parties (listed above) with whom he or she is required under §872.05(6)(c) to consult agree, the human skeletal remains, and the associated burial artifacts, shall belong to the State of Florida. The title thereto will be vested in the Division.

SouthArc's Scope of Work

SouthArc will provide coordination with state and local agencies, including the Division. We will work with property owners and contractors to alleviate construction delays or alterations resulting from such discoveries. Typically, construction is temporarily shifted to areas away from the find while an assessment is conducted. Depending upon results of the assessment however, project redesign, and/or provisions for reburial, may be required.

Should the remains be classified as archaeologically or scientifically significant, SouthArc will negotiate a Scope of Work or a Management Plan with the State Archaeologist. A Management Plan may include disinterment, or preservation in place. If disinterment is selected, SouthArc will work with a physical anthropologist to carefully remove the remains for forensic examination. Following completion of the forensic investigation, a Management Report will be provided to facilitate decisions regarding whether site development activities may proceed in the vicinity of the discovery. The Management Report will also include all relevant correspondence between SouthArc, the District Medical Examiner, the State Archaeologist, and other agencies involved in the project.

When forensic and management analyses are completed, SouthArc will prepare a draft report to the client for review and approval. Florida Master Site File forms will be completed and updated as needed. In compliance with Florida law, SouthArc will submit a Final Report to the State Archaeologist.[13]

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12 *Id.* (6)(c).

13 *Id.* (7) (providing "The archaeologist and human skeletal analyst involved in the archaeological excavation and scientific analysis of an unmarked human burial shall submit a written report of archaeological and scientific findings as well as a summary of such findings, in terms that may be understood by laypersons, to the State Archaeologist within 2 years after completion of an excavation. The division shall publish the summary within 1 year after its receipt and shall make such report available upon request.").

APPENDIX

FLORIDA MASTER SITE FILE SURVEY RECORD LOG

Appendix E

Wetland Evaluation Report

WETLAND EVALUATION REPORT

Hartwood Marsh Road

5± miles *in* Sections 1, 2, 9, 10, and 11, Township 23 South, Range 26 East
Lake County, Florida

Prepared for :

Lake County Public Works
P.O. Box 7800
Tavares, Florida 32778-7800

Submitted to :

TEI Engineers and Planners, Inc.
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746

29 October 2003
L&A No. 2002-267.41
Doc: \2002-267-WetRpt-J29.wpd

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Hartwood Marsh Road Study

5± miles *in* Sections 1, 2, 9, 10, and 11, Township 23 South, Range 26 East
Lake County, Florida
Doc: \2002-267-WETRPT-J28.wpd

1.0 INTRODUCTION

Lake County's Public Works Department (Lake County) is proposing to widen an approximately 5 mile segment of Hartwood Marsh Road from U.S. Highway 27 to the Lake County/Orange County line (Figure 1).

The purpose of this Wetland Evaluation Report is to identify the potential involvement of federally jurisdictional wetlands in the project corridor and to evaluate potential wetland impacts resulting from the proposed road improvements in an effort to comply with the Presidential Executive Order 11990 entitled "Protection of Wetlands" dated 23 May 1977 and the U.S. Department of Transportation Order 5660.1A entitled "Preservation of the Nation's Wetlands," dated 24 August 1978.

1.1 Project Description

The project limits include 5± miles of the Hartwood Marsh corridor. The western limits of the project begin at the intersection of Hartwood Marsh Road and U.S. Highway 27. The eastern limits of the project is the Lake County/Orange County line.

1.2 Project Need

The need for the widening of Hartwood Marsh Road is based upon the inability of State Road (S.R.) 50 to handle projected future traffic volumes. Although six-lane improvements to S.R. 50 are in various stages of development, traffic projections indicate this facility will operate below acceptable levels of service. It is anticipated that Hartwood Marsh Road will address some of the capacity deficiencies along S.R. 50.

1.3 Alternatives

1.3.1 No-Build

The existing roadway facility would remain unchanged under the No-Build alternative.

Hartwood Marsh Road is currently a 2-lane rural road with uncontrolled access.

1.3.2 Build

The Build Alternative (proposed project area) includes the construction of a four-lane roadway and an associated stormwater management system. The construction would include the addition of two lanes to Hartwood Marsh Road and the realignment of

portions of the existing roadway. The majority of the new construction would take place largely in the existing right-of-way. A realignment of the roadway through the spoil tailings area of Tarmac Mineral's Center Sand Mine has been proposed. Some additional takings may be required.

1.4 Stormwater Management System

A stormwater management system would be constructed per the requirements of the St. Johns River Water Management District. The system includes the construction of surface water and stormwater treatment ponds. The proposed ponds would be constructed entirely in the proposed right-of-way, generally located to the north of the existing right-of-way.

2.0 WETLAND DELINEATION AND IDENTIFICATION

2.1 Methodology

All potentially jurisdictional wetlands in the project area were mapped using aerial photography and field investigations. Each wetland area was evaluated based on the Corps of Engineers Wetlands Delineation Manual (1987) and the Unified Wetland Delineation Methodology for the State of Florida dated 1 July 1994 (62-340, Florida Administrative Code (F.A.C.).

Wetlands were classified using the system adopted by the FDOT as detailed in the Florida Land Use, Cover, and Forms Classification System (FLUCFCS) (FDOT, 1999) and the system adopted by the U.S. Fish and Wildlife Service as detailed in the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, et. al, 1979)

2.2 Wetland Baseline Descriptions

No wetlands or jurisdictional surface waters were identified within the project corridor during the field investigation.

Additional wetlands and surface waters were found adjacent to the existing right-of-way, but do not appear to be within the proposed right-of-way. These areas include a large excavated borrow pond (FLUCFCS 533) on the north side of the roadway in the Tarmac Minerals property, and a herbaceous marsh (FLUCFCS 641) on the north side of the roadway south of Johns Lake. These areas or additional areas may need to be reviewed in greater detail during the siting of the surface water management ponds for the proposed roadway improvements.

2.2.1 Size and Classification

The proposed project area contains no jurisdictional wetlands.

2.2.2 Contiguity

There are no wetlands hydrologically connected to waters of the United States within the project corridor.

2.2.3 Vegetative Structural Diversity

No wetlands occur within the Hartwood Marsh Road project corridor. The wetlands associated with Johns Lake (located north of the existing roadway) has no wetland canopy species. The wetlands are characterized by a shrub layer consisting of buttonbush (*Cephalanthus occidentalis*) and scattered slash pine (*Pinus elliottii*) along the edge, with a central herbaceous area dominated by maidencane (*Panicum hemitomon*), umbrella pennywort (*Hydrocotyle umbellata*), and broomsedge (*Andropogon* sp.).

2.2.4 Edge Relationships

There are no wetlands within the project corridor to which edge relationships may be discussed.

2.2.5. Wildlife Habitat Value

There are no wetlands located within the project corridor within which to evaluate wildlife habitat. Wetlands located on adjacent properties or associated with Johns Lake likely provide the more significant wildlife habitat within the region.

2.2.6 Hydrologic Function

There are no wetlands within the Hartwood Marsh Road project corridor. The wetlands located adjacent to the corridor likely serve some pollution abatement function and water detention functions during rain events, as the surface water runoff from the roadway and surrounding lands appears to sheet flow to this area. The adjacent wetlands would likely provide some level of ground water recharge function.

2.2.7 Public Use

There are no on-site wetlands to provide recreational, scientific, food, fiber source, or public water supply system use. The off-site wetlands are on private land and, therefore, would not provide public use functions.

2.2.8 Integrity

The off-site wetlands appear to support viable wetland communities, although it appears that the adjacent pine plantation has encroached due to historic drought.

2.3 Wetland Rapid Assessment Procedure (WRAP) Analysis

2.3.1 Methodology

A functional analysis of each wetland is typically conducted using the Wetland Rapid Assessment Procedure (WRAP), Technical Publication REG-001, South Florida Water Management District (1999). The WRAP analysis establishes a numerical ranking for individual ecological and anthropomorphic variables for each wetland and provides an assessment of wetland function.

The WRAP variables used in the analysis are:

- Wildlife Utilization
- Wetland Overstory/Shrub Canopy
- Wetland Vegetative Ground Cover
- Adjacent Upland Support/Wetland Buffer
- Field Indicators of Wetland Hydrology
- Water Quality Input and Treatment Systems.

2.3.2 Field Evaluation

The project corridor was reviewed during field inspections by Lotspeich and Associates personnel on 3 October 2003 and 13 October 2003.

2.3.3 WRAP Scores

Each variable is scored based on a set of descriptions. A score of 3 is considered the best a system can function and 0 is for a system that is severely impacted and is exhibiting negligible attributes. An evaluator has the option to score variables at half increments. The scores are then summed for each wetland and then divided by the total possible score.

3.0 WETLAND IMPORTANCE TO THE SURROUNDING COMMUNITY

Due to the fact that no wetlands occur within the project corridor, no WRAP analysis was conducted for this study.

4.0 WETLAND INVOLVEMENT

The secondary and cumulative effects of wetland involvement in the project were not assessed due to the absence of wetlands within the project corridor.

5.0 EVALUATION OF AVOIDANCE/MINIMIZATION AND MITIGATION MEASURES

5.1 Avoidance/Minimization

All wetland involvement (including adjacent wetlands) could be avoided by implementing the No Build alternative.

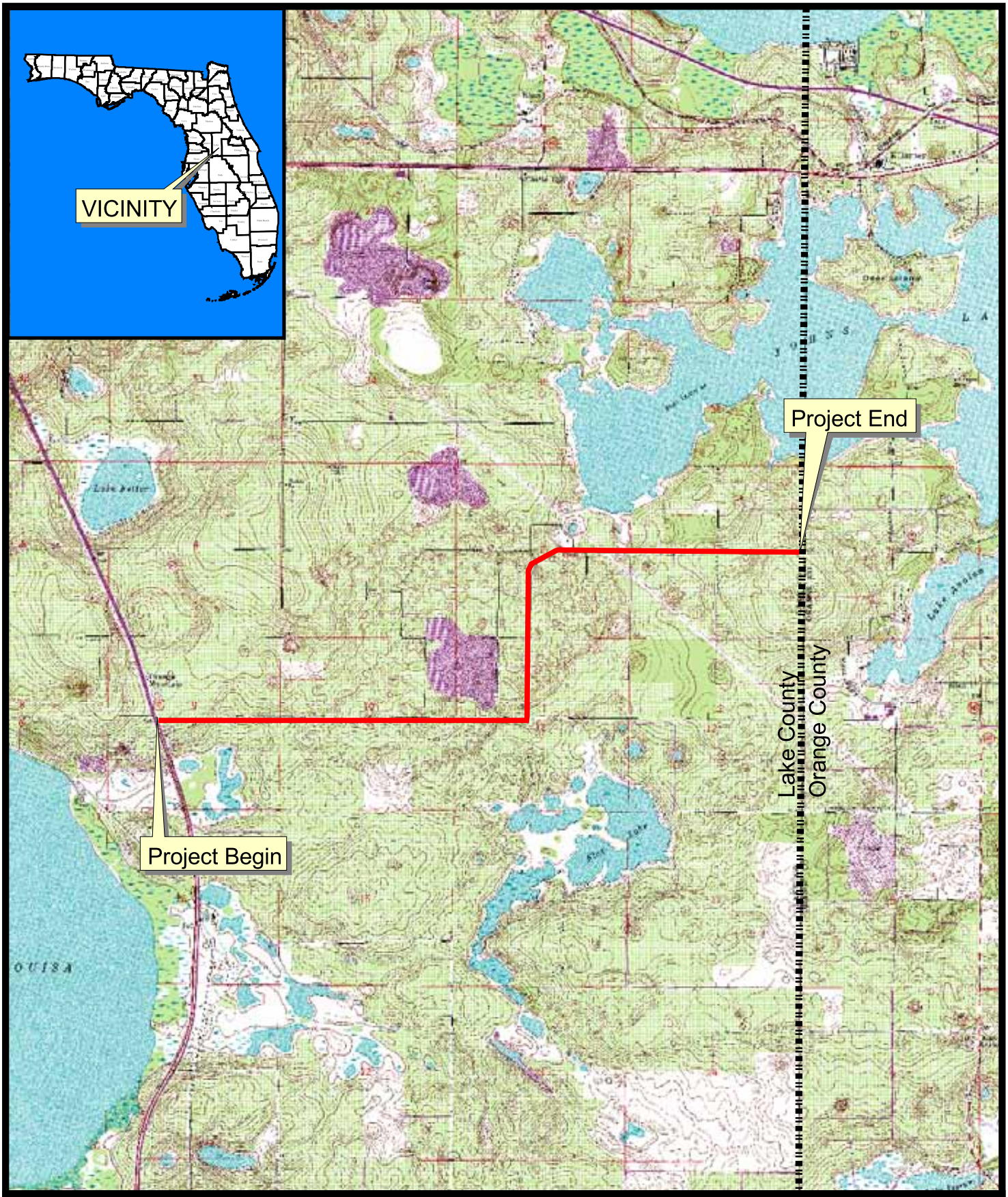
Only one Build Alternative was studied in this analysis. The alternative does not directly impact nor indirectly influence wetlands within or immediately adjacent to the proposed right-of-way. Surface water management ponds have yet to be sited, and involvement of adjacent wetlands may occur in the future. Additional study of the effects of the future surface water management ponds will likely be required. Best management practices for erosion and sediment control would be used to prevent temporary changes to off-site wetland areas that may abut the proposed project area.

5.2 Mitigation Measures

Any wetland alterations would be mitigated through use of a mitigation option that is deemed acceptable to regulatory agencies, such as the use of a permitted mitigation bank.

6.0 CONCLUSIONS

There are no wetlands under federal jurisdiction within the proposed project area. There is one wetland considered to be waters of the State adjacent to the roadway. The wetland is hydrologically isolated from other waters of the State or waters of the United States. The "Build Alternative" would not appear to alter nor affect this wetland as the right-of way is proposed to be extended approximately 120 feet to the north, while the wetland is approximately 175 feet north of the right-of-way. The U.S. Army Corps of Engineers (USACE) is unlikely to claim this off-site wetland per the U.S. Supreme Court decision, **Solid Waste Agency of Northern Cook County (SWANCC) v. U.S. Army Corps of Engineers, No. 99-1178 (January 9, 2001)**, that has resulted in the USACE no longer exerting jurisdiction over most isolated wetlands under Section 404 of the Clean Water Act. The SJRWMD will likely exert jurisdiction over this wetland. Based on the size of the contributing watershed for the roadway expansion, the project would require an Individual ERP from the SJRWMD.



Lotspeich and Associates, Inc
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Hartwood Marsh Road Study

5.0+/- linear miles in
Sections 1, 2, 9, 10, and 11, Township 23 South, Range 26 East
Lake County, Florida

Location Map

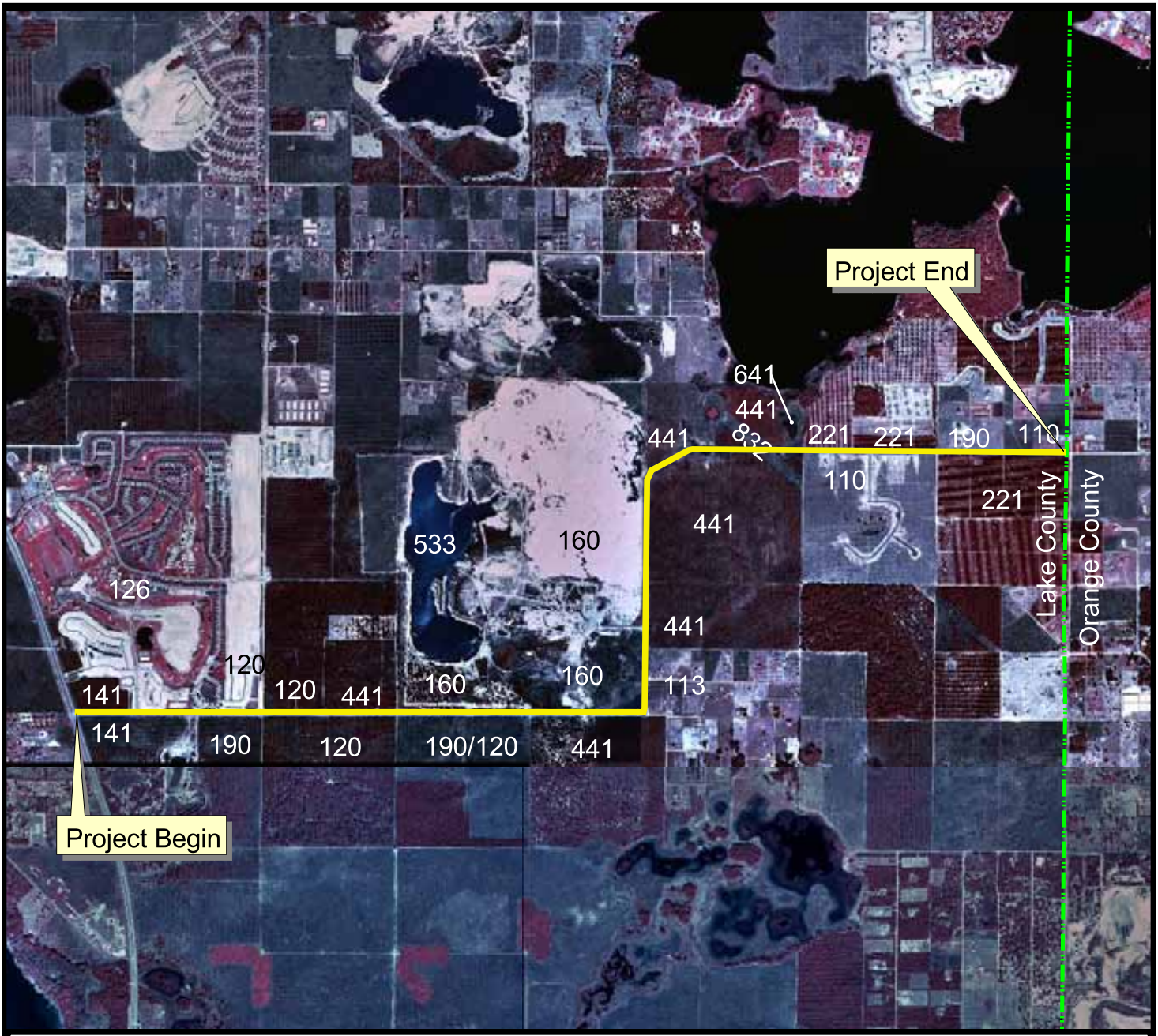
Source: USGS Topography, 2001,
Clermont East and Lake Louisa Quadrangles

North

Scale: 1" = 4000'

Figure 1

File:2002-267J29.APR | Drawn By: JM | Job No.:2002-267.33 | Date: 29 Oct. 2003



Legend

110 Residential, Low Density
113 Residential, Low Density, Mixed Units
120 Residential, Medium Density
126 Medium Density with Golf Courses
141 Retail Sales & Services
160 Extractive
190 Open Land
190/120 Open Land/Residential, Medium Density
221 Citrus Groves
441 Coniferous Plantation
641 Herbaceous Marsh
832 Electrical Power Transmission LInes

Existing Roadway
County Line

Notes:

Land Use delineation based on aerial photointerpretation and groundtruthing. This is not a survey.

Classification based on Florida Land Use, Cover and Forms Classification System (FLUCFCS), FDOT, 1999.

Project limits as provided by TEI, Inc.

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Hartwood Marsh Road Study

5.0+/- linear miles in
Sections 1, 2, 9, 10, and 11, Township 23 South, Range 26 East
Lake County, Florida

Existing Land Use Map

Source: Florida Department of Environmental Protection, 1999

North

Scale: 1" = 3000'

Figure 2

File:2002-267J29.APR | Drawn By: DJS | Job No.:2002-267.33 | Date: 29 Oct. 2003

Appendix F

Wildlife and Habitat Evaluation Report
Contamination Screening

WILDLIFE AND HABITAT EVALUATION REPORT

Hartwood Marsh Road

5± miles *in* Sections 1, 2, 9, 10, and 11, Township 23 South, Range 26 East
Lake County, Florida

Prepared for :

Lake County Public Works
P.O. Box 7800
Tavares, Florida 32778-7800

Submitted to :

TEI Engineers and Planners, Inc.
300 Primera Boulevard, Suite 200
Lake Mary, Florida 32746

10 October 2003
L&A No. 2002-267.41
Doc: \2002-267-WILDLIFERPT-J10.wpd

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Hartwood Marsh Road Study

5± miles *in* Sections 1, 2, 9, 10, and 11, Township 23 South, Range 26 East
Lake County, Florida
Doc: \2002-267-WILDLIFERPT-J10.wpd

1.0 INTRODUCTION

Lake County's Public Works Department (Lake County) is proposing the widening of an approximately 5± mile segment of Hartwood Marsh Road from U.S. Highway 27 to the Lake County/Orange County line (Figure 1). This Wildlife and Habitat Evaluation was conducted to determine the potential involvement of state and federally listed wildlife species in the project and to evaluate potential effects the project may have on such species as required by Section 7 of the Endangered Species Act.

1.1 Project Description

The project study limits include 5± miles of the Hartwood Marsh corridor. The western limits of the project begin at the intersection of Hartwood Marsh Road and U.S. Highway 27. The eastern limits of the project are the Lake County/Orange County line.

1.2 Alternatives

1.2.1 No-Build

The existing roadway facility would remain as is under the No-Build alternative.

Hartwood Marsh Road is currently a two-lane rural road with uncontrolled access.

1.2.2 Build

The Build Alternative (proposed project) includes the construction of a four-lane roadway and an associated stormwater management system. The construction would include the addition of two lanes to the existing Hartwood Marsh Road and the realignment of portions of the existing roadway. The majority of the new construction would take place largely in the existing right-of-way. A realignment of the roadway through the spoil tailings area of Tarmac Mineral's Center Sand Mine has been proposed. Some acquisition of new right-of-way may be required.

2.0 THREATENED AND ENDANGERED SPECIES

2.1 Methodology

A wildlife and habitat evaluation was conducted on the study area to determine the potential involvement with state and/or federally protected species per the methodology described in Chapter 27 of the (FDOT) PD&E Manual (revised 10-01-91). The study included database searches and field surveys of the study area. Database search requests were sent to the Florida Fish and Wildlife Conservation Commission (FFWCC), the Florida Natural Areas Inventory (FNAI), and the U.S. Fish and Wildlife Service (USFWS). The proposed study area was surveyed by representatives of Lotspeich and Associates on 3 October 2003.

2.2 Results

2.2.1 Database Search Results

Database records were received from the USFWS, the FNAI, and the FFWCC. The FFWCC identified one record of a bald eagle (*Haliaeetus leucocephalus*) nest occurring in Section 36, Township 22 South, Range 26 East, which is located approximately 0.5 mile north of the study area along the shoreline of Johns Lake near Eddy Drive (Appendix A). The FNAI provided a comprehensive inventory of listed and ranked species (those species considered to be "rare" by the FNAI but not listed by the FFWCC or the USFWS) (Appendix B). These records include several species confirmed to occur in Lake County, but with no possibility of occurrence in the vicinity of the study area (e.g., the Florida manatee). The USFWS also provided a comprehensive list of protected animals and plants that are known to occur in Lake County, but not necessarily in the study area (Appendix C). No site specific records were provided by the USFWS. The probability that any of the wildlife species identified in the database searches would occur in the proposed study area is summarized in Tables 1 and 2.

2.2.2 Field Survey Results

The field survey found that the proposed study area consists largely of maintained road rights-of-way, fallow and active citrus groves, and coniferous plantations, and that there is little native habitat remaining (Figure 2). The remaining native habitats are limited to upland pockets in the area of the Tarmac Minerals sand mine, and disturbed uplands proposed for planned development in the western portion of the study area. Many of the adjacent properties located outside the existing rights-of-way have been converted to cattle grazing pasture or commercial development.

Gopher tortoise (*Gopherus polyphemus*) burrows and one tortoise were observed within the remnant upland habitats and citrus groves adjacent to the Tarmac Minerals sand mine. Gopher tortoise burrows were also observed in the berm that separates the sand mine property from the existing right-of-way. Suitable habitat for the Eastern indigo snake (*Drymarchon corais couperi*) occurs throughout the study area, although none were observed during the field survey. There were no other critical habitats for state or federally listed animals or plants found in the study area during the field survey.

Table 1 summarizes the probability that the state and federally listed animals and federally listed plants may occur in the study area. Several species listed in Table 1, such as the Florida scrub-jay, the red-cockaded woodpecker, the American alligator, and the West Indian manatee, have no probability of occurring in the study area due to the apparent lack of suitable habitat. A low probability of occurring in the study area was assessed for several species that may have habitat descriptions that correspond to areas in or adjacent to the proposed study area, but are not expected to occur in the study area due to the low quality of the existing habitat. Each of the species specifically identified by the USFWS, the FFWCC, or field survey are addressed below.

2.3 Federally Listed Species

2.3.1 Sand Skink

No individuals or signs of sand skink were observed during the field investigations. The suitable sand skink habitat is restricted to remnants of historic sandhill communities and sand pine plantations adjacent to the right-of-way. These areas were observed to have significant herbaceous growth and duff layers, and would not be considered optimal habitat for this species, as the absence of dense ground cover is considered a key feature of suitable habitat. Thus, the proposed road improvements should not adversely affect the sand skink.

2.3.2 Bald Eagle

A bald eagle nest is documented as occurring approximately 0.5 mile north of the proposed corridor along the shoreline of Johns Lake near Eddy Drive. No eagles were observed during the site investigations conducted for this project. Coordination with the USFWS prior to construction is recommended to confirm the status of the nest at that time. There should not be any limitations on any proposed construction due to the presence of the nest as apparent flight lines and foraging areas are directed away from the roadway.

2.3.3 Eastern Indigo Snake

Suitable upland habitats for the Eastern indigo snake were found adjacent to the proposed study area. The Eastern indigo snake is found in a variety of habitats. This snake prefers undisturbed upland habitats in close proximity to water or wetlands, but is also found in developed areas such as golf courses and residential developments. Standard Protection Measures for the Eastern Indigo Snake (Appendix D) will be implemented to avoid any adverse effects on this species.

2.3.4 Wood Stork

The wood stork is primarily associated with freshwater habitats. Typical foraging sites for the wood stork include freshwater marshes and ponds, shallow, seasonally flooded roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, and depressions in cypress heads and swamp sloughs. Although these habitat types occur adjacent to the roadway corridor, none are anticipated to be affected by the proposed improvements. Therefore, no adverse effects upon wood storks are anticipated.

2.4 State Listed Wildlife

Several species identified by the FNAI and FFWCC are listed by the State FFWCC, but not listed by the USFWS. Each of these species are discussed below.

2.4.1 Florida Black Bear

No individuals or signs of black bear were observed during the field investigations. FNAI reports that black bear occur in Lake County; however, it is likely that these occurrences are in northern Lake County associated with the Wekiva River Basin or the Ocala National Forest. No suitable bear habitat is contained in the proposed study area. Thus, the proposed road improvements should not adversely affect this species.

2.4.2 Wading Birds

Several species of wading birds, including the limpkin, little blue heron, snowy egret, tricolored heron, and white ibis, likely utilize the wetlands and lakes located adjacent to the Hartwood Marsh Road corridor. The proposed roadway improvements should in no way affect the use of these habitats by the wading birds, and it is unlikely that the proposed action would have any adverse effect on these species.

2.4.3 Least Tern

Least terns were not observed in the proposed study area during the field surveys. The least tern nests in open sandy habitats with shell fragments along the coasts of Florida. Although the sand mine area contains open sandy areas, it is unlikely that the proposed corridor would impact any suitable habitat, and it is unlikely that the project would have any adverse effect on this species.

2.4.4 Gopher Tortoise and Commensals

There were gopher tortoises and active burrows observed in the study area during the field review. It is likely that the proposed roadway improvements would have an effect on this species. If gopher tortoises are identified in the actual construction footprint, coordination with the FFWCC will be conducted to develop an appropriate management plan. The gopher frog and the Florida mouse typically inhabit the burrow of gopher tortoises, and may be located in the burrows noted along the roadway corridor. Any management plan developed for the gopher tortoise would also address these commensal species.

2.4.5 Florida Pine Snake and Short Tailed Snake

Suitable upland habitats for the Florida pine snake and the short-tailed snake were found adjacent to the proposed study area. The snakes are found in a variety of habitats. These snakes prefer undisturbed upland habitats on well-drained soils, but occasionally are found in abandoned fields. Implementation of the Standard Protection Measures for the Eastern Indigo Snake (Appendix D) should serve to prevent any adverse effects upon these species.

2.4.6 Southeastern American Kestrel

Southeastern American kestrels were not observed in the proposed study area during the field surveys, but have been previously observed in the vicinity of the project. The kestrel typically feeds along the edges of forested areas, on farm lands, and cleared lands. Although the proposed roadway improvements will impact these foraging areas within the study area, new edges and openings will be created by the proposed improvements, and sufficient foraging habitat for kestrels should remain once the project is completed. Adverse effects upon this species are not anticipated as a result of the proposed action.

2.5 Secondary and Cumulative Effects

2.5.1 Secondary Effects

The proposed project is not anticipated to have any adverse secondary effects on the regional wildlife habitat. The proposed study area is largely confined to the existing right-of-way and does not provide greater access to new undeveloped lands. The adjacent land uses in the north portion of the site are largely developed. The undeveloped agricultural and silvicultural lands that comprise the majority of the central and eastern portions of the site have road access to meet their current development designations in the City of Clermont and Lake County future land use plans. The development of these areas is dependent on other factors separate from this project.

2.5.2 Cumulative Effects

Construction within the proposed study area will not affect any critical wildlife habitat. The proposed project is largely contained in the existing road right-of-way that is largely unsuitable for most wildlife species. The few natural areas remaining in the right-of-way consist of remnant fragments of a sandhill plant community that are not currently proposed to be affected by the proposed action. Similarly, the areas outside the current right-of-way include remnant fragments of sandhill, as well as coniferous plantation, citrus groves, and cleared lands. These areas do not provide any significant habitat value. There are several residential development projects planned along the existing roadway corridor. It appears that these development projects will be initiated prior to or concurrent to the proposed action, and do not appear to be directly related to the proposed improvements. Thus, it is unlikely that the proposed project will result in any cumulative regional loss of wildlife habitat.

3.0 CONCLUSIONS

It is likely that the proposed project will affect gopher tortoises and their commensal species where the footprint of the proposed roadway improvements crosses through occupied habitat. It is unlikely that the proposed action would affect any other threatened or endangered species based on the review of existing state and federal wildlife databases and field surveys described in this report. These conclusions do not exclude the possibility that listed species may occasionally forage on-site or may move onto the site at a later date. For this reason, pre-

construction surveys for gopher tortoise burrows and new bald eagle nests are recommended. In addition, the use of Standard Protection Measures for the Eastern Indigo Snake should be employed as a matter of precaution.

Table 1. State and Federal Listed Plant Species Documented in Lake County and the Potential for Occurrence within the Hartwood Marsh Road Study Area.
Source: Lotspeich and Associates, Inc.

SCIENTIFIC NAME COMMON NAME	DESIGNATED STATUS		HABITAT	LIKELIHOOD OF OCCURRENCE	OBSERVED
	FDACS	FWS			
Asclepias curtissii Curtis' milkweed	E	-	Sand pine scrub, dry hammocks, flatwoods; May-Sep	Low - Limited suitable habitat	---
Bonamia grandiflora Florida bonamia	E	T	Scrub; Apr-Sep	Low - Limited suitable habitat	---
Calamintha ashei Ashe's calamintha	T	-	Dry pinelands and sand pine scrub, disturbed areas; Jan-Nov	Low - Limited suitable habitat	---
Carex chapmanii Chapman's sedge	E	-	Hammocks, woodlands; Spring	Unlikely - No suitable habitat	---
Celosia nitida Slender celosia	E	-	Hardwood hammocks, coastal dunes; Summer	Unlikely - No suitable habitat	---
Centrosema arenicola Sand butterfly pea	E	-	Open, mixed woodlands, pine or oak-palmetto thickets; Summer-Fall	Unlikely - No suitable habitat	---
Chionanthus pygmaeus Pygmy fringe-tree	E	E	Low nutrient levels, sandy, dry soil of Central Florida scrub; Mar-Apr	Unlikely - No suitable habitat	---
Cleistes divaricata Spreading pogonia	T	-	Low pinelands and savannas, pitcher-plant bogs, swamps, stream banks; Apr-Jun	Unlikely - No suitable habitat	---
Clitoria fragrans Butterfly-pea	E	T	Turkey oak, sandy soil, scrub, scrubby flatwoods, roadside; Apr-Jul	Low - Limited suitable habitat	---
Coelorachis tuberculosa Florida jointtail	T	-	Marshes, margins of ponds; Jun-Jul	Unlikely - No suitable habitat	---
Cucurbita okeechobeensis Okeechobee gourd	E	-	Wet hammocks, ditch banks; Mar-May	Unlikely - No suitable habitat	---
Drosera intermedia Water sundew	T	-	Seepage slopes, wet flatwoods, depression marshes, sinkhole lakes, drainage ditches; Apr-Nov	Unlikely - No suitable habitat	---
Encyclia tampensis Florida butterfly orchid	C	-	Mangrove, cypress and hardwood swamps and hammocks; Jun-Jul	Unlikely - No suitable habitat	---
Epidendrum conopseum Green-fly orchid	C	-	Cypress and hardwood swamps, moist hammocks; all year	Unlikely - No suitable habitat	---
Eriogonum floridanum Scrub buckwheat	E	T	Scrub, sandhill, longleaf pine; all year	Low - Limited suitable habitat	---
Eulophia ecristata Non-crested eulophia	T	-	Sand pine scrub, sandhills, pine rockland; Jul-Sep	Low - Limited suitable habitat	---

Table 1 - continued

SCIENTIFIC NAME COMMON NAME	DESIGNATED STATUS		HABITAT	LIKELIHOOD OF OCCURRENCE	OBSERVED
	FDACS	FWS			
Garberia heterophylla Garberia	T	-	Dry sand pine or pine oak scrub and prairies; Summer-Fall	Unlikely - No suitable habitat	---
Hartwrightia floridana Hartwrightia	T	-	Wet flatwoods, bogs, seepage slope clearings, pine woods; Sep-Nov	Unlikely - No suitable habitat	---
Hasteola robertiorum Gulf hammock indian-plantain	E	-	Hydric hammocks, on muck soils; Oct	Unlikely - No suitable habitat	---
Hexalectris spicata Crested coralroot	E	-	Pine-hickory woods; secondary woods, calcareous hammocks; Jun-Aug	Unlikely - No suitable habitat	---
Illicium parviflorum Star anise	E	-	Bottom land forest, wet hammock; Apr-Jun	Unlikely - No suitable habitat	---
Justicia cooleyi Cooley's water-willow	E	-	Rocky woods, moist to seasonally wet; Aug-Dec	Unlikely - No suitable habitat	---
Lechea cernua Scrub pinweed	T	-	Sandy openings in scrub, fire maintained; Jul-Jan	Low - Limited suitable habitat	---
Lilium catesbaei Catesby's lily	T	-	Wet flatwoods, bogs, usually with grasses; Jul-Oct	Unlikely - No suitable habitat	---
Listera australis Double-leaf orchid	T	-	Low moist woods, sphagnum moss, stream banks; Jan-Mar	Unlikely - No suitable habitat	---
Lobelia cardinalis Cardinal flower	T	-	Riverbanks, springs, coastal hammocks; Jul-Oct	Unlikely - No suitable habitat	---
Lycopodium cernuum Nodding club-moss	C	-	Wet depressions, ditches, moist areas	Unlikely - No suitable habitat	---
Matelea floridana Florida spiny pod	E	-	Bluffs, pine-oak-hickory woods; Apr-Aug	Unlikely - No suitable habitat	---
Matelea pubiflora Sandhill spiny pod	E	-	Sandhills and scrubs; Spring-Summer	Low - Limited suitable habitat	---
Monotropa hypopithys Pine-sap	E	-	Upland woods	Low - Limited suitable habitat	---
Najas filifolia Slender naiad	T	-	Submerged in water	Unlikely - No suitable habitat	---
Nemastylis floridana Fall-flowering ixia	E	-	Clearings in swamps, marshes, and wet pine flatwoods; Jul-Nov	Unlikely - No suitable habitat	---
Nolina brittoniana Britton's beargrass	E	E	Dry pinelands and sand pine scrub; Mar-May	Low - Limited suitable habitat	---
Osmunda cinnamomea Cinnamon Fern	C	-	Swamps and wetlands; Spring	Unlikely - No suitable habitat	---
Osmunda regalis Royal fern	C	-	Swamps and wetlands; all year	Unlikely - No suitable habitat	---

Table 1 - continued

SCIENTIFIC NAME COMMON NAME	DESIGNATED STATUS		HABITAT	LIKELIHOOD OF OCCURRENCE	OBSERVED
	FDACS	FWS			
Paronychia chartacea Papery whitlow-wort	E	T	Scrub vegetation, shores of karst lakes; Jun-Dec	Low - Limited suitable habitat	---
Pinguicula caerulea Blue flowered butterwort	T	-	Sandy to sandy-peaty soils of pine flatwoods, ditches and roadsides; Dec-May	Low - Limited suitable habitat	---
Pinguicula lutea Yellow flowered butterwort	T	-	Sandy to sandy-peaty soils of pine flatwoods, ditches and roadsides, and seepage bogs; Feb-May	Low - Limited suitable habitat	---
Platanthera blephariglottis White-fringed orchid	T	-	Marshes, meadows, bogs, depressions in pine savannas; Aug-Sep	Unlikely - No suitable habitat	---
Platanthera ciliaris Yellow-fringed orchid	T	-	Marshes, swamps, bogs, pine savannahs and flatwoods, floodplain forests, forest slopes; Aug-Sep	Unlikely - No suitable habitat	---
Platanthera flava Gypsy-spikes	T	-	Mud flats, floodplain swamps, meadows, swales; Mar-Oct	Unlikely - No suitable habitat	---
Platanthera nivea Snowy orchid	T	-	Bogs, wet pine savannahs and flatwoods, wet prairies; May-Jun	Unlikely - No suitable habitat	---
Pogonia ophioglossoides Rose pogonia	T	-	Sphagnum bogs, meadows, swamps, pine savannas, pine flatwoods, prairies; Mar-May	Unlikely - No suitable habitat	---
Polygala lewtonii Lewton's polygala	E	E	White sand, scrub; Feb-May	Low - Limited suitable habitat	---
Polypodium plumula Plume polypody	E	-	Hammocks; all year	Low - No suitable habitat	---
Polypodium ptilodon Swamp plume polypody	E	-	Hammocks and swamps; all year	Unlikely - No suitable habitat	---
Prunus geniculata Scrub plum	E	E	Sand pine scrub; Feb-Mar	Unlikely - No suitable habitat	---
Rhapidophyllum hystrix Needle palm	C	-	River bluffs, ravine slopes, bottomlands	Unlikely - No suitable habitat	---
Salix floridana Florida willow	E	-	Wet hammocks, dense bottomland forests, stream margins, swamps; Feb-Apr	Unlikely - No suitable habitat	---
Sarracenia minor Hooded pitcher-plant	T	-	Flatwoods, bogs, ditches; Mar-May & Sep	Unlikely - No suitable habitat	---
Spiranthes laciniata Lace-lip ladies' tresses	T	-	Shore swamps, marshes, flatwoods, wet sandy soils; Apr	Unlikely - No suitable habitat	---
Spiranthes tuberosa Little pearl-twist	T	-	Dry acid soil, open pine-palmetto woods, pine flatwoods; Jun	Unlikely - No suitable habitat	---

Table 1 - continued

SCIENTIFIC NAME COMMON NAME	DESIGNATED STATUS		HABITAT	LIKELIHOOD OF OCCURRENCE	OBSERVED
	FDACS	FWS			
Stenorrhynchos lanceolatus Little pearl-twist	T	-	Open pastures, roadside, wet pine flatwoods, sandhills; Apr-Jul	Low - Limited suitable habitat	---
Tillandsia utriculata Giant wild-pine	E	-	Hammocks, cypress swamps, pinelands	Unlikely - No suitable habitat	---
Triphora trianthophora Three-birds orchid	T	-	Hammocks, rich woods; Jul-Nov	Unlikely - No suitable habitat	---
Vicia ocalensis Ocala vetch	E		Open moist areas, banks of thickets and marshes; Apr-May	Unlikely - No suitable habitat	---
Warea amplexifolia Clasping warea	E	E	Dry pinelands and sandhill; Aug-Oct	Low - Limited suitable habitat	---
Zamia floridana Florida coontie	C	-	Scrub, oak hammock, well-drained sandy or loamy soils; Fall-Winter	Low - Limited suitable habitat	---
Zephranthes atamasco Rainlily	T	-	Low ground, rich moist woods, wet pastures & meadows, limestone out-crops in woods; Spring	Unlikely - No suitable habitat	---
Zephranthes simpsonii Simpson's zephyr-lily	T	-	Wet pinelands and pastures, roadsides; Spring	Unlikely - No suitable habitat	---
Zephranthes treatiae Treat's zephyr-rainlily	T	-	Wet pine flatwoods, fire maintained, roadsides; Spring	Unlikely - No suitable habitat	—

LEGEND:

E = Endangered
T = Threatened
C = Commercially exploited
FDACS = Florida Department of Agriculture and Consumer Services (1996)
FWS = U.S. Fish and Wildlife Service

Table 2. State and Federal Listed Animal Species Documented in Lake County and the Potential for Occurrence within the Hartwood Marsh Road Study Area.
Source: Lotspeich and Associates, Inc.

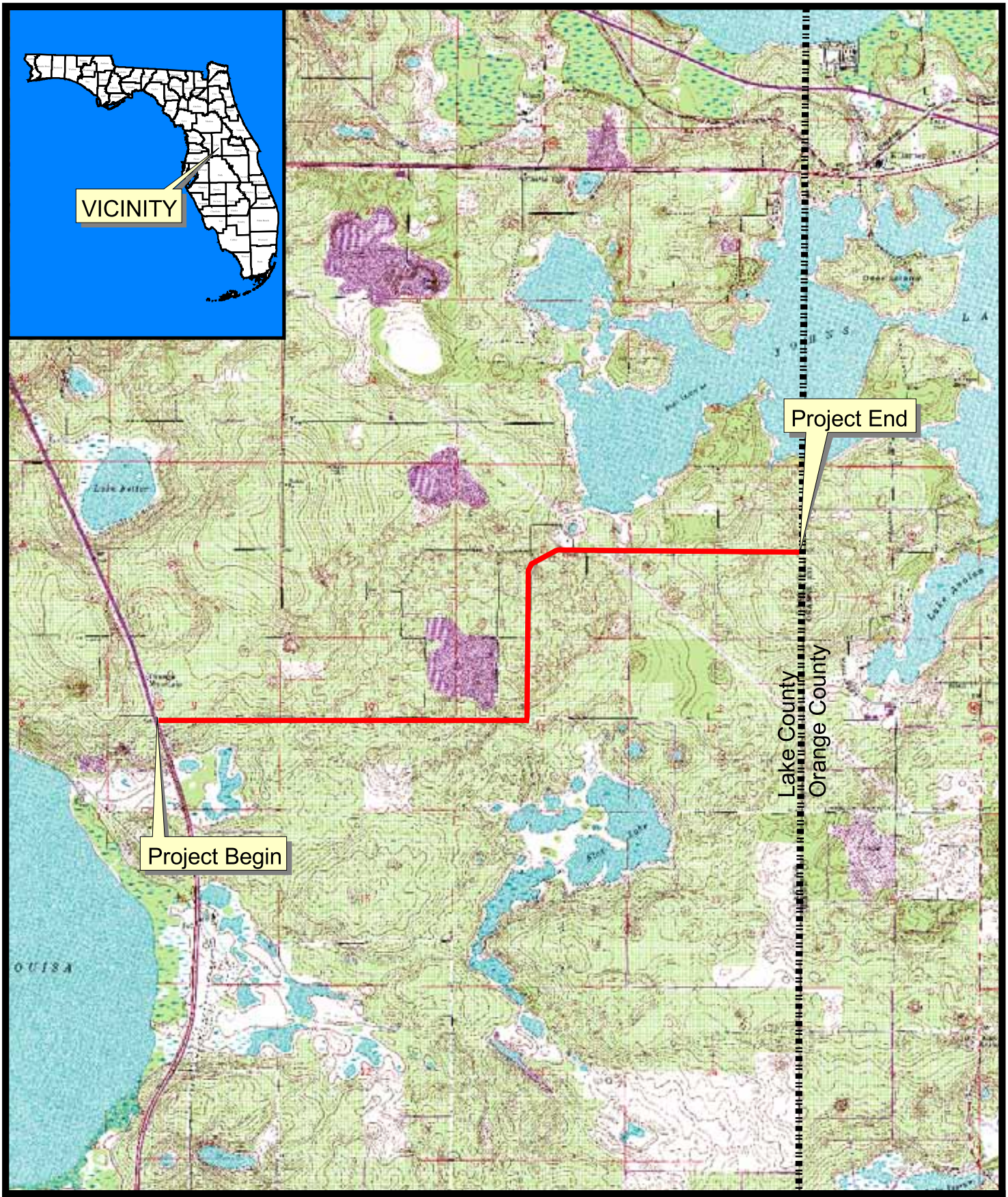
SCIENTIFIC NAME COMMON NAME	DESIGNATED STATUS		HABITAT	LIKELIHOOD OF OCCURRENCE	OBSERVED
	FWC	FWS			
BIRDS					
Aphelocoma coerulescens Florida scrub jay	T	T	Oak scrub with open ground	Unlikely - No suitable habitat	---
Aramus guarauna Limpkin	SSC	-	Slow-moving freshwater rivers, marshes, and lakeshores	Low - Limited suitable habitat	---
Egretta caerulea Little blue heron	SSC	-	Marshes, lakeshores, ponds, ditches, and pastures	Low - Limited suitable habitat	---
Egretta thula Snowy egret	SSC	-	Marshes, lakeshores, ponds, ditches, and pastures	Low - Limited suitable habitat	---
Egretta tricolor Tricolored heron	SSC	-	Marshes, lakeshores, ponds, ditches, and pastures	Low - Limited suitable habitat	---
Eudocimus albus White ibis	SSC	-	Shallow freshwater and estuarine wetlands	Low - Limited suitable habitat	---
Falco peregrinus tundrius Arctic peregrine falcon	E	-	Coastal areas. Needs plentiful supply of birds for food, perches for roosting and feeding	Low - Limited suitable habitat	---
Falco sparverius paulus Southeastern American kestrel	T	-	Forest ecotone, urban areas, farm lands, and clearings	Moderate - Suitable habitat present	---
Grus canadensis pratensis Florida sandhill crane	T	-	Wet prairies, littoral zones, and wet pastures; nests in pickerelweed-maidencane marshes	Low - Limited suitable habitat	---
Haliaeetus leucocephalus Southern bald eagle	T	T	Coastal areas, large lakes, and river shorelines; nests near water bodies	Moderate - Suitable habitat present	---
Mycteria americana Wood stork	E	E	Marshes, ponds, and lagoons; nests in cypress and mangrove swamps	Low - Limited suitable habitat	---
Picoides borealis Red-cockaded woodpecker	T	E	Mature longleaf and slash pine forests with open mid-story	Unlikely - No suitable habitat	---
Rostrhamus sociabilis Snail kite	E	E	Freshwater marsh	Unlikely - No suitable habitat	---
Speotyto cunicularia Burrowing owl	SSC	-	Open grassland, prairies, farm land, pastures, and airfields; can be found in urban settings	Low - Limited suitable habitat	---
Sterna antillarum least tern	T	-	Open flat sand or gravel, spoil areas, and roof-tops; adjacent to coastal areas	Low - Limited suitable habitat	---
MAMMALS					
Podomys floridanus Florida mouse	SSC	-	Sand pine scrub, coastal scrub, scrubby flatwoods, and sandhills	Low - Limited suitable habitat	---

Table 2 - continued

SCIENTIFIC NAME COMMON NAME	DESIGNATED STATUS		HABITAT	LIKELIHOOD OF OCCURRENCE	OBSERVED
	FWC	FWS			
Sciurus niger shermani Sherman's fox squirrel	SSC	-	Longleaf pine-turkey oak sandhills and flatwoods	Low - Limited suitable habitat	---
Trichechus manatus latirostris West Indian manatee	E	E	St. Johns River and its major tributaries	None - No suitable habitat	---
Ursus americanus floridanus Florida black bear	T	-	Pine flatwoods, cypress swamps, hardwood swamp, sand pine scrub, and mixed hardwoods	Unlikely - No suitable habitat	---
FISH					
Cyprinodon variegatus habbsi Lake Eustis pupfish	SSC	-	Sandhill upland lakes; all year	None - No suitable habitat	---
Pteronotropis welaka Bluenose shiner	SSC	-	Blackwater stream; all year	None - No suitable habitat	---
AMPHIBIANS AND REPTILES					
Alligator mississippiensis American alligator	SSC	-	Lakes, ponds, sloughs, and marshes	Low - Limited suitable habitat	---
Drymarchon corais couperi eastern indigo snake	T	-	Varied habitat from wet prairie to xeric pineland and scrub	Moderate - Suitable habitat present	---
Gopherus polyphemus gopher tortoise	SSC	-	Sandhills, sand pine scrub, live oak hammocks, palmetto prairie, pine flatwoods, abandoned grove, and pasture	High - Suitable habitat present	Observed
Neoseps reynoldsi sand skink	T	-	Rosemary scrub, sand pine scrub, oak scrub, and scrubby flatwoods	Low - Limited suitable habitat	---
Pituophis melanoleucus mugitus Florida pine snake	SSC	-	Longleaf pine-xeric oak, sand pine scrub, dry pine flatwoods, and abandoned fields on well drained soils	Moderate - Suitable habitat present	---
Pseudemys concinna suwanniensis Suwannee cooter	SCC	-	Alluvial stream, blackwater stream, spring-run stream; all year	Unlikely - No suitable habitat	---
Rana capito gopher frog; crawfish frog	SSC	-	Sandhill, pine flatwoods, and sand pine scrub; needs ephemeral marshes for breeding	Moderate - Suitable habitat present	---
Stilosoma extenuatum Short-tailed snake	T	-	Turkey oak-longleaf pine, occasionally upland hammock, and sand pine scrub	Moderate - Suitable habitat present	—

LEGEND:

E = Endangered
T = Threatened
T(s/a) = Threatened due to similarity of appearance
SSC = Species of Special Concern
FWC = Florida Fish and Wildlife Conservation Commission (29 April 1996)
FWS = U.S. Fish and Wildlife Service



Lotspeich and Associates, Inc
ECOLOGICAL CONSULTANTS
2711 West Fairbanks Avenue, Winter Park, Florida 32789
(407) 740-8482 Fax - 645-1305 www.lotspeichandassociates.com

Hartwood Marsh Road Study

5.0+/- linear miles in
Sections 1, 2, 9, 10, and 11, Township 23 South, Range 26 East
Lake County, Florida

Location Map

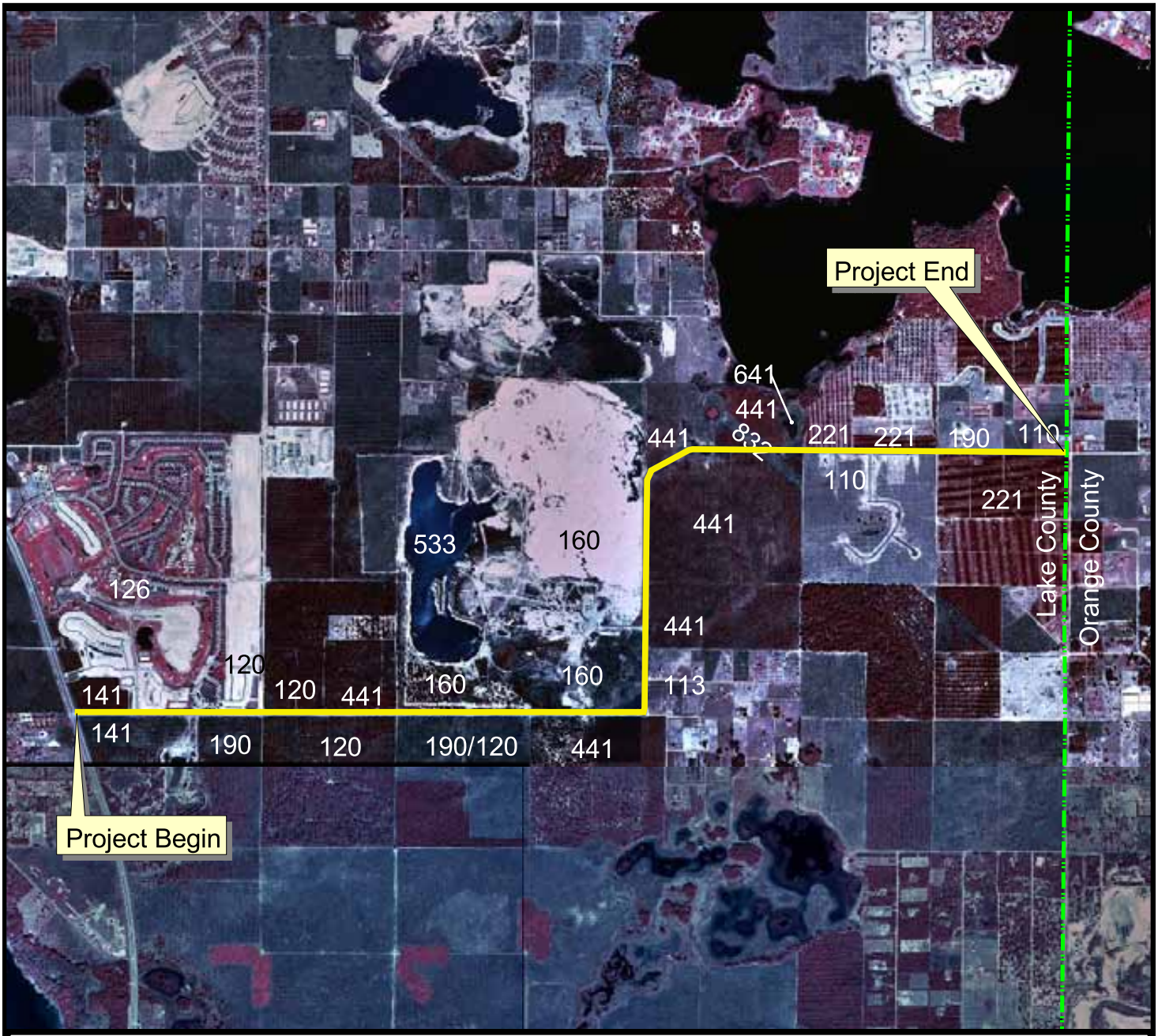
Source: USGS Topography, 2001,
Clermont East and Lake Louisa Quadrangles

North

Scale: 1" = 4000'

Figure 1

File:2002-267J29.APR | Drawn By: JM | Job No.:2002-267.33 | Date: 29 Oct. 2003



Legend

110 Residential, Low Density
113 Residential, Low Density, Mixed Units
120 Residential, Medium Density
126 Medium Density with Golf Courses
141 Retail Sales & Services
160 Extractive
190 Open Land
190/120 Open Land/Residential, Medium Density
221 Citrus Groves
441 Coniferous Plantation
641 Herbaceous Marsh
832 Electrical Power Transmission LInes

Existing Roadway
County Line

Notes:

Land Use delineation based on aerial photointerpretation and groundtruthing. This is not a survey.

Classification based on Florida Land Use, Cover and Forms Classification System (FLUCFCS), FDOT, 1999.

Project limits as provided by TEI, Inc.

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Hartwood Marsh Road Study

5.0+/- linear miles in
Sections 1, 2, 9, 10, and 11, Township 23 South, Range 26 East
Lake County, Florida

Existing Land Use Map

Source: Florida Department of Environmental Protection, 1999

North

Scale: 1" = 3000'

Figure 2

File:2002-267J29.APR | Drawn By: DJS | Job No.:2002-267.33 | Date: 29 Oct. 2003

APPENDIX A

Lotspeich and Associates, Inc.

ECOLOGICAL CONSULTANTS, 2711 WEST FAIRBANKS AVENUE, WINTER PARK, FLORIDA 32789-3314
TELEPHONE: 407-740-8482 FAX: 407-645-1305 WWW.LOTSPEICHANDASSOCIATES.COM

CONFERENCE MEMO TO FILE

PROJECT	Hartwood Marsh Road	**DATE**	10/03/03
WITH	State of Florida Fish and Wildlife Conservation Commission		
TELEPHONE #		**L&A Job#**:	2002-267.45

ITEMS DISCUSSED

This Site is located:

in Sections 1, 2, 9, 10, and 11, Township 23 South and Range 26 East

Lake County, Florida

Approximate center: Latitude: 28°30.01'N Longitude: 81° 41.03'W

Area Searched:

3 mile radius of Latitude/Longitude:28°30.85'N; 81° 39.47'W; 28°30.01'N, 81° 41.03'W; 28°30.01'N; 81° 43.15'W

Following the search procedures for the FFWCC's Eagle nest locator database (2002), there is **one** nest within one (1) mile of the project study area.

Nest LA130 is located at Sec. 36, T22S, R26E, approximately 0.5 miles north of a portion of the study corridor

Other nest(s) close to study area:

Nest LA026 is located at Sec. 23, T22S, R26E, approximately 2.7 miles north of a portion of the study corridor

RESEARCH INFO

Research sources: http://wld.fwc.state.fl.us/eagle/eaglenests/nestsearch **Information Last Updated**: **7 February 2003**

"This site is compiled and maintained by Wildlife Technology Services in the Division of Wildlife for the Florida Fish and Wildlife Conservation Commission. Bald eagle nest location data are current as of the end of the 2002 nesting season (mid-April 2002). This database contains records for all known and verified bald eagle nests in the state of Florida that were surveyed by the FWC during the period of 1998-2002. Nests discovered more recently than this are not yet included in the database. Each year, a number of new nest sites are found. For this reason, users of this database are cautioned that the absence of an eagle nest record for a given property does not necessarily mean nesting eagles are not present. This nest locator service is not meant to replace a specific on-the-ground survey."

Topo Quad(s): Clermont East

ACTION ITEMS REQUIRED

CC: FILE/RLT DJS SIGN: Ann

S:\PROJECTS\2002\02-267 - Hartwood Marsh Road PD&E\2002-267-eaglememo.wpd

Instructions for use of the "Map" and "Topo" buttons:

Clicking on the MAP button near the end of a nest row links to a website that displays the nest location on an interactive road map. You can zoom and shift the view area of the map and control the level of detail displayed. You can return to the list of found nests by using the "Back" browser button.

Clicking on the TOPO button at the end of a nest row links to a website that displays the nest location on a printable portion of a USGS 1:100,000 scale topographic map. The name of the USGS 1:24,000 scale quad map on which the nest is located is displayed above the map, and additional USGS quad map information can be accessed by clicking on the "Quad Info" link. When the "printer dialog" box displays, you can choose to print the map immediately or cancel the printer dialog in order to view the map first. You can return to the list of found nests by using the "Back" button on your browser.

Please Note: The nest location map accessed by the TOPO or MAP buttons is not an adequate substitute for careful plotting of FWC eagle nest location coordinates on an accurate small-scale topographic paper map or Geographic Information System (GIS) electronic map. This feature is provided only to allow the user to view the general location of a nest and to confirm that an appropriate area of interest was targeted by the user's search. Careful plotting of a nest location on an accurate map is not an adequate substitute for a specific on-the-ground survey of the nest site.

Eagle nests within 5 miles of latitude 28° 30.76', longitude 81° 41.03'.

							Active Territory?						Relative location			Maps	
County	NestID	Longitude	Latitude	Township	Range	Section	98	99	00	01	02	Last	Distance	Bearing	Direction	Road	Topo
Lake	LA026	81 41.20	28 33.10	22S	26E	23	Y	Y	Y	Y	Y	2002	2.7	356	N	MAP	TOPO

Nearby Eagle nest search results

Page 1 of 1

Instructions for use of the "Map" and "Topo" buttons:

Clicking on the MAP button near the end of a nest row links to a website that displays the nest location on an interactive road map. You can zoom and shift the view area of the map and control the level of detail displayed. You can return to the list of found nests by using the "Back" browser button.

Clicking on the TOPO button at the end of a nest row links to a website that displays the nest location on a printable portion of a USGS 1:100,000 scale topographic map. The name of the USGS 1:24,000 scale quad map on which the nest is located is displayed above the map, and additional USGS quad map information can be accessed by clicking on the "Quad Info" link. When the "printer dialog" box displays, you can choose to print the map immediately or cancel the printer dialog in order to view the map first. You can return to the list of found nests by using the "Back" button on your browser.

Please Note: The nest location map accessed by the TOPO or MAP buttons is not an adequate substitute for careful plotting of FWC eagle nest location coordinates on an accurate small-scale topographic paper map or Geographic Information System (GIS) electronic map. This feature is provided only to allow the user to view the general location of a nest and to confirm that an appropriate area of interest was targeted by the user's search. Careful plotting of a nest location on an accurate map is not an adequate substitute for a specific on-the-ground survey of the nest site.

Eagle nests within 1 miles of latitude 28° 30.85', longitude 81° 40.05'.

							Active Territory?						Relative location			Maps	
County	NestID	Longitude	Latitude	Township	Range	Section	98	99	00	01	02	Last	Distance	Bearing	Direction	Road	Topo
Lake	LA130	81 40.10	28 31.30	22S	26E	36	Y	Y	Y	Y	Y	2002	0.5	354	N	MAP	TOPO

One nest found.

Search again

0 0.3 0.6 0.9 1.2 1.5 km

0 0.2 0.4 0.6 0.8 1 mi

Map center is 28.5217°N, 81.6683°W (NAD27)
Clermont East quadrangle
Projection is UTM Zone 17 NAD83 Datum

MN
GN

MN=-4.669
GN=0.319

APPENDIX B

Species and Natural Community Summary for Lake County

Fish Amphibians Reptiles Birds Mammals Invertebrates Plants Natural Communities Other

Explanations and Definitions: Global/State Rank, Federal/State Status Occurrence Status

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	Occurrence Status
FISH						
Ameiurus brunneus	snail bullhead	G4	S3	N	N	C
Cyprinodon variegatus hubbsi	Lake Eustis pupfish	G5T2Q	S2	N	LS	C
Enneacanthus chaetodon	blackbanded sunfish	G4	S3	N	N	C
Petromyzon marinus	sea lamprey	G5	SA	N	N	P
Pteronotropis welaka	bluenose shiner	G4	S4	N	LS	C
AMPHIBIANS						
Notophthalmus perstriatus	striped newt	G2G3	S2S3	N	N	P
Rana capito	gopher frog	G4	S3	N	LS	C
REPTILES						
Alligator mississippiensis	American alligator	G5	S4	T(S/A)	LS	C
Clemmys guttata	spotted turtle	G5	S3?	N	N	P
Crotalus adamanteus	eastern diamondback rattlesnake	G5	S3	N	N	C
Drymarchon corais couperi	eastern indigo snake	G4T3	S3	LT	LT	C

Gopherus polyphemus	gopher tortoise	G3	S3	N	LS	C
Lampropeltis calligaster	mole snake	G5	S2S3	N	N	P
Neoseps reynoldsi	sand skink	G2	S2	LT	LT	C
Pituophis melanoleucus mugitus	Florida pine snake	G5T3?	S3	N	LS	C
Pseudemys concinna suwanniensis	Suwannee cooter	G5T3	S3	N	LS	P
Sceloporus woodi	Florida scrub lizard	G3	S3	N	N	C
Stilosoma extenuatum	short-tailed snake	G3	S3	N	LT	C
BIRDS						
Accipiter cooperii	Cooper's hawk	G4	S3?	N	N	P
Aimophila aestivalis	Bachman's sparrow	G3	S3	N	N	P
Aphelocoma coerulescens	Florida scrub-jay	G3	S3	LT	LT	C
Aramus guarauna	limpkin	G5	S3	N	LS	C
Ardea alba	great egret	G5	S4	N	N	C
Buteo brachyurus	short-tailed hawk	G4?	S3	N	N	P
Egretta caerulea	little blue heron	G5	S4	N	LS	C
Egretta thula	snowy egret	G5	S4	N	LS	C
Egretta tricolor	tricolored heron	G5	S4	N	LS	C
Elanoides forficatus	swallow-tailed kite	G4	S2S3	N	N	P
Eudocimus albus	white ibis	G5	S4	N	LS	C
Falco columbarius	merlin	G5	SU	N	N	P
Falco peregrinus	peregrine falcon	G4	S2	LE	LE	P
Falco sparverius paulus	southeastern American kestrel	G5T3T4	S3?	N	LT	P
Grus canadensis pratensis	Florida sandhill crane	G5T2T3	S2S3	N	LT	C
Haliaeetus leucocephalus	bald eagle	G4	S3	LT	LT	C
Ixobrychus exilis	least bittern	G5	S4	N	N	P
Laterallus jamaicensis	black rail	G4	S3?	N	N	P
Mycteria americana	wood stork	G4	S2	LE	LE	C

Nyctanassa violacea	yellow-crowned night-heron	G5	S3?	N	N	P
Nycticorax nycticorax	black-crowned night-heron	G5	S3?	N	N	P
Pandion haliaetus	osprey	G5	S3S4	N	LS**	C
Picoides borealis	red-cockaded woodpecker	G3	S2	LE	LT	C
Picoides villosus	hairy woodpecker	G5	S3?	N	N	P
Plegadis falcinellus	glossy ibis	G5	S2	N	N	C
Speotyto cunicularia floridana	Florida burrowing owl	G4T3	S3	N	LS	C
Sterna antillarum	least tern	G4	S3	N	LT	P
MAMMALS						
Corynorhinus rafinesquii	Rafinesque's big-eared bat	G3	S3?	N	N	P
Mustela frenata olivacea	southeastern weasel	G5T4	S3?	N	N	P
Mustela frenata peninsulae	Florida long-tailed weasel	G5T3	S3?	N	N	P
Neofiber alleni	round-tailed muskrat	G3	S3	N	N	P
Podomys floridanus	Florida mouse	G3	S3	N	LS	C
Sciurus niger shermani	Sherman's fox squirrel	G5T2	S2	N	LS	C
Sorex longirostris longirostris	southeastern shrew	G5T5	S4	N	N	P
Trichechus manatus	manatee	G2?	S2?	LE	LE	C
Ursus americanus floridanus	Florida black bear	G5T2	S2	C	LT**	C
INVERTEBRATES						
Aphaostracon pycnus	dense hydrobe	G1	S1	N	N	C
Cincinnatia vanhyningi	Seminole Spring siltsnail	G1	S1	N	N	C
Procambarus delicatus	big-cheeked cave crayfish	G1	S1	N	N	C
VASCULAR PLANTS						

Aristida rhizomophora	Florida three-awned grass	G2	S2	N	N	C
Asclepias curtissii	Curtiss' milkweed	G3	S3	N	LE	C
Bonamia grandiflora	Florida bonamia	G3	S3	LT	LE	C
Calamintha ashei	Ashe's savory	G3	S3	N	LT	C
Carex chapmanii	Chapman's sedge	G3	S2	N	N	C
Centrosema arenicola	sand butterfly pea	G2	S2	N	N	C
Chionanthus pygmaeus	pygmy fringe tree	G3	S3	LE	LE	C
Clitoria fragrans	pigeon-wing	G3	S3	LT	LE	C
Coelorachis tuberculosa	piedmont jointgrass	G3	S3	N	N	C
Cyrilla arida	scrub leatherwood	G1Q	S1	N	N	C
Digitaria gracillima	longleaf crabgrass	G1	S1	N	N	C
Drosera intermedia	spoon-leaved sundew	G5	S3	N	LT	C
Eriogonum longifolium var *gnaphalifolium*	scrub buckwheat	G4T3	S3	LT	LE	C
Hartwrightia floridana	hartwrightia	G2	S2	N	LT	C
Hasteola robertiorum	Florida hasteola	G1	S1	N	LE	C
Ilex opaca var *arenicola*	scrub holly	G5T3	S3	N	N	C
Illicium parviflorum	star anise	G1G2	S1	N	LE	C
Justicia cooleyi	Cooley's water-willow	G1G2	S1S2	LE	LE	C
Lechea cernua	nodding pinweed	G3	S3	N	LT	C
Matelea floridana	Florida spiny-pod	G2	S2	N	LE	C
Monotropa hypopithys	pinesap	G5	S1	N	LE	C
Najas filifolia	narrowleaf naiad	G1	S1?	N	LT	C
Nemastylis floridana	fall-flowering ixia	G2	S2	N	LE	C
Nolina brittoniana	Britton's beargrass	G2	S2	LE	LE	C
Paronychia chartacea ssp *chartacea*	paper-like nailwort	G3T3	S3	LT	LE	C
Persea humilis	scrub bay	G3	S3	N	N	C
Polygala lewtonii	Lewton's polygala	G2	S2	LE	LE	C
Polygonella myriophylla	Small's jointweed	G3	S3	LE	LE	C

Prunus geniculata	scrub plum	G2G3	S2S3	LE	LE	C
Pteroglossaspis ecristata	wild coco	G2G3	S2	N	LT	C
Rhynchospora decurrens	decurrent beakrush	G3G4	S2	N	N	C
Salix floridana	Florida willow	G2	S2	N	LE	C
Stylisma abdita	scrub stylisma	G2G3	S2S3	N	LE	C
Vicia ocalensis	ocala vetch	G1	S1	N	LE	C
Warea amplexifolia	clasping warea	G1	S1	LE	LE	C
Warea carteri	Carter's warea	G1G2	S1S2	LE	LE	C
NATURAL COMMUNITIES						
Aquatic Cave		G3	S2	N	N	C
Basin Marsh		G?	S4?	N	N	C
Basin Swamp		G4?	S3	N	N	C
Baygall		G4?	S4?	N	N	C
Blackwater Stream		G4	S2	N	N	C
Bog		G?	S3	N	N	C
Depression Marsh		G4?	S3	N	N	C
Dome Swamp		G4?	S3?	N	N	C
Floodplain Swamp		G?	S4?	N	N	C
Hydric Hammock		G?	S4?	N	N	C
Marsh Lake		G4	S4	N	N	C
Mesic Flatwoods		G?	S4	N	N	C
River Floodplain Lake		G4?	S2	N	N	C
Sandhill Upland Lake		G3	S2	N	N	C
Sandhill		G2G3	S2	N	N	C
Scrubby Flatwoods		G3	S3	N	N	C
Scrub		G2	S2	N	N	C
Shell Mound		G3	S2	N	N	C
Sinkhole		G?	S2	N	N	C
Spring-run Stream		G2	S2	N	N	C

Strand Swamp		G4?	S4?	N	N	C
Upland Hardwood Forest		G?	S3	N	N	C
Wet Flatwoods		G?	S4?	N	N	C
Wet Prairie		G?	S4?	N	N	C
Xeric Hammock		G?	S3	N	N	C
OTHER						
Bird rookery				N	N	C
Geological feature				N	N	C

** See Rank and Status Explanations and Definitions, Special Animal Listings - Federal and State Status

County Occurrence Status

Vertebrates and Invertebrates:

C = (Confirmed) Occurrence status derived from a documented record in the FNAI data base.

P = (Potential) Occurrence status derived from a reported occurrence for the county or the occurrence lies within the published range of the taxon.

N = (Nesting) For sea turtles only; occurrence status derived from documented nesting occurrences.

Plants, Natural Communities, and Other:

C = (Confirmed) Occurrence status derived from a documented record in the FNAI data base or from a herbarium specimen.

R = (Reported) Occurrence status derived from published reports.

APPENDIX C

U.S. Fish & Wildlife Service

North Florida Field Office

Lake County Federally Listed Species

The following table lists those federally-listed species known to be present in the county.
Code Key: E = Endangered, T = Threatened, P = Proposed, C = Candidate, CH = Critical Habitat

Category	Species Common Name	Species Scientific Name	Code
Mammals	West Indian (Florida) Manatee	*Trichechus manatus latirostris*	E/CH
Birds	Bald Eagle	*Haliaeetus leucocephalus*	T
	Everglade Snail Kite	*Rostrhamus sociabilis plumbeus*	E
	Florida Scrub-jay	*Aphelocoma coeruluscens*	T
	Wood Stork	*Mycteria americana*	E
	Red-cockaded Woodpecker	*Picoides borealis*	E
Fish	None		
Reptiles	Sand Skink	*Neoseps reynoldsi*	T
	Eastern Indigo Snake	*Dymarchon corais couperi*	T
Amphibians	None		
Mollusks	None		
Crustaceans	None		
Plants	Britton's Beargrass	*Nolina brittoniana*	E
	Florida Bonamia	*Bonamia grandiflora*	T
	Pygmy Fringetree	*Chionanthus pygmaeus*	E
	Scrub Plum	*Prunus geniculata*	E
	Lewton's Polygala	*Polygala lewtonii*	E
	Wide-leaf Warea	*Warea Amplexifolia*	E
	Papery Whitlow-wort	*Paronychia chartacea (= Nyachia) pulvinata*	T
	Scrub Wild Buckwheat	*Eriogonum longifolium* var. *gnaphalifolium*	T
	Pigeon Wings	*Clitoria fragrans*	T

▶ County List ▶ Home

APPENDIX D

STANDARD PROTECTION MEASURES FOR THE EASTERN INDIGO SNAKE

1. An Eastern indigo snake protection/education plan shall be developed by the applicant or requestor for all construction personnel to follow. The plan shall be provided to the Service for review and approval at least 30 days prior to any clearing activities. The educational materials for the plan may consist of a combination of posters, videos, pamphlets, and lectures *(e.g.,* an observer trained to identify Eastern indigo snakes could use the protection/education plan to instruct construction personnel before any clearing activities occur). Informational signs should be posted throughout the construction site and along any proposed access road to contain the following information:

    a. a description of the Eastern indigo snake, its habits, and protection under Federal Law;
    b. instructions not to injure, harm, harass or kill this species;
    c. directions to cease clearing activities and allow the Eastern indigo snake sufficient time to move away from the site on its own before resuming clearing; and,
    d. telephone numbers of pertinent agencies to be contacted if a dead Eastern indigo snake is encountered. The dead specimen should be thoroughly soaked in water, then frozen.

2. If not currently authorized through an Incidental Take Statement in association with a Biological Opinion, only individuals who have been either authorized by a section l0(a)(l)(A) permit issued by the Service, or by the State of Florida through the Florida Fish and Wildlife Conservation Commission for such activities, are permitted to come in contact with or relocate an Eastern indigo snake.

3. If necessary, Eastern indigo snakes shall be held in captivity only long enough to transport them to a release site; at no time shall two snakes be kept in the same container during transportation.

4. An Eastern indigo snake monitoring report must be submitted to the appropriate Florida Field Office within 60 days of the conclusion of clearing phases. The report should be submitted whether or not Eastern indigo snakes are observed. The report should contain the following information:

    a. any sightings of Eastern indigo snakes;
    b. summaries of any relocated snakes if relocation was approved for the project *(e.g.,* locations of where and when they were found and relocated);
    c. other obligations required by the Florida Fish and Wildlife Conservation Commission, as stipulated in the permit.

Revised July 27, 1999

CAUTION!

Federal & State Protected Species

Eastern Indigo Snake
(*Drymarchon corais couperi*)

- If encountered, do not injure, harm, harass or kill this snake. Doing so is punishable by fines and/or jail.

- Cease work and allow suffient time for the snake to move out of the work area.

- Report all sightings <u>immediately</u> (dead or alive) to:

Lotspeich and Associates, Inc.
2711 W. Fairbanks Ave.
Winter Park, FL 32789
Phone: (407) 740-8482
Fax: (407)645-1305

DESCRIPTION:

The Eastern Indigo Snake is the largest snake in North America. **This snake is Non-poisonous!** Adults average between 5 - 8 feet in length, hatchlings are 1.5 - 2 feet in length. The coloration of this snake is a glossy blue-black over the entire body, although portions of the chin, throat, and sides of the head may be reddish.

Young Adult

LIFE CYCLE:

Breeding takes place in late fall, winter, or early spring. About 5 - 11 eggs are laid in early summer under logs or other suitable cover. The eggs hatch in August or September.

Adult

HABITAT:

The Eastern Indigo Snake lives in pine - scrub oak woods, pine flatwoods, and forested sandhills. In the warmer summer months, Indigos also frequent streams and swamps. The Indigo has a strong association with the State protected Gopher Tortoise, whose burrows may be used for dens.

HABITS:

The Eastern Indigo Snake is typically quite docile when approached. It may slowly move out of the way or seek cover under leaves or nearby brush. Striking and erratic movements are not typical of the Indigo.

PROTECTION:

The Eastern Indigo Snake is designated as a Federally Threatened Species. **It is illegal to injure, harm, harass or kill this species per the Endangered Species Act.** Doing so can result in fines and or jail. **If an Eastern Indigo Snake is present during land clearing activities, you are to cease clearing activities and allow the snake sufficient time to move away from the site before resuming clearing activities.** Report sightings to designated parties on reverse side of phamplet.

Adult

Adult

Adult

REPORT EASTERN INDIGO SNAKE SIGHTINGS IMMEDIATELY TO:

Lotspeich and Associates, Inc. 2711 W. Fairbanks Ave.
Winter Park, FL 32789

Phone: (407) 740-8482
Fax: (407) 645-1305

•If a dead Indigo Snake is encountered, soak the animal in water then freeze. Call U.S. Fish and Wildlife Service immediately at:

U.S. Fish and Wildlife Service 1339 20th St.
Vero Beach, FL 32960

Phone: (772) 562-3909
Fax: (772) 562-4288

•Questions or concerns may be directed to:

Jay Slack - Supervisor
USFWS Vero Beach
Phone: (772) 562-3909

OR

Tom Logan - Endangered Species Coordinator
FFWCC Tallahassee
Phone: (850) 921-5987

Federal & State Protected Species

Eastern Indigo Snake (*Drymarchon corais couperi*)

Pamphlet, signs, and lectures are conducted in accordance with the July 1999 Standard Protection Measures For The Eastern Indigo Snake per the U.S. Fish and Wildlife Service.

Appendix G
Contamination Screening

Appendix H
Geotechnical Data