CHAPTER 3:
ANALYSIS

Introduction

This chapter documents the results of the two FSUTMS network alternatives based on the methodology provided in Chapter 2. Alternative 1 included the future road network with an interchange on the Florida Turnpike (SR 91) approximately six miles north of the SR 50 interchange. Alternative 2 included the future road network without this interchange. This analysis is discussed below and includes the forecast number of lanes, level of congestion, volumes, and the anticipated cost of each alternative.

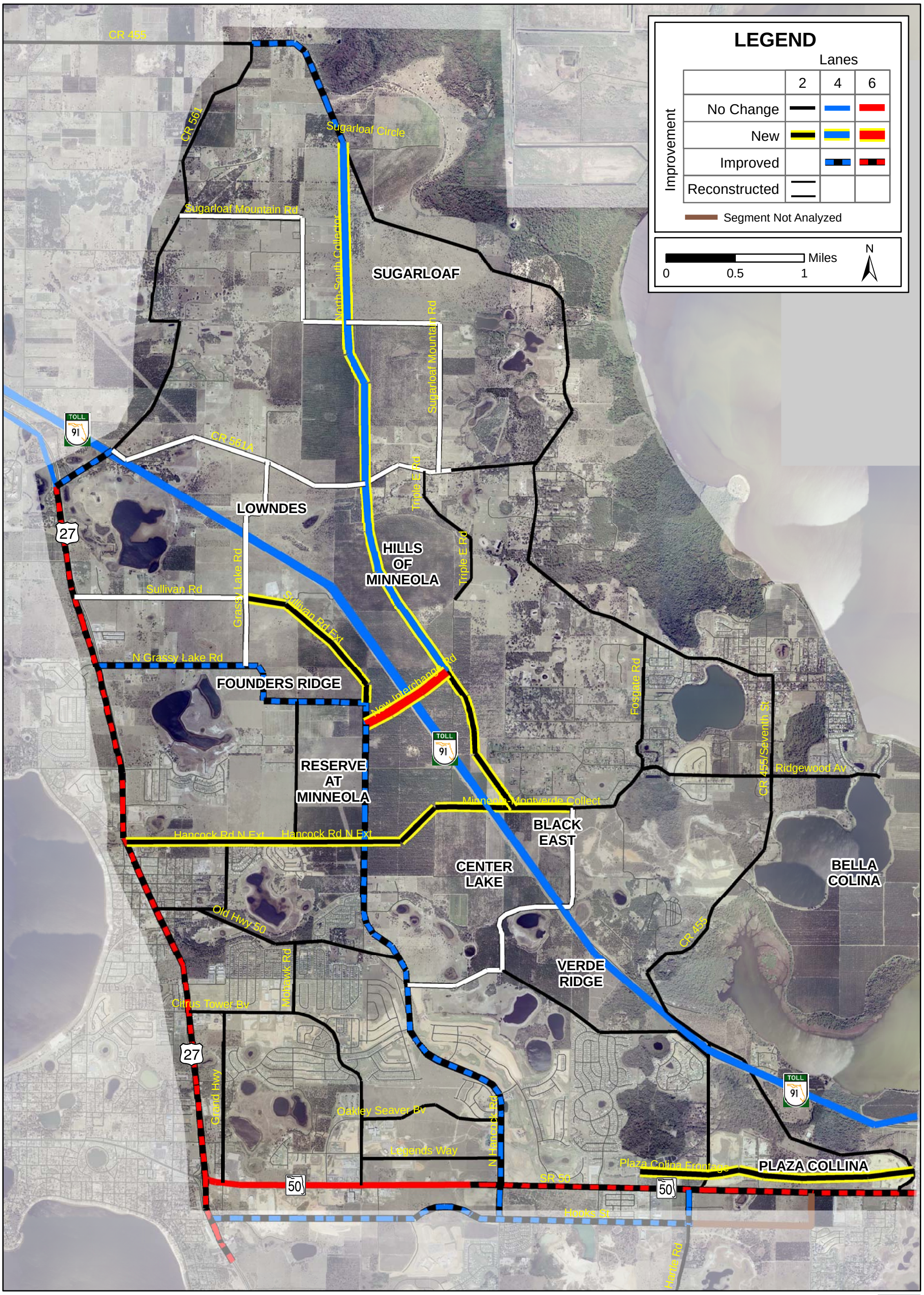
Number of Lanes and Improvements

The future number of lanes and improvements for each alternative was forecasted based on the use of FSUTMS travel demand model forecasts and professional judgment. Figure 3-1 illustrates the number of lanes and improvements for Alternative 1 with the interchange on the Florida Turnpike while Figure 3-2 illustrates the number of lanes and improvements for Alternative 2 without the interchange. These Figures illustrate the needed improvements using the original future number of lanes network. These improvements reflect the anticipated capacity improvements required to meet the forecast travel demand for each alternative. The improvements illustrated in the Figures are categorized by the following;

- No Change – indicates no improvement required to an existing roadway in the network.
- New - indicates the required construction of a new road.
- Improved - indicates a capacity enhancement that results in an increase of the number of lanes from the existing conditions.
- Reconstructed - indicates the reconstruction an existing rural roadway to meet current standards for urban roadways.

Both alternatives identify the need for new major roadways. These new roadways include roadways that are included in the County 2005-2009 Transportation Program that includes programmed and funded, programmed and unfunded, or unprogrammed roadways. These roadways are summarized below;

- Plaza Collina Reverse Frontage Road from South Greater Hills Blvd to the Orange County Line. (Unprogrammed)
- Hancock Road North Extension C-1354 from C-50, north on Turkey Farm Road to Grassy Lake Road and west to US-27, Phase I of II. (Programmed and Unfunded)



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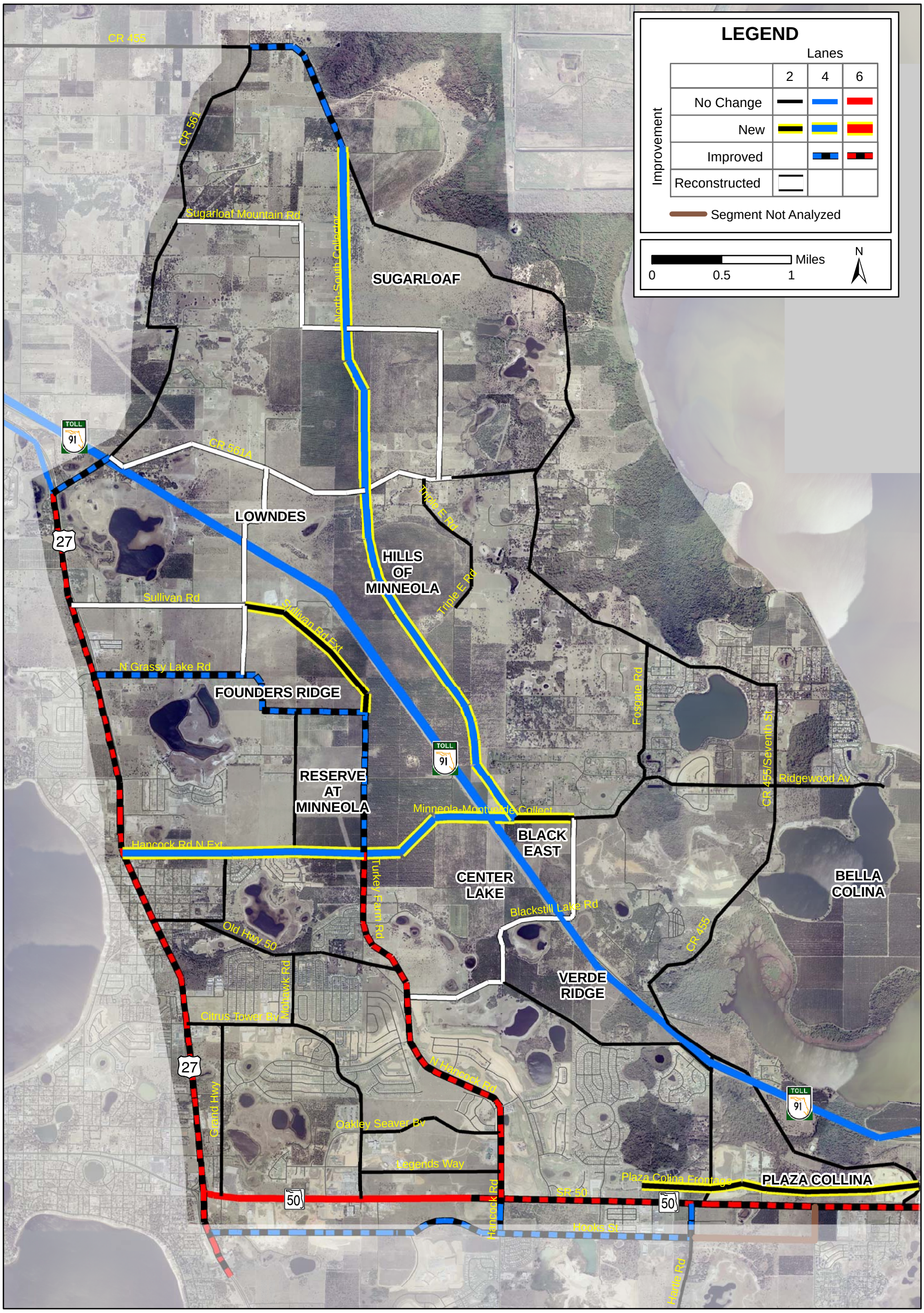
MINNEOLA RIDGE AREA-WIDE TRAFFIC STUDY

Alternative 1: With Turnpike Interchange
Future Number of Lanes and Improvements

Figure 3-1

Figure 3-1



MINNEOLA RIDGE AREA-WIDE TRAFFIC STUDY

Alternative 2: Without Turnpike Interchange
Future Number of Lanes and Improvements

Figure 3-2

Figure 3-2

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- Minneola-Montverde Collector from North Hancock Road Extension to Blackstill Lake Road C-1850 (Programmed and Unfunded)
- Fosgate Road C-1860/Blackstill Lake Road C-1757 from intersection to new Florida Turnpike Interchange (Programmed and Unfunded)
- North-South Collector from proposed Florida Turnpike interchange to CR 455 (Unprogrammed).
- Sullivan Road Extension from Grassy Lake Road to Turkey Farm Road (Programmed and Unfunded)

The most obvious difference between the two alternatives is the new Turnpike interchange approximately six miles north of the existing SR 50 interchange. This new interchange creates an alternative north-south corridor when combined with N. Hancock Road and the new North-South Collector. Without the interchange more travel demand will be likely on N. Hancock Road, N. Hancock Road Extension, Minneola-Montverde Collector, and the North-South Collector. This increased travel demand results in the need for additional capacity improvements to the non-Turnpike alternative on the following roadways:

- N. Hancock Road is forecasted to require 6 lanes in Alternative 2, compared to 4 lanes in Alternative 1.
- N. Hancock Road Extension and the Minneola-Montverde Connector forecasted to require 4 lanes in Alternative 2, compared to 2 lanes in Alternative 1.
- North-South Collector from Fosgate Road to the new turnpike interchange is forecasted to require 4 lanes in Alternative 2, compared to 2 lanes in Alternative 1.

In summary, both network alternatives illustrate the demand for an additional north-south and east-west corridor. Alternative 1, based on the location of the new turnpike interchange, distributes trips more evenly across the network and thus requires less extensive capacity improvements. The Turnpike interchange creates a new distribution point for using the Turnpike for regional vehicle trips that would otherwise be forced to use US 27 or SR 50. This interchange combined with N. Hancock Road and the North-South Collector creates alternative north-south corridor and subsequently provides viable east-west alternatives to SR 50. Alternative 2 places additional travel demand from SR 50 onto N. Hancock Road, N. Hancock Road Extension, and the Minneola-Montverde Collector. This additional travel demand results in the need for additional lane capacity improvements.

Level of Congestion

The future level of congestion compares the volume of a specific roadway to its maximum service volume. The forecasted volumes were derived from the FSUTMS travel demand models developed for each alternative. The maximum service volume for each roadway is derived from the 2002 FDOT Quality Level of Service Handbook's Generalized Daily Level of Service Volume Tables. These tables summarized the maximum service volumes for a given level of service based on the roadway characteristics. For this study, a level of service standard of C was used for the Florida Turnpike. All other roads were assumed to have a level of service standard of D. Table 3-1 summarized the generalized service volumes used in calculating the level of congestion.

Table 3-1: Generalized Maximum Service Volumes

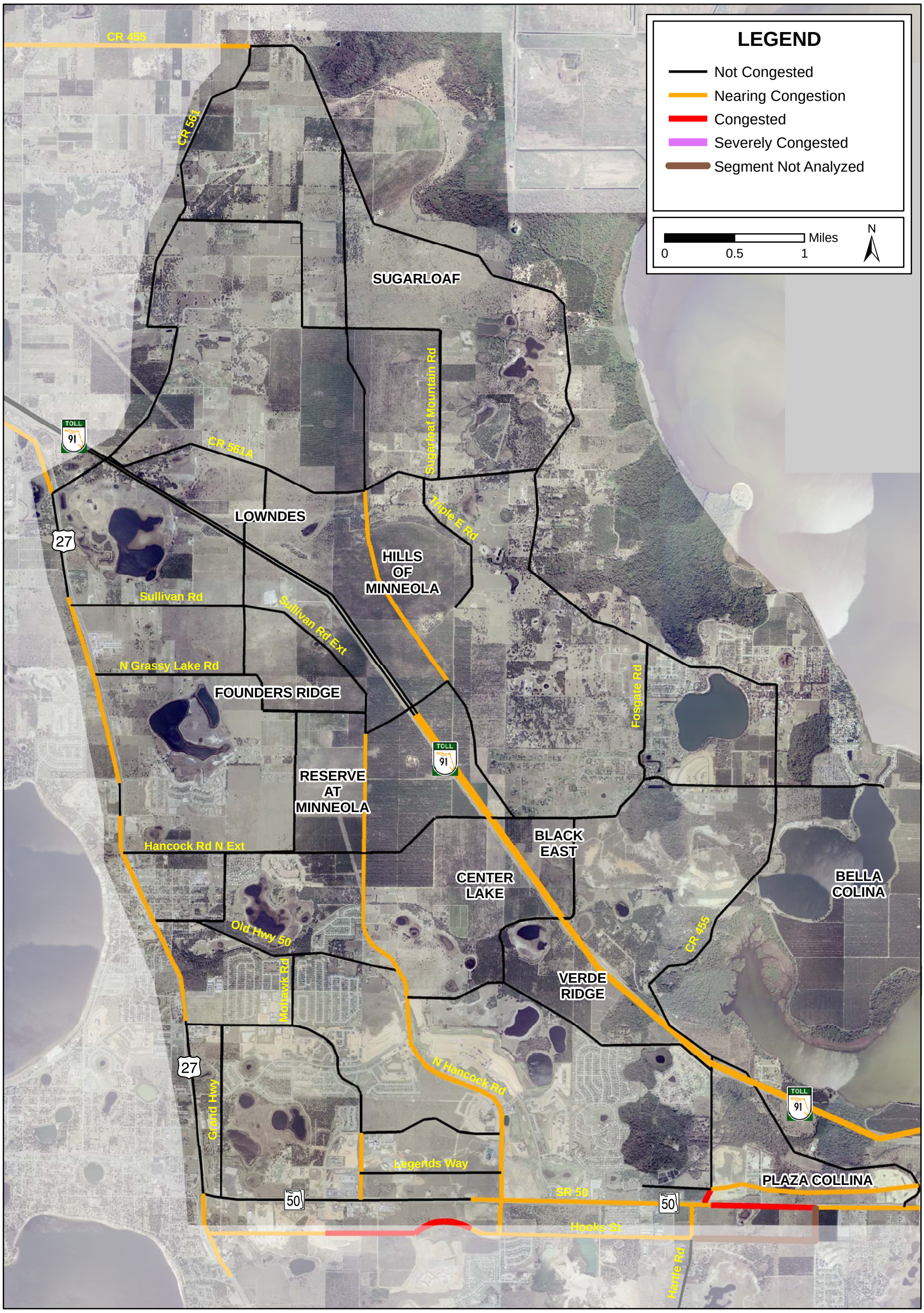
Facility Type	Area Type	Facility Type Description	Area Type Description	Maximum Service Volume (@ Los D) [1]			
				2 Lanes	4 Lanes	6 Lanes	8 Lanes
21	33	Divided Arterial Unsignalized (55mph)	Transitioning	13,600	29,300	44,100	67,800
22	21	Divided Arterial Unsignalized (45mph)	CBD Fringe	14,600	31,100	46,800	
22	51	Divided Arterial Unsignalized (45mph)	Rural	17,300	54,100	81,200	
22	52	Divided Arterial Unsignalized (45mph)	Rural	17,300	54,100	81,200	
23	21	Divided Arterial Class 1	CBD Fringe	16,400	35,700	53,500	
23	33	Divided Arterial Class 1	Transitioning	15,500	34,200	51,400	
23	52	Divided Arterial Class 1	Rural	13,900	29,400	44,200	
41	33	Major Local Divided Roadway	Transitioning	13,600	29,300	44,100	
42	33	Major Local Undivided Roadway with Turn Bays	Transitioning	13,600	29,300	44,100	
43	31	Major Local Undivided Roadway without Turn Bays	Transitioning	13,600	29,300	44,100	
43	33	Major Local Undivided Roadway without Turn Bays	Transitioning	13,600	29,300	44,100	
43	51	Major Local Undivided Roadway without Turn Bays	Rural	17,300	54,100	81,200	
43	52	Major Local Undivided Roadway without Turn Bays	Rural	17,300	54,100	81,200	
45	21	Other Local Undivided Roadway with Turn Bays	CBD Fringe	14,600	31,100	46,800	
45	31	Other Local Undivided Roadway with Turn Bays	Transitioning	13,600	29,300	44,100	
45	33	Other Local Undivided Roadway with Turn Bays	Transitioning	13,600	29,300	44,100	
45	52	Other Local Undivided Roadway with Turn Bays	Rural	17,300	54,100	81,200	
46	33	Other Local Undivided Roadway without Turn Bays	Transitioning	13,600	29,300	44,100	
46	52	Other Local Undivided Roadway without Turn Bays	Rural	17,300	54,100	81,200	
92	51	Other Freeway Toll Facility	Rural		47,900 [(2)]	73,900 [(2)]	
92	52	Other Freeway Toll Facility	Rural		47,900 [(2)]	73,900 [(2)]	

1) Source: 2002 FDOT Quality Level of Service Handbook.

2) Maximum Service Volume at Level of Service C

Figure 3-3 illustrates the forecasted level of congestion for Alternative 1 with the interchange on the Florida Turnpike. Figure 3-4 illustrates the same for Alternative 2 without the interchange. The level of congestion illustrated on the Figures is categorized into four categories; not congested, nearing congestion, congested, and severely congested. For the purposes of this analysis, a volume to maximum service volume ratio of 100 to 125% was considered congested and greater than 125% was considered severely congested.

Upon review, the SR 50 corridor from the Orange County Line to N. Hancock Road is forecasted to be the most congested. Even with the 4-laning of Hooks Street immediately to the South (programmed and funded in the County Transportation



MINNEOLA RIDGE AREA-WIDE TRAFFIC STUDY

Alternative 1: With Turnpike Interchange
Future Level of Congestion

Figure 3-3

Figure 3-3

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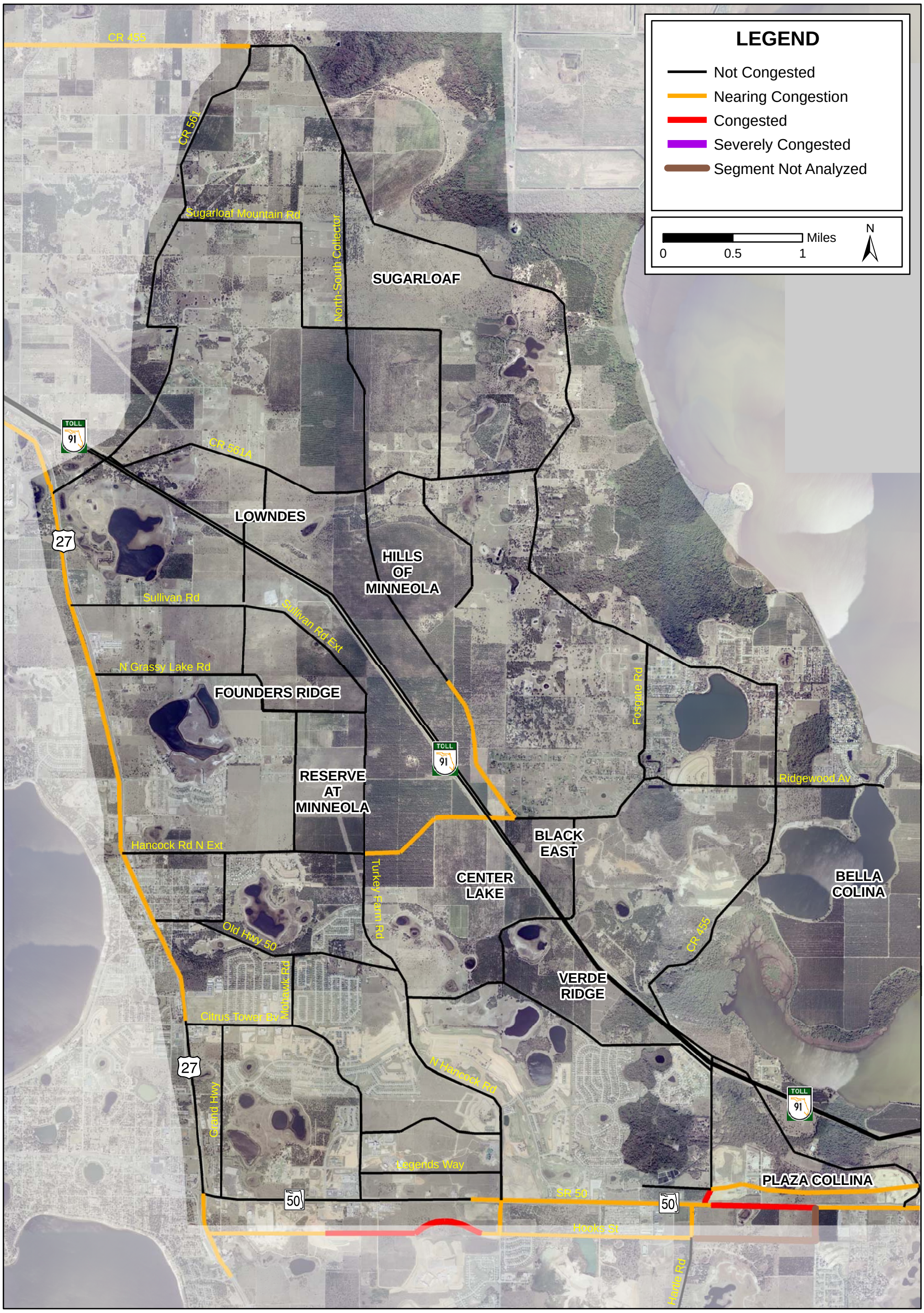

MINNEOLA RIDGE AREA-WIDE TRAFFIC STUDY

Alternative 2: Without Turnpike Interchange
Future Level of Congestion

Figure 3-4

Figure 3-4

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Program), SR 50 operates near, or in some areas, over capacity. This is the case in both alternatives. As previously mentioned, Alternative 1 creates alternative regional travel routes using the new Turnpike interchange. Even though the new interchange isn't directly diverting trips from SR 50, it does allow for fewer capacity improvements on N. Hancock Road and N. Hancock Road Extension by decreasing the parallel roadway demand. This was evidenced earlier in this Chapter in the number of lanes and improvement Figures (refer to Figures 3-1 and 3-2).

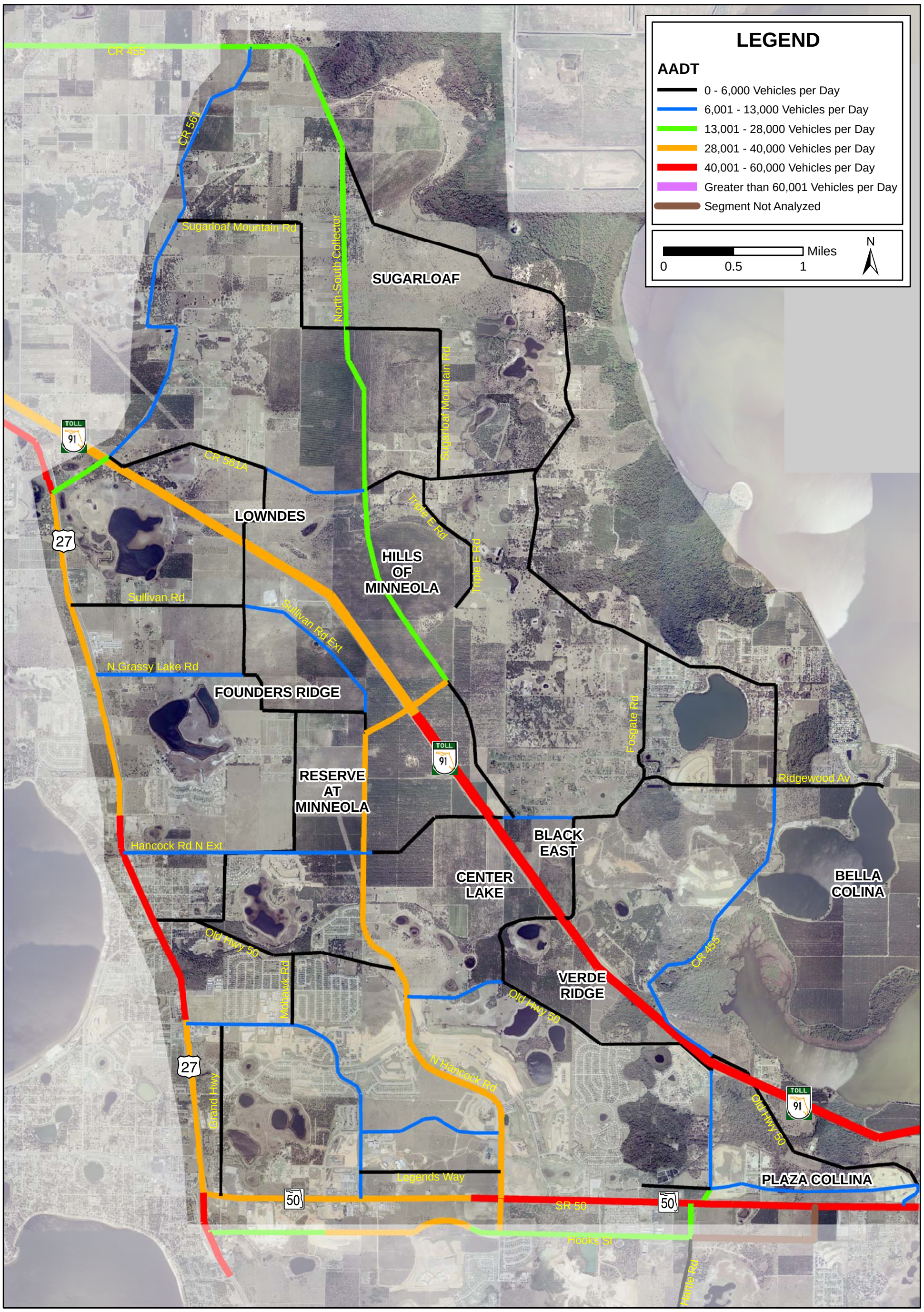
In alternative 1, the Florida Turnpike (SR 91) from the SR 50 interchange to the new proposed interchange displays volume levels nearing congestion. This is to be expected due to the amount of new growth from approved and proposed developments surrounding the Florida Turnpike. It is anticipated that consistent with other areas in the state, that the Turnpike Enterprise would make appropriate capacity improvements to the Turnpike to accommodate travel demand. These improvements would be financed using tolls collected by the users of the Turnpike facilities.

Forecast Volumes

Annual Average Daily Traffic (AADT) was forecasted using the Minneola FSUTMS model developed with the previously discussed refinements. Output model volumes were adjusted from Peak Season Weekday Average Daily Traffic (PSWADT) to AADT using a Model Output Conversion Factor (MOCF) of 0.94, provided by the Florida Department of Transportation. Figure 3-5 illustrates the forecast volumes for Alternative 1 with the interchange on the Florida Turnpike. Figure 3-6 illustrates the same for Alternative 2 without the interchange. These 2025 forecast volumes illustrated in these Figures are grouped in the following volume ranges;

- 0 to 6,000 AADT
- 6.001 to 13,000 AADT
- 13,001 to 28,000 AADT
- 28,001 to 40,000 AADT
- 40,001 to 60,000 AADT
- 60,000 and greater AADT

Volumes ranging from 0 to 13,000 are generally acceptable for 2 lane roads. Most of the interior collector roads in both alternatives fall between this range and are illustrated in the number of lanes Figure as 2 lane roads. As with the number of lanes and improvements discussed in a previous section, the east-west corridor of Hancock Road North Extension and the Minneola-Montverde Collector displays differences between the two alternatives. In Alternative 1, this corridor maintains a volume forecast between 6,000 and 13,000 daily trips. This is due to trips traveling north on N. Hancock Road



MINNEOLA RIDGE AREA-WIDE TRAFFIC STUDY

Alternative 1: With Turnpike Interchange
2025 Volume Forecast

Figure 3-5

Figure 3-5

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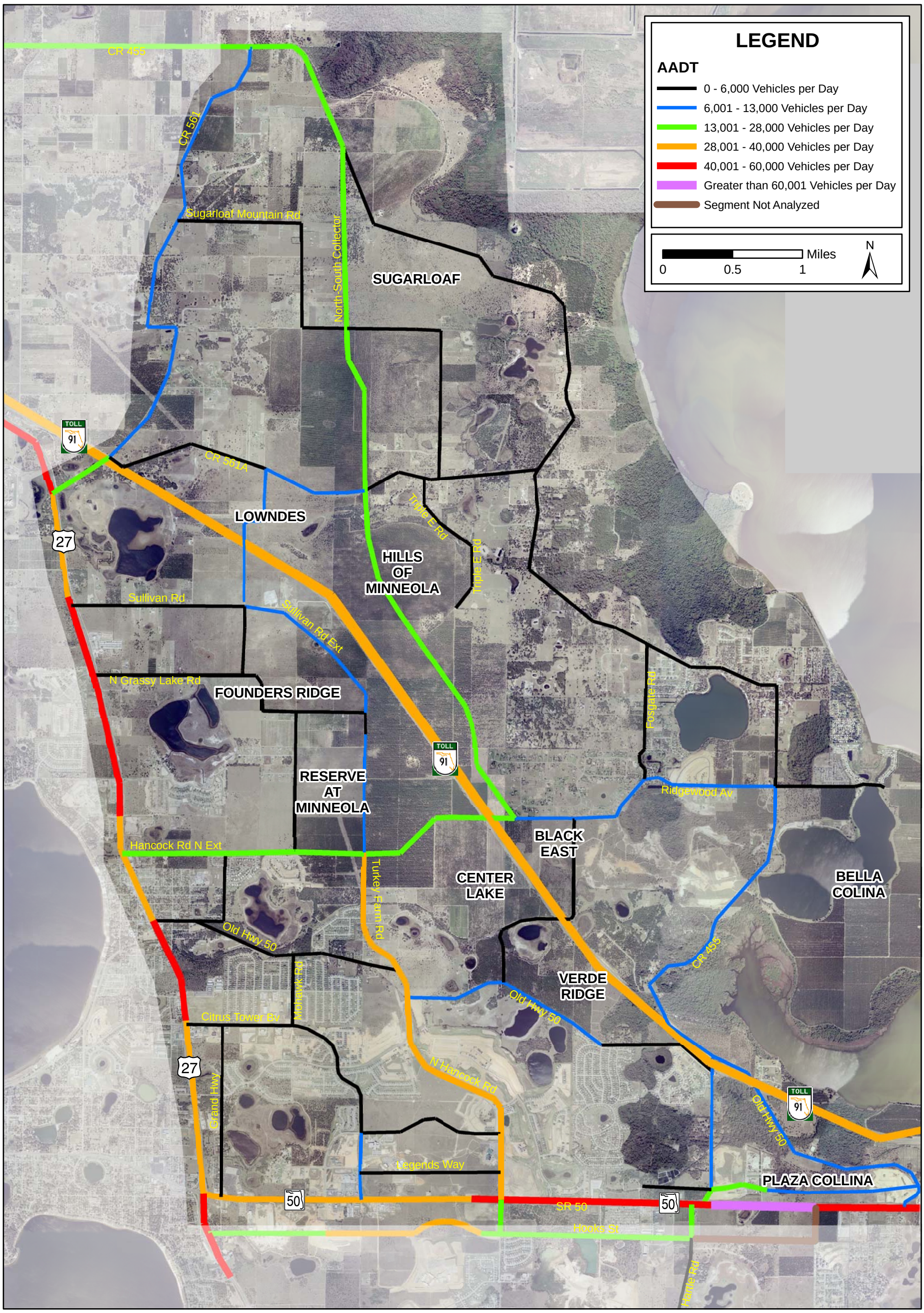

MINNEOLA RIDGE AREA-WIDE TRAFFIC STUDY

Alternative 2: Without Turnpike Interchange
2025 Volume Forecast

Figure 3-6

Figure 3-6

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being funneled past this east-west corridor in favor of traveling northeast on the Turnpike. On the other hand, Alternative 2 trips on N. Hancock Road are loaded onto this east-west corridor to get to US 27 and the North-South Collector. This results in a volume forecast in the 13,000 to 28,000 daily trip range, which is the generally acceptable range for a 4 lane road.

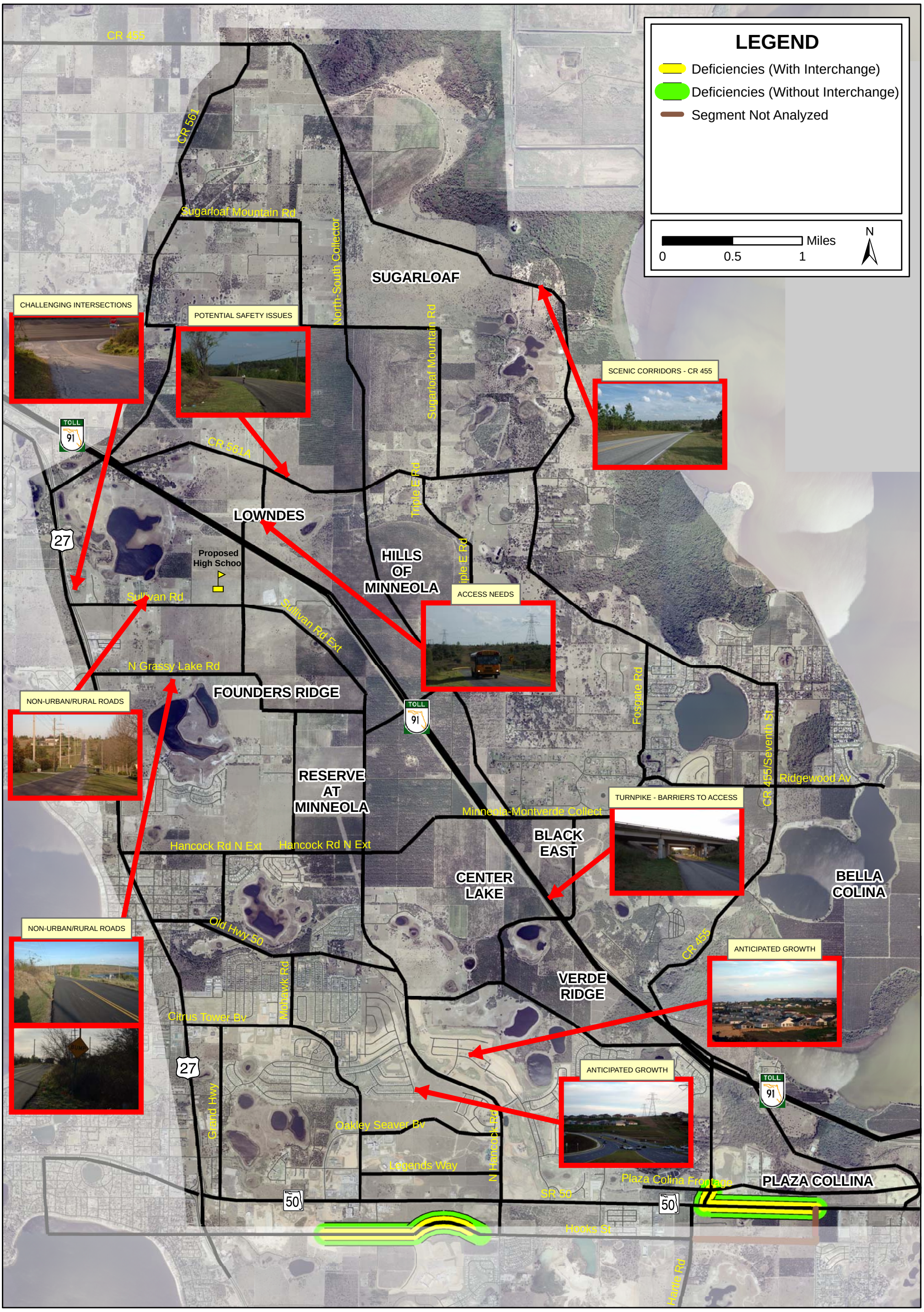
The impact of the new Turnpike interchange is illustrated in the 2025 volume forecast Figures and is similar to the previous discussion of the level of congestion. The volume forecast in Alternative 1 is in the 40,000 to 60,000 range compared to the 28,000 to 40,000 range in Alternative 2. However, Alternative 2 also shows a volume forecast of greater than 60,000 on SR 50, which would likely result in a deficient level of service for a 6-lane road. The diversion of trips from SR 50 onto the turnpike is apparent in Alternative 1, where SR 50 volume forecasts are less than 60,000 vehicles per day.

The flow of future volume can be viewed in these Figures. A majority of the forecasted volume in both alternatives is accommodated by SR 50, US 27, and the Florida Turnpike. The key differences when comparing alternatives is the Hancock Road N. Extension, in which Alternative 1 vehicle trips use the new Turnpike interchange to travel north and Alternative 2 vehicle trips use the Hancock Road N. Extension to go to/from north on US 27. It is also important to note the forecast volume decrease on Ridgewood Avenue in Montverde in Alternative 1 compared to Alternative 2. An increased in volume is evidence on this corridor in Alternative 2 without the Turnpike interchange.

Potentially Future Un-addressed Capacity Demands and other Deficiencies

Even with the improvements outlined in the previous sections there are some sections of roadways that will be deficient in terms of capacity. Potential safety issues, barriers to access, and existing rural roadways that would result in sub-standard conditions under urban travel demands will also need to be addressed to better accommodate future growth. Figure 3-7 illustrates the potentially location of several future capacity deficiencies and potentially future sub-standard roadways identified in this study.

Sections of SR 50 and Hooks Street were identified as potentially being capacity deficient in the future. These roadways will likely need additional increases in the number of lanes or require an alternative method of capacity enhancement. Intersection approaches to major arterials roads, bike lanes, and school locations are safety issues that should be accommodated for in the future road network as it is developed. Barriers to access which constrain roads and capacity should be reviewed to allow for maximum traffic flow. With the population growth expected for the Minneola area, all of these areas of concern will need to be addressed.



LEGEND
🟨 Deficiencies (With Interchange)
🟩 Deficiencies (Without Interchange)
Segment Not Analyzed
0 0.5 1 Miles
N
CR 455
CR 561
Sugarloaf Mountain Rd
North-South Collector
SUGARLOAF
Sugarloaf Mountain Rd
CHALLENGING INTERSECTIONS
POTENTIAL SAFETY ISSUES
SCENIC CORRIDORS - CR 455
TOLL 91
CR 561A
Triple E Rd
LOWNDES
27
Proposed High School
HILLS OF MINNEOLA
ACCESS NEEDS
Sullivan Rd
Sullivan Rd Ext
N Grassy Lake Rd
NON-URBAN/RURAL ROADS
FOUNDERS RIDGE
Fosgate Rd
CR 455/Seventh St
Ridgewood Av
RESERVE AT MINNEOLA
Minneola-Montverde Collect
TURNPIKE - BARRIERS TO ACCESS
BLACK EAST
Hancock Rd N Ext
Hancock Rd N Ext
CENTER LAKE
BELLA COLINA
Old Hwy 50
NON-URBAN/RURAL ROADS
CR 455
ANTICIPATED GROWTH
VERDE RIDGE
Mohawk Rd
Citrus Tower Bv
ANTICIPATED GROWTH
Grand Hwy
Oakley Seaver Bv
Legends Way
N Hancock Rd
Plaza Colina Frontage
PLAZA COLLINA
SR 50
50
50
Hooks St
Hartle Rd

MINNEOLA RIDGE AREA-WIDE TRAFFIC STUDY

Potential Future Un-addressed Capacity Demands and Other Deficiencies

Figure 3-7

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Anticipated Costs

The improvement costs for Alternative 1 and Alternative 2 were calculated to provide an estimate of their financial impact. This Chapter summarizes the cost assumptions used to develop the anticipated costs, provides a comparison of the two alternatives, and briefly describes which entity is likely to be financially responsible for specific improvements. It is important to note that the anticipated costs provided in this Chapter do not include costs for the purchase of Right-of-Way. These costs are planning level estimates of construction and design costs. The actual costs for these improvements will not be available until detailed engineering study of each specific roadway is performed.

Cost Assumptions

The improvement costs for each alternative were based on the following assumptions that were reviewed and accepted by County staff which reflect generally accepted costing methodology. As previously illustrated in Figures 3-1 and 3-2, Improvements to the alternatives are grouped into three categories; new roads, improved roads, and reconstructed roads. Once again, it is important to note, these costs do not include the purchase of additional right-of-Way.

- Assumption #1: County road improvement costs were calculated manually using the following unit costs per centerline mile. These costs were applied uniformly without consideration of the improvement category (new, improved, or reconstructed) since it was assumed that these roadways would need to be totally reconstructed. These unit costs per centerline mile were provided by County staff.

    - 2 Lane improvement = $1,056,000 per centerline mile
    - 4 Lane improvement = $3,168,000 per centerline mile
    - 6 Lane improvement = $5,280,000 per centerline mile

- Assumption #2: State road improvement costs are derived Florida Department of Transportation (FDOT) Work Plan. These costs were calculated for construction cost only and do not include Right-of-Way. The individual segment centerline miles for the Minneola improvements were divided by the total centerline miles for these FDOT projects to calculate a length ratio per project. These ratios were then multiplied by the total FDOT cost in order to approximate the individual segment cost. The total FDOT costs for the State roads and an example segment cost calculation are provided below.

- SR 50 from West of Hancock to Orange County Line (3.25 centerline miles) – 4 lane to 6 lane improvement = $30,139,000
- US 27 from SR 50 to CR 561A (3.06 centerline miles) – 4 lane to 6 lane improvement = $20,570,000

Example State Road Cost Calculation:

X/Y*Z – where;

X = segment length

Y = total FDOT project length

Z = total FDOT project cost

Link ID 350 – US 27 from CR 561A to S. Grassy Lake Rd. = .24/3.06*$20,570,000 = $1,613,000.

Link ID 360 – US 27 from S. Grassy Lake Rd. to Washington St. = .80/3.06*$20,570,000 = $5,378,000.

Link ID 370 – US 27 from Washington St. to Citrus Tower Blvd. = .77/3.06*$20,570,000 = $5,176,000.

Link ID 380 – US 27 from Citrus Tower Blvd. to SR 50 = 1.25 /3.06*$20,570,000 = $8,403,000.

- Assumption #3: The calculation of design cost was based on a ratio of the construction cost for each improvement. This ratio was 18 percent of construction costs. The ratio of 18 percent was provided by County staff and applied uniformly for both County and State improvements.

- Assumption #4: Improvement costs were estimated for the Turnpike interchange and underpass improvements at Fosgate Road and CR 561. An estimate for the Turnpike interchange was provided by the Florida Turnpike Authority ranging from $10,000,000 to in excess of $40,000,000. The cost difference for the Fosgate Rd. underpass in the alternative 2 is due to potential future capacity enhancement. For this study the following cost estimates were used;

  - New Florida Turnpike Interchange = $20,000,000
  - Fosgate Rd. Underpass = $2,000,000 in Alternative 1 and $4,000,000 in Alternative 2.
  - CR 561 Underpass = $1,200,000

Comparison of the Alternatives

At first glance, the total cost of Alternative 1 and Alternative 2 are fairly similar. The most significant difference is the cost of the new Florida Turnpike interchange. Table 3-2 summarizes the improvement costs for Alternative 1 with new Florida Turnpike

interchange while Table 3-3 summarizes these costs for Alternative 2 without the interchange. Both of these tables categorize the improvements by jurisdiction (County, State, and Turnpike). The tables summarize the number of lanes miles (the length of the project limits multiplied by the number of additional lanes) and the total cost. Again, the cost for the improvements does not include the right-of-Way and only reflects an estimate of the construction and design costs based on the planning level cost assumptions previously documented. Appendix 3-A contains a complete listing of project level costs in greater detail.

Table 3-2: Alternative 1 Anticipated Cost Estimate

IMPROVEMENT	LANE MILES	COST
COUNTY		
New	37.8	$30,281,000
Improved	45.5	$14,183,000
Reconstructed	23.6	$9,895,000
STATE		
Improved	54.5	$69,396,000
TURNPIKE		
Turnpike Interchange	N/A	$20,000,000
Fosgate Underpass	N/A	$2,000,000
CR 561 Underpass	N/A	$1,200,000
TOTAL	**161.44**	**$146,955,000**

Table 3-3: Alternative 2 Anticipated Cost Estimate

IMPROVEMENT	LANE MILES	COST
COUNTY		
New	41.5	$35,476,000
Improved	51.5	$21,684,000
Reconstructed	23.6	$9,895,000
STATE		
Improved	54.5	$69,396,000
TURNPIKE		
Turnpike Interchange	N/A	$0
Fosgate Underpass	N/A	$4,000,000
CR 561 Underpass	N/A	$1,200,000
TOTAL	**171.12**	**$141,651,000**

A review of the County road costs indicates that alternative 1 requires fewer new and improved roads, while the same amount of reconstructed roads are needed in both alternatives. This is primarily the result of the proposed Turnpike interchange. More trips, in Alternative 1, travel the Turnpike to the new interchange and are dispersed more evenly over the transportation network. In comparison, Alternative 2 trips are higher on alternative arterial roadways, such as N. Hancock Road and the east-west corridor of Hancock Road N Extension, thus requiring the construction of additional lanes of

capacity. The decreased need for additional capacity in Alternative 1 can be directly contributed to the proposed Florida Turnpike interchange.

The State Road improvement costs are consistent between the two alternatives. State Road costs in this study are derived from the FDOT Work Plan for SR 50 and US 27. As previously identifed, the improvements for both of these corridors would require the construction of six lanes.

The most obvious difference between the two alternatives is the new Florida Turnpike Interchange. Based on estimates received from the Florida Turnpike Authority, the planning level cost estimate for the interchange is $20 million. The underpass improvement costs at Fosgate Road and CR 561 are reconstruction improvements. The Fosgate Road underpass in Alternative 1 is for a reconstructed 2-lane road, where the underpass in Alternative 2 is for a reconstructed for a potential future capacity improvement.

Funding

Similar to the cost of improvements, the funding of these improvements can be categorized by County, State, and Turnpike Enterprise. The two State road projects, SR 50 and US 27, are already programmed in the FDOT Work Plan and therefore funded by the State. Improvements to the County road system would need to be identified and prioritized in the Lake County 2025 LRTP Update. These projects would therefore be funded by the County using Federal and State dollars provided for the Long Range Transportation Plan that is currently in development. Based on information provided by the Turnpike Enterprise, most if not all of the funding required for the proposed Florida Turnpike interchange would be provided by developers and would not use Turnpike funding. Attention is directed to the fact that many of the roadways identified my also be funded directly as developer improvements that are internal to their sites or which are required to directly mitigate their impacts in addition to impact fee funded projects. It is estimated that approximately 50 percent of the design and construction costs identified for County road improvements could be accomplished using impact fees collected within the study area. Thus, in addition to right-of-way dedications by the development community, additional developer roadway improvements will be required to fund the forecasted transportation improvements required for the study area.