The Town of Montverde

CR 455 Corridor Master Plan

Prepared for:

Town of Montverde and Lake County

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we plan and design livable communities

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The Town of Montverde

is a historic community, whose name means "green hill." Thirty minutes from Downtown Orlando and major attractions, the small community is defined by its rural surroundings while still within close proximity to regional resources. The unique scenic quality and rural community life are valued by the residents of the Town of Montverde, who would like to see their way of life preserved for years to come.

The Town of Montverde, the site of an early Indian settlement, has a long and rich history. The first non-Native American residents arrived in 1865 and called the place West Lake Apopka. The Town was incorporated on May 18th, 1925. From 1887 to 1969, the Town was served by the Tavares and Gulf railroad, which used the connection mainly to haul agricultural products. Past industries include a cement plant, a facility for drying and processing moss for furniture, and the original manufacturing plant of the Snapper Mower.

Located on the west shore of Lake Apopka along the Lake Wales Ridge, the Town is blessed with rolling topography and views rare in Florida. The Town of Montverde is part of the Green Mountain Scenic Byway. The rolling hills and winding roadway draw cyclists from around the world for competition, training, and touring. The Byway is one of the most popular cycling routes in Florida, and is the site of several internationally recognized triathlons each year. In addition to cyclists, the Green Mountain Scenic Byway is a favorite of motorcyclists, antique car clubs, and Sunday drivers.

Montverde has maintained its small town rural character and life. The Town takes pride in its many civic facilities, including town hall, the community center, Kirk Park, Lake Florence Park, the cemetery framed by moss-draped live oaks, and the Mediterranean Revival buildings of the 125-acre campus of the Montverde Academy. The oldest building in the Town is the historic Harper House, which dates from the mid 1870s. These facilities add to a strong sense of identity and community.

The Town of Montverde is at a unique and significant time in its history. Due to the pace of suburban development in surrounding Lake County, the Town is experiencing pressure on its roadway infrastructure. Development pressures are providing opportunities to develop within the town. Careful planning is needed to ensure that future growth adds to the fabric of the community while preserving the rural identity and lifestyle of the Town.

This report outlines public investments that can assist the Town of Montverde to revitalize the historic Town Center, serve vehicular travel while improving safety and pedestrian access, increase access to Lake Apopka, and reinforce the historic character of the community.

Photo by Leslie Gensheimer

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Introduction

1. Introduction

The Town of Montverde is a historic community located along the Lake Wales Ridge, on the western shores of Lake Apopka. The Town is bisected by CR 455, also known as the Green Mountain Scenic Byway, the only north/south corridor through the Town. This is a small town, with a population of 882 residents in 2000 and 942 as of 2004 (source: U.S. Census Bureau). While growth has occurred within the Town, the Town is experiencing development pressures and congestion due to growth in the surrounding Lake County.

The Town of Montverde understands that growth will occur in the surrounding rural areas, and that this growth will impact CR 455, and therefore the residents of the Town. The Town is also moving towards attracting economic growth that will enhance the quality of life of its residents. The Town would like to stimulate appropriate commercial development within its Town Center and residential development that is in scale and form with the Town. To this end, the Town of Montverde has developed this corridor study along CR 455 from the southern Town limits (approximately 1,500 feet south of the intersection of Ridgewood Road and CR 455) to a point approximately 1,060 feet west of the intersection of Fosgate Road and CR 455. The study covers a distance of approximately 12,900 linear feet, or 2.44 miles along CR 455. The study area is presented in *Figure 1*.

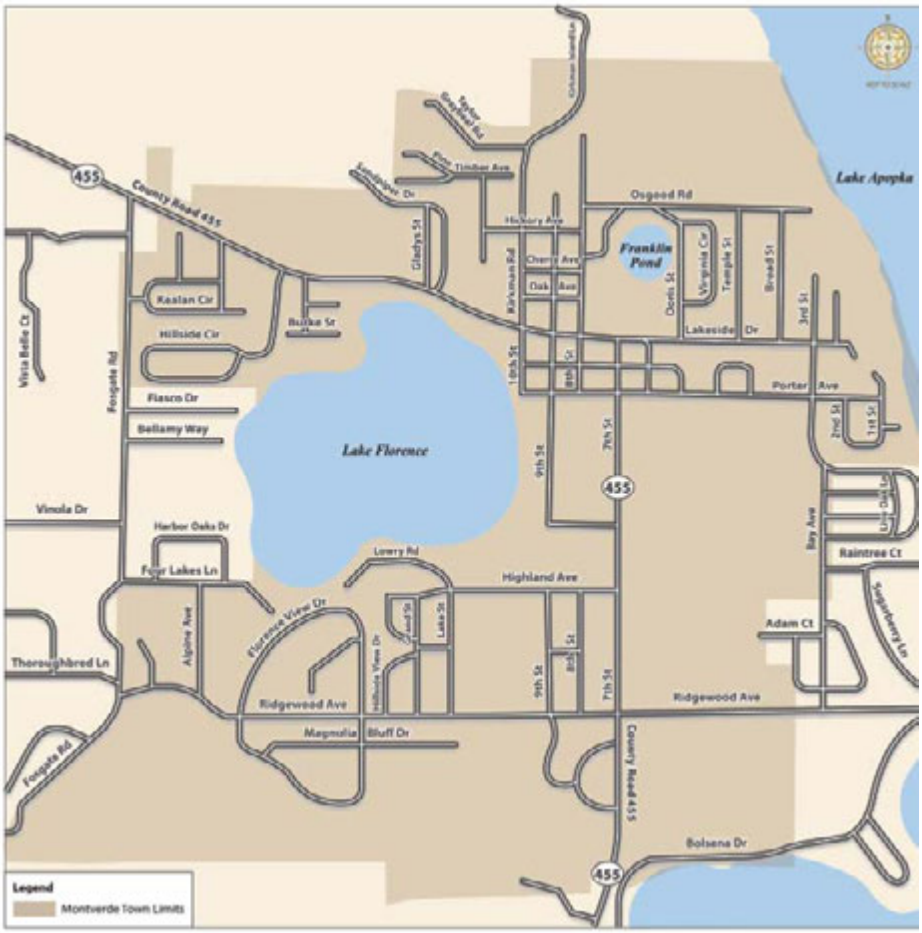


Figure 1 - Study Area

The purpose of this study is to create a multi-modal transportation investment plan that will address safety, traffic flow, drainage improvements, the pedestrian environment, and bicycle facilities within the study area. Transportation systems play a critical role in defining the character of any community, and the interaction of transportation enhancements and other land uses determines the success of each. Therefore, the study looked beyond transportation investments to include park enhancements, access to Lake Apopka, and the reconfiguration of the downtown area to support commercial development in the Town Center. The final recommendations from the study will set a tone for roadway design, service for multiple modes of travel, architectural style for the Town of Montverde, and outline infrastructure investments that will strengthen community cohesion and invite economic development.

The report addresses development patterns, safety and traffic concerns, bicycle and pedestrian circulation, drainage improvements, parking and landscaping along CR 455.

Community Engagement

2. Community Engagement

The Town of Montverde Corridor Master Plan study ran concurrent with the Green Mountain Scenic Highway Corridor Master Plan. Both projects were managed by Glatting Jackson Kercher Anglin, Inc.. Both projects were community driven projects, with leadership and direction provided by the Town of Montverde, Lake County, the Green Mountain Scenic Byway Corridor Management Committee (CMC), residents, and local stakeholders. The public outreach for both projects overlapped, with information for both projects presented at public meetings.

2.1 Public Involvement Plan

The Public Involvement Plan consisted of one-on-one meetings with stakeholders, small group meetings, presentations to the Town of Montverde Town Council, public meetings to the community, and participation in Montverde Day. Written material, such as flyers, newsletters, and a web site were also utilized to inform residents of the study and obtain feedback. Copies of these materials are included in the Appendix.

One-on-One Meetings

Glatting Jackson conducted one-on-one meetings with individuals and groups identified by the Town of Montverde and the CMC who are invested in the project to understand their ideas and concerns. Those meetings are listed in the box above right.

Minutes for these meetings are included in the Appendix.

Corridor Management Committee Monthly Meetings

Representatives from Glatting Jackson met with the CMC monthly at the regularly scheduled CMC meetings to gain input on the corridor as it passes through Montverde.

Presentations to the Town of Montverde Town Council

Glatting Jackson presented to the Town of Montverde Town Council on three separate occasions. The first was the project kick-off meeting, on June 14, 2007. The second was an update to Town council given on July 10, 2007. The third, held on September 25, 2007 was to present draft recommendations and receive feedback.

Design Workshop

Glatting Jackson conducted a multi-day design workshop and public meeting in coordination with the Green Mountain Scenic Byway Corridor Master Plan study. The workshop involved a multidisciplinary team of land use planners, transportation planners, landscape architects, wayfinding experts, ecologists and engineers who worked together with the public to develop draft concepts addressing issues and opportunities identified by the public.

Opening Presentation

On July 30th, 2007, residents were invited to inform the design team of the issues they would like addressed during the design workshop.

Walking Audits

Two walking audits were held during the Design Workshop. Walking audits are one of the most powerful tools for people to discuss common issues of interest or concern for the design or operation of

Table 1
List of Stakeholders

Stakeholder	Date
Rural Community of Ferndale	July 12, 2007
Montverde Academy	July 12, 2007 and September 13, 2007
Team Olympus (Ken Taylor)	July 12, 2007
Montverde Visioning Committee	July 12, 2007
Tom Daugherty	July 30, 2007
Lake-Sumter Metropolitan Planning Organization	August 1, 2007
Lake County Trails Master Plan Team	August 24, 2007
Plaza Collina	August 30, 2007
Sugarloaf Mountain	September 6, 2007
Friends of Lake Apopka	September 13, 2007
Oakland Park	September 18, 2007
St. Johns River Water Management District	October 17, 2007
Ginn Group	December 21, 2007

streets, parks, open space, trails and other features of their neighborhood. Billy Hattaway and Patty Hurd, from Glatting Jackson, accompanied attendees on walks through downtown Montverde to learn about residents concerns at specific sites. Residents concerns focused on pedestrian circulation in the commercial area, parking and redevelopment in the commercial area, drainage issues along CR 455, vehicular circulation at the intersection of CR 455 and Lakeside Drive, extension of the existing bicycle trail, signage and visual clutter.

Closing Presentation

On August 2, 2007, the design team presented their preliminary concepts based on information received during the Design Workshop, detailed background analysis, and observations made in the field. The PowerPoint presentation is presented in the Appendix.

Citizen Outreach

Glatting Jackson developed a stakeholder mailing list which was used to distribute information about upcoming public meetings and how to obtain copies of draft concepts or reports. A copy of the mailing list is included in the Appendix. Flyers were used to notify residents of all public meetings. They were mailed to all residents of the Town of Montverde by the Town, as an enclosure to the Town's water bills.

Glatting Jackson attended Montverde Day, made numerous presentations, attended meetings with numerous stakeholders, and distributed a newsletter advertising the study and the study's web page.

Walking audit

Opening presentation at design workshop

Background Analysis

3. Background Analysis

Data was collected and documented to determine existing and future transportation and community needs.

3.1 Right-Of-Way

The Town of Montverde recently completed right-of-way (ROW) survey along CR 455. Using ARCGIS, this data has been mapped and is presented in *Figure 2*. This information was used to determine preliminary ROW impacts of proposed enhancements.

Figure 2 - Roadway Right-Of-Way

(Source: Town of Montverde)

3.2 Existing Roadway Conditions

CR 455 serves multiple roles. It is a regional roadway, serving regional commercial truck and automobile trips. It is main street for the Town of Montverde, home to a Town Center with great potential. CR 455 bisects the Montverde Academy campus. It is a residential roadway, the front door to many historic homes. It is a significant recreational amenity, serving as an internationally recognized resource for competition and touring cycling.

Currently CR 455 consists of two twelve foot travel lanes without paved shoulders or curbs through the Town of Montverde. There is a flashing signal located at CR 455 and Lakeside Drive. From the southern Town limits to Lakeside Drive, utility poles are located along the east side of the roadway. From Lakeside Drive to the northern Town limits, utility poles are located along the north side of the roadway. There are sidewalks along CR 455 within Montverde Academy, and a multiuse trail along the north/east side of CR 455 from 600 feet north of Gladys Street to Lakeside Drive.

The posted speed limit from Fosgate Road to the southern Town limits is 35 mph. There is a 20 mph school speed zone for Montverde Academy located between the northern and southern school pedestrian crossing locations, a distance of approximately 800 feet.

Photo, top right: *CR 455 facing westbound, north of Lakeside Drive*

Photo, second from top: *CR 455 facing northbound, south of Lakeside Drive.*

Photo, third from top: *CR 455 facing southbound through Montverde Academy*

Photo, bottom: *CR 455 facing northbound, north of southern Town limit*

3.3 Drainage Analysis

The Town of Montverde lies within the jurisdictional boundaries of the St. Johns River Water Management District (SJRWMD). Within the jurisdictional boundaries of the SJRWMD, the project lies within the Ocklawaha River Basin and can be further characterized by being included within the Lake Apopka Drainage Basin.

Throughout the project corridor there is a limited amount of drainage infrastructure. Generally, roadway and surface runoff sheet flows to their respective outfall locations without receiving any water quality treatment.

The project area has three receiving bodies: Lake Apopka, Franklin Pond and Lake Florence. Franklin Pond and Lake Florence are landlocked. All three receiving bodies are considered distressed and subject to more stringent water quality requirements. In general, the area west of the downtown area drains to Lake Florence; the area east of the downtown and north of Porter Avenue drains to Franklin Pond; and the areas east of CR 455 and south of Porter Avenue drains to Lake Apopka. Since the described boundaries do not exactly follow the existing infrastructure a drainage basin map is provided in *Figure 3*.

Project Soils Information

The soils present along the project corridor are shown in *Figure 4*.

Figure 3 - Drainage Basin Map

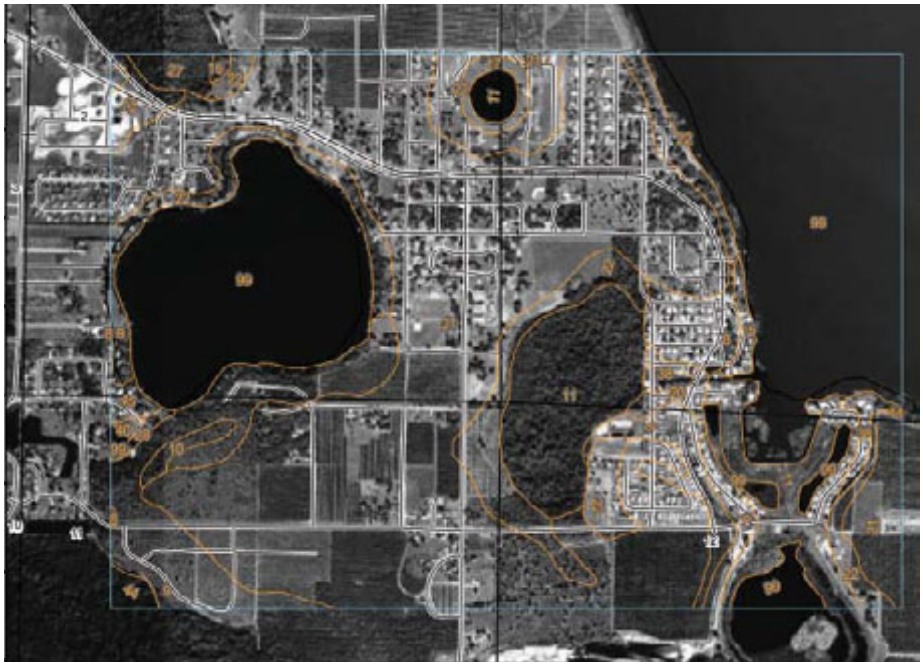


Figure 4 - Soils Map
(See table on page 22, Table 9 - Soils Types, for more soils information.)

Floodplain Information

The project corridor lies outside of a FEMA 100-year floodplain. However each of the three project receiving bodies has an associated 100-year flood elevation. Floodplain flood elevation information is located in FEMA's FIRM Map, 12069C0560 D, and is shown in *Figure 5*.

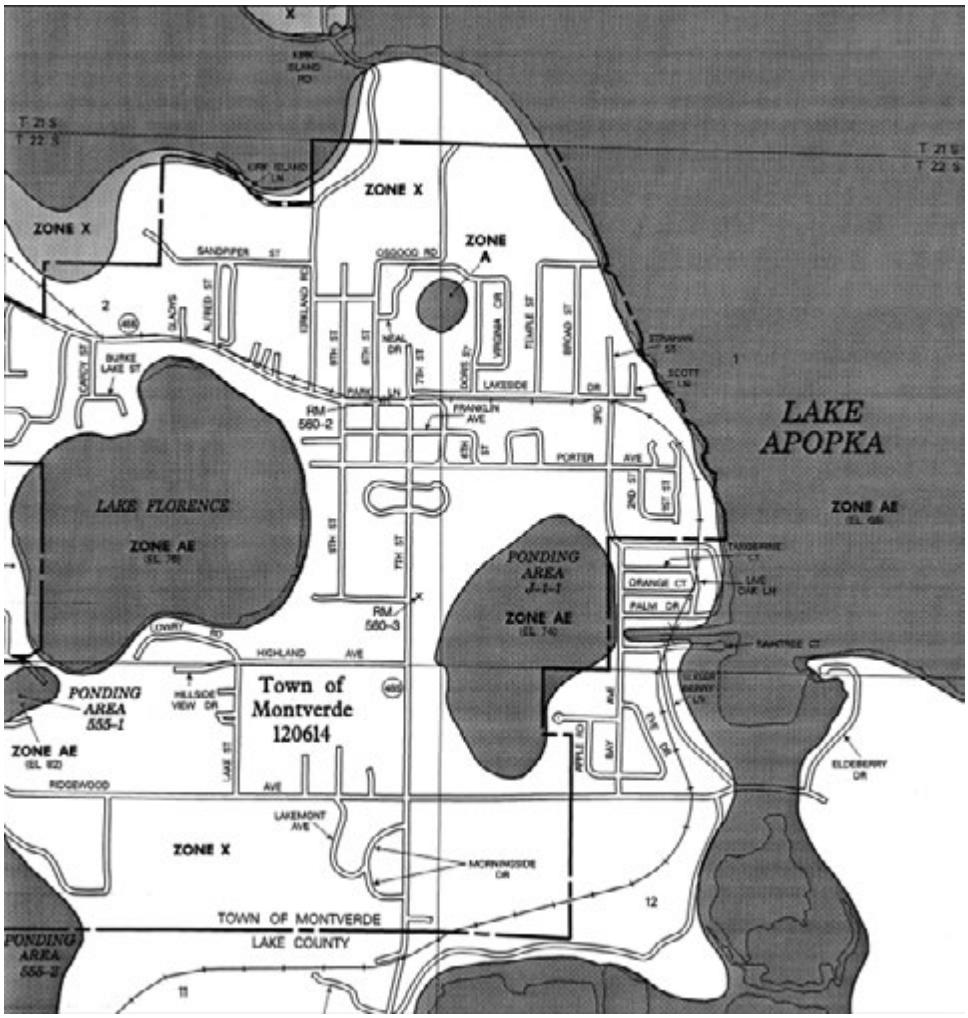


Figure 5 - Floodplain Information

Special Flood Hazard Areas Inundated by 100-Year Flood

ZONE A No base flood elevations determined.

ZONE AE Base flood elecations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood with velocity hazzard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

Floodway Areas in ZONE AE

Other Flood Areas

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less that 1 square mile; and areas protected by levees from 100-year flood.

Other Areas

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

Undeveloped Coastal Barriers*

Identified 1983

Identified 1990 or Later

Otherwise Protected Areas Identified 1991 or Later

*Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations within Special Flood Hazard Zones.

Figure 6 - CR 445/Gladys Street Drainage Concerns

Existing Drainage Concerns

There are several areas within the project corridor that experience flooding during normal to severe storm events. Specifically, the following areas have been identified:

• *CR 455/Gladys Street*

CR 455 experiences ponding within the roadside swales just west of Gladys Street. The ponded runoff within the swales has been reported to encroach on to the roadway; however, overtopping has not been reported. The existing swale receives roadway runoff as well as offsite runoff from the north. The swales do not have an unobstructed conveyance path to the existing cross drain located just west along CR 455. See *Figure 6*.

Figure 7 - CR 455/10th Street Drainage Concerns

• CR 455/10th Street

CR 455 experiences ponding within the roadside swales at the intersection of CR 455 and 10th Street. The ponded runoff stages and overtops CR 455 creating severe shoulder washouts on the southern side of the roadway. The existing swales receive roadway runoff as well as offsite runoff from the north. There is no apparent outfall for the roadside swales. See *Figure 7*.

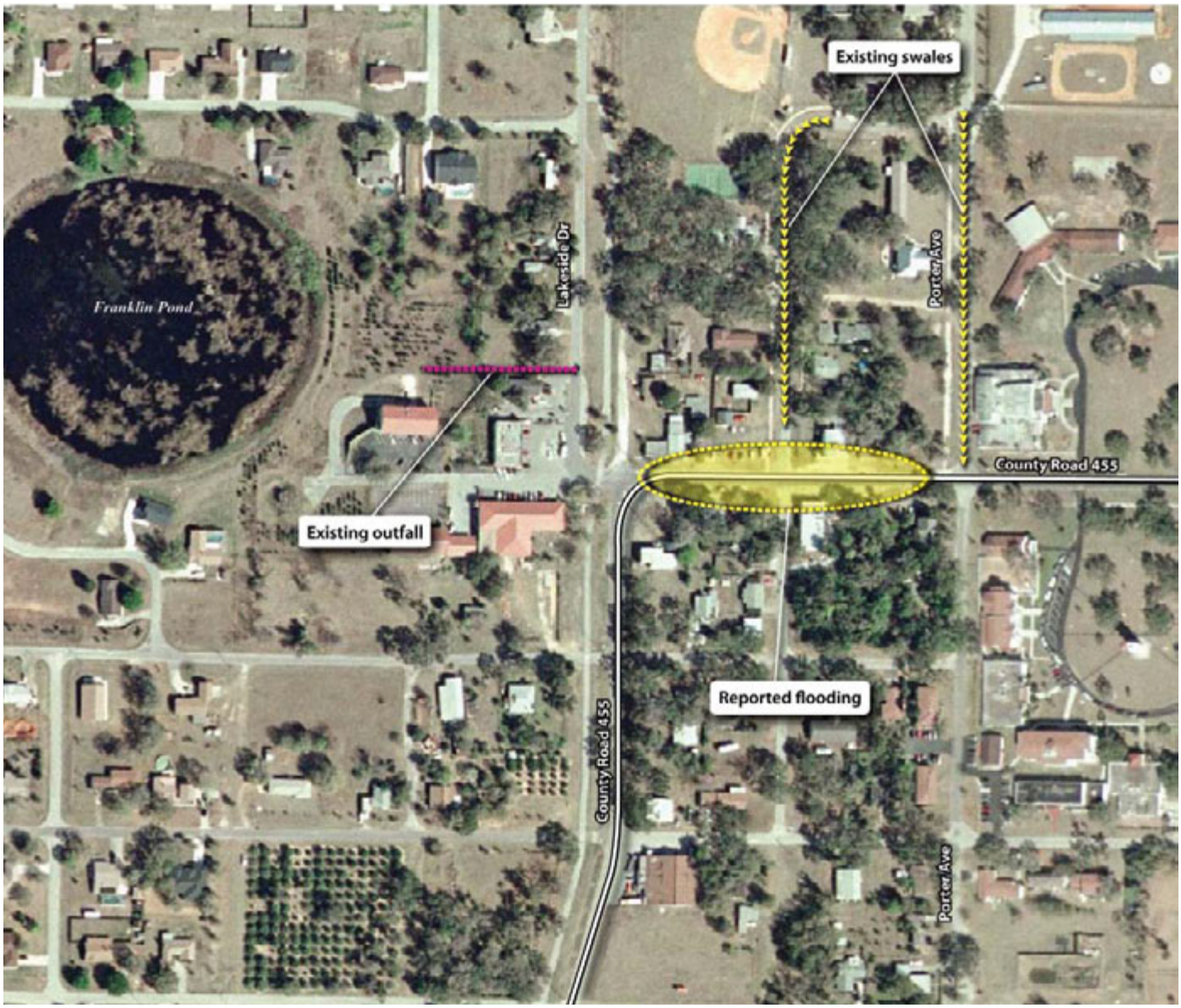


Figure 8 - CR 445/Franklin to Porter Avenue Drainage Concerns

• *CR 455/Franklin to Porter Avenue*

CR 455 between Franklin and Porter Avenues experiences flooding due to a significant amount of offsite runoff that enters CR 455's right of way from the east. There are no existing storm water management facilities to accommodate this runoff. See *Figure 8*.

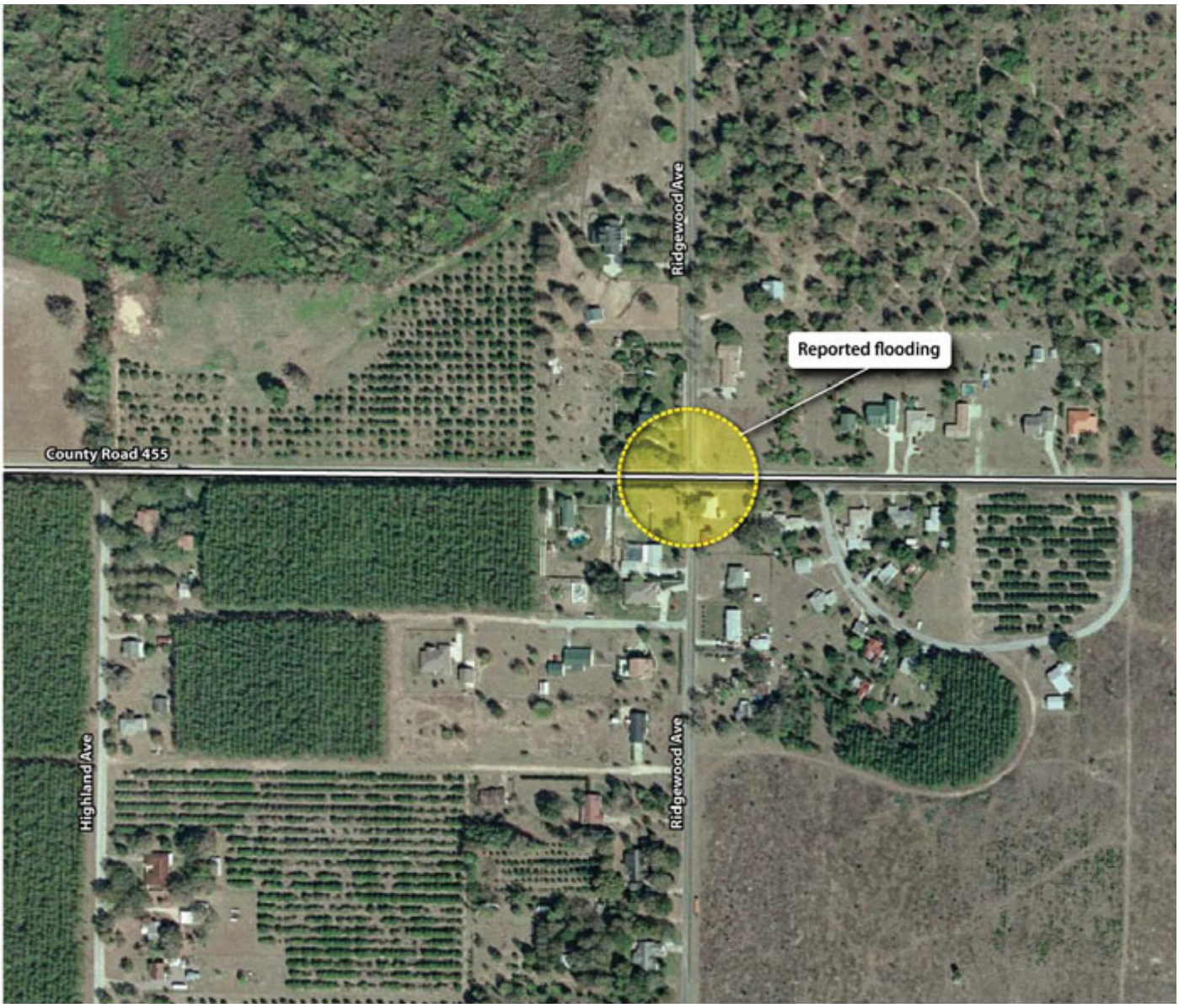


Figure 9 - CR 445/Ridgewood Avenue Drainage Concerns

• *CR 455/Ridgewood Avenue*

The intersection of CR 455 and Ridgewood Avenue experiences flooding due to trapped roadway runoff. Ridgewood Avenue has an inverted crown cross section which channels the roadway runoff eastward to CR 455. The existing intersection grading does not provide for a positive conveyance of the approaching runoff from Ridgewood Avenue once it reaches CR 455. See *Figure 9*.

3.4 Traffic Analysis

The methodology used to complete the traffic analysis includes:

• Collecting available traffic count information from the County's historical traffic count records and from field count data collection activities, review of previous studies, traffic characteristics and other relevant data for the study corridor.

• Based on the data collection, use the existing peak hour turning movement counts for performing intersection Level of Service (LOS) analysis and roadway segment LOS analysis for the CR 455 corridor.

• Evaluate the existing traffic volumes based on the available capacity, to determine if the roadway is currently operating under constrained or unconstrained conditions.

• Based on the data collected, estimate the roadway travel characteristics of the corridor. These characteristics include Design Hour Volume factor (K30), Directional Design Hour Volume factor (D30), and Daily Truck factor (T).

• Develop future year traffic volume forecasts for the corridor based on trends analysis of historical traffic counts, population estimates for Lake County, and/or travel demand models [Florida State Urban Transportation Model Structure (FSUTMS)].

• Use opening year and design year turning movements for the a.m. and p.m. design hours for performing intersection and roadway level of service analysis along the study corridor for the recommended enhancements.

Existing Traffic Conditions

In analyzing the year 2007 operating conditions of the intersections and roadway segments, traffic counts collected from the field during June and September 2007 were used along with the existing roadway and intersection geometry. The existing conditions intersection Level of Service (LOS) analysis was performed using the latest Synchro Software (version 7), which utilizes the HCM procedures for unsignalized intersections. The generalized LOS Table 4-9 from the Florida Department of Transportation (FDOT) LOS Manual was used for the roadway segment LOS along CR 455. The following sub-sections describe the overall process.

Traffic Count Information

Figure 10 indicates the location of traffic counts and type of traffic count data collected for the study. All existing traffic count data was collected during the month of June and September of 2007.

The data collected included:

- 24-Hour bi-directional counts (7 locations)
- 72-Hour classification count (1 location)
- 24-Hour classification count (1 location)
- 4-Hour intersection turning movement counts for a.m. and p.m. peak hours (3 intersections)

The weekday turning movement counts were collected for the intersections of CR 455 and Ridgewood Avenue, CR 455 and Lakeside Drive, and CR 455 and Fosgate Road. Counts were collected between the peak hours of 7:00-9:00 a.m. and 4:00-6:00 p.m.. All the existing daily traffic data collected was seasonally adjusted utilizing the latest (2006) FDOT seasonal adjustment factors for Lake County to provide 2007 annual average conditions. The actual turning movement data collected in the field was adjusted with the appropriate seasonal factor (1.07) to get an estimate of the annual average turning volumes.

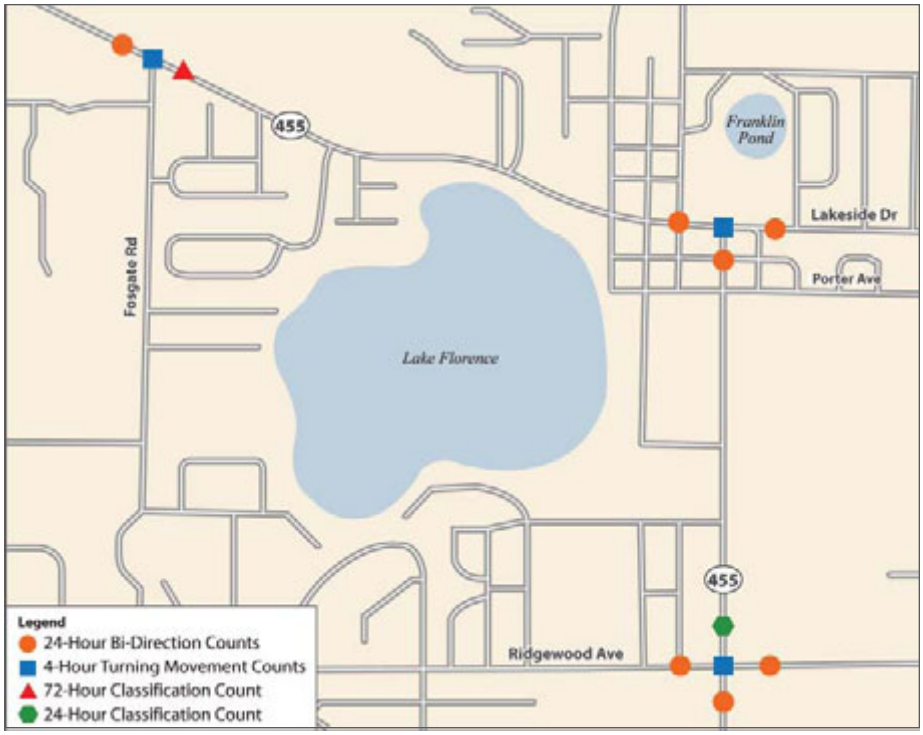


Figure 10 - Traffic Count Locations by Type

Table 2

CR 455 from South of Ridgewood Avenue to West of Fosgate Road – Year 2007 Existing Roadway Characteristics

			Measured Characteristics									
Roadway/Segment	Type of Count	Count Start Date	ADT	Peak Hour	NB/EB	SB/WB	Peak Time	"K"	"D"	Axle Adj. Factor [2,3]	Seasonal Adj. Factor [1]	Adjusted AADT [4]
Mainline Characteristics												
CR 455												
South of Ridgewood Avenue	24-Hour Bi-Directional	18-Sep-07	5,709	563	374	189	4:15-5:15 PM	9.86%	66.43%	0.96	1.03	5,600
North of Ridgewood Avenue	24-Hour Classification	18-Sep-07	4,285	559	233	326	7:30-8:30 PM	13.05%	58.32%	0.96	1.03	4,200
South of Lakeside Drive	24-Hour Bi-directional	18-Sep-07	3,712	388	239	149	4:30-5:30 PM	10.45%	61.60%	0.96	1.03	3,700
West of Lakeside Drive	24-Hour Bi-directional	18-Sep-07	3,558	346	113	233	4:30-5:30 PM	9.72%	67.34%	0.96	1.03	3,500
East of Fosgate Road	72-Hour Classification	26-Jun-07	3,042	268	116	152	4:45-5:45 PM	8.81%	56.72%	0.96	1.07	3,100
West of Fosgate Road	24-Hour Bi-directional	19-Jun-07	3,131	291	123	168	5:00-6:00 PM	9.29%	57.73%	0.96	1.07	3,200
Side Street Characteristics												
Ridgewood Avenue												
East of CR 455	24-Hour Bi-directional	19-Jun-07	1,120	114	87	27	4:45-5:45 PM	10.18%	76.32%	0.99	1.07	1,200
West of CR 455	24-Hour Bi-directional	18-Sep-07	2,481	287	172	115	7:15-8:15 AM	11.57%	59.93%	0.99	1.03	2,500
Lakeside Drive												
East of CR 455	24-Hour Bi-directional	26-Sep-07	1,331	106	73	33	5:00-6:00 PM	7.96%	68.87%	0.99	1.07	1,400

1. Most recent Seasonal Adjustment factors were obtained from FDOT 2006 Traffic Count CD.
2. Axle Adjustment factor for CR 455 was obtained from classification counts.
3. Axle Adjustment factor was assumed to be .99 for side streets.
4. Measured ADT "Axle Adjustment" Seasonal Adjustment = Adjusted AADT.

As part of the traffic count program for this project, two locations were utilized in this study for vehicle classification count. Vehicle composition for the classification counts were broken into three primary vehicle types:

- Passenger Vehicles – Motorcycles, Cars, Vans, and Pickups;
- Medium Truck – Buses and 2 axle Single Unit Trucks;
- Heavy Trucks – (3 or 4 axles) Single Unit Trucks, 2 axle Tractors (with 1 or 2 axle Trailer), 3 axle Trailers (2 or 3 axle Trailers), and (5, 6 and 7 axle) Multi-trailers.

Based on these categories, percentages for overall trucks (medium and heavy) were determined for peak and daily traffic conditions. Copies of the raw traffic count data and adjusted turning movement volumes are provided in Appendix A of the Design Traffic Technical Memorandum. FDOT axle and seasonal adjustment factors for Lake County are provided in Appendix B of the same report.

Traffic Characteristics

The following design traffic characteristics were established using traffic flow characteristics obtained from the traffic count data:

- **K30** - represents the relationship between the travel demand occurring during the 30th highest hour of the year and the average annual daily traffic.
- **D30** - represents the directional factor occurring in the traffic flow during the 30th highest hour.
- **T factor** - represents the percentage composition of medium sized and heavy trucks occurring in the traffic stream.

Traffic count information as collected was used to develop existing traffic characteristics for CR 455 and the intersecting side streets. The design traffic characteristics established were used in developing design hour volumes (DHV's) for the intersections and directional design hour volumes (DDHV's) for the roadway segments for future build condition. The truck factor for the peak condition was used in the existing intersection analysis and also used in the intersection analysis for the future condition.

Based on the 24-Hour volume counts and classification counts, peak hour traffic flow (K measured) and, directional split (D measured) for the roadways in the study area were derived. *Table 2* provides information on K measured, D measured, the peak direction and the AADT for all locations.

Table 3

CR 455 from South of Ridgewood Avenue to West of Fosgate Road – Design Traffic Characteristics Comparison

Roadway/Segment	Measured Characteristics			"K_{30}" Estimated[1]	2007 Lake County Counts		
	"K"	"D"	"Tdaily"		"K"	"D"	"Tdaily"
Mainline Characteristics							
CR 455							
South of Ridgewood Avenue	9.86%	66.43%	-----	11.23%	8.92%	-----	-----
North of Ridgewood Avenue	13.05%	58.32%	16.50%	14.85%	-----	-----	-----
South of Lakeside Drive	10.45%	61.60%	-----	11.90%	-----	-----	-----
West of Lakeside Drive	9.72%	67.34%	-----	11.07%	-----	-----	-----
East of Fosgate Road	8.81%	56.72%	19.10%	10.03%	-----	-----	-----
West of Fosgate Road	9.29%	57.73%	-----	10.58%	-----	-----	-----
Average	**10.38%**	**61.36%**	**17.80%**	**11.81%**	10.09	-----	-----
Side Street Characteristics							
Ridgewood Avenue							
East of CR 455	10.18%	76.32%	-----	11.59%	-----	-----	-----
West of CR 455	11.57%	59.93%	-----	13.17%	-----	-----	-----
Lakeside Drive							
East of CR 455	7.96%	68.87%	-----	9.07%	-----	-----	-----

Notes: 1. Estimated K30 = Measured K* (median of the thirteen highest consecutive peak season factors/median of thirteen lowest consecutive peak season factors).
----- Not Available

Existing travel characteristics and information from the actual traffic counts and Lake County counts were used to develop the design characteristics for the mainline and the side streets. The K30 factor represents an estimate (design for the 30th highest hour). The measured K factor was converted to K30 (estimate) using an adjustment factor of 1.14. This adjustment factor was based on the FDOT weekly seasonal adjustment factors, and equates to the median of thirteen highest consecutive Peak Season Factors to the median of thirteen lowest weeks. The estimated K30 for the study area roadways are shown in *Table 3*. For comparison purposes, the available K, D, and daily truck percentage (Tdaily) values for CR 455 and intersecting routes obtained from Lake County are also included in *Table 3*.

Based on the average of estimated K30 values and values from Lake County counts, a K30 value of 10.3 percent is recommended as the design characteristic for the project corridor along CR 455. Also, based on the average of measured values, a D30 value of 62.0 percent is recommended as the design characteristic along the project corridor.

As shown in *Table 4*, K30 and D30 for Ridgewood Avenue is based on the highest recommended values for an urban arterial from the Project Traffic Forecasting Handbook. For Lakeside Drive, K30 and D30 is based on the highest recommended value from the Project Traffic Forecasting Handbook. In the case of Fosgate Road, average K30 and highest D30 values for an urban arterial were recommended based on the Project Traffic Forecasting Handbook.

Based on the comparison of daily truck percentage (Tdaily) from the classification counts conducted for the project, the average measured truck percentage of 17.8 percent is recommended as the Tdaily factor for CR 455. For the remaining side streets, due to the lack of classification data and based on the surrounding roadway and land use characteristics, a Tdaily factor of 8%, 4% and 4% was assumed as the design daily truck factor for Ridgewood Avenue, Lakeside Drive and Fosgate Road, respectively. The truck percentage for the design hour (Tpeak) was assumed to be 50 percent of the Tdaily factor for all the roads.

Based on review of current and historical statistics, the recommended design characteristics represent current travel patterns throughout the study area. As development and growth continue within the area, it can be expected that travel characteristics for the area will vary slightly. Based on the current data, the recommended design characteristics as provided in *Table 4* represent the best indication of travel patterns within the study area. The axle and seasonal factors used in deriving the AADT and estimated K30 are provided in Appendix B of the Design Traffic Technical Memorandum.

Table 4

CR 455 from South of Ridgewood Avenue to West of Fosgate Road–Recommended Design Traffic Characteristics

	Recommended Design Characteristics			
Roadway/Segment	**"K_{30}" Factor**	**"D_{30}" Factor**	**"Tdaily" Factor**	**"Tpeak" Factor**
Mainline Characteristics				
CR 455	10.3%	62.0%	17.8%	8.9%
Side Street Characteristics				
Ridgewood Avenue	11.5%	67.1%	8.0%	4.0%
Lakeside Drive	9.1%	67.1%	4.0%	2.0%
Fosgate Road	10.2%	67.1%	4.0%	2.0%

Notes:

1. K_{30} for CR 455 is based on the average of estimated K_{30} values and K values from Lake County counts.
2, D_{30} for CD 455 is based on the average of measured values.
3. K_{30} and D_{30} for Ridgewood Avenue is based on the highest recommended values for an urban arterial from the Project Traffic Forecasting Handbook.
4. For Lakeside Drive, K_{30} is based on the estimated K_{30} and D_{30} is based on the highest recommended value from the Project Traffic Forecasting Handbook.
5. For Fosgate Road, average K_{30} and highest D_{30} values for an urban arterial was recommended based on the Project Traffic Forecasting Handbook.
6. The Tdaily factor for CR 455 is based on the average of measured values.
7. The Tdaily factor for Ridgewood Avenue, Lakeside Drive, and Fosgate Road is assumed to be 8%, 4%, and 4% based on the surrounding roadway characteristics.
8. The Tpeak factors were obtained based on Tpeak = Tdaily/2.

Existing Geometry

Figure 11 provides the year 2007 intersection geometry for all the intersections to be evaluated in the study. The year 2007 intersection geometry information was obtained and verified based on field visits and aerial photographs. The following intersections are evaluated as part of this study:

- CR 455 @ Ridgewood Avenue (Unsignalized)
- CR 455 @ Lakeside Drive (Flashing/Unsignalized)
- CR 455 @ Fosgate Road (Unsignalized)

The intersection geometry information was collected during the traffic count data collection phase. As mentioned above, all of the study intersections are currently stop controlled. However, it should be noted that the intersection of CR 455 at Lakeside Drive has a flashing signal, with flashing red for the southbound, eastbound, and westbound approaches and flashing yellow for the northbound approach. Stop signs are also placed along the approaches with flashing red. The intersections along CR 455 at Ridgewood Avenue and Fosgate Road have stop signs that are placed at the side street approaches.

Existing Year Traffic Volumes

As stated earlier, the adjusted AADT's for the individual roadway segments were provided in *Table 2*. *Figure 12* provides the existing AADT's for the study corridor and the side streets.

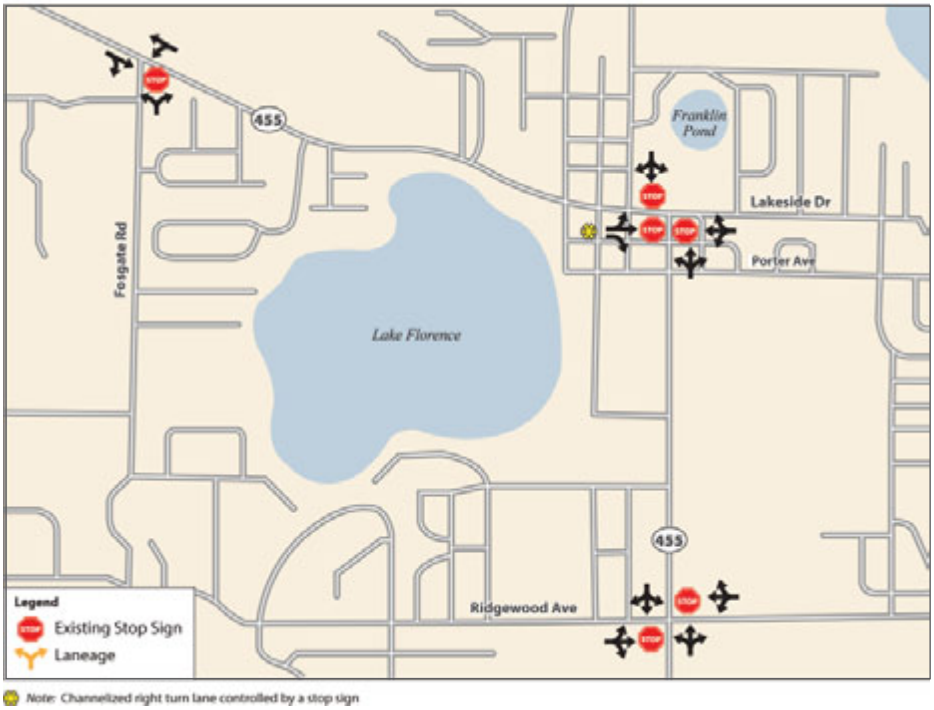


Figure 11 - Existing Intersection Geometry

Figure 12 - Existing AADT Volumes

Year 2007 Turning Movement Volumes

Turning movement counts were obtained for the a.m. and p.m. peak hour conditions for the above mentioned intersections. The raw and seasonally adjusted year 2007 a.m., and p.m. peak hour turning movement volumes collected at the study intersections along CR 455 are shown in Appendix A of the Design Traffic Technical Memorandum. The adjusted year 2007 a.m., and p.m. peak hour turning movement volumes for the study corridor are shown in *Figures 13 and 14*, respectively.

Year 2007 Intersection Level of Service Analysis

Levels of service for the study corridor were determined using the most current adopted procedures as outlined in the Transportation Research Board's – Highway Capacity Manual (HCM 2000) using the latest Synchro software version 7 and generalized LOS tables from the FDOT LOS manual. The Synchro analysis using HCM procedures was used for analyzing the unsignalized intersections and the roadway segment LOS was determined using the generalized LOS Table 4-9. The year 2007 a.m. and p.m. peak hour adjusted turning movement volumes shown in *Figures 13* and *14* along with the year 2007 intersection geometry shown in Figure 11 were used in the intersection LOS analysis.

As shown in *Figure 13*, during the year 2007 a.m. peak hour conditions, the two-way stop controlled intersections along CR 455 at Ridgewood Avenue and Fosgate Road were found to operate at LOS A for the major street and at LOS B for the minor street. It should be noted that the LOS shown is for the lane with the worst condition for both the major and minor streets for these intersections.

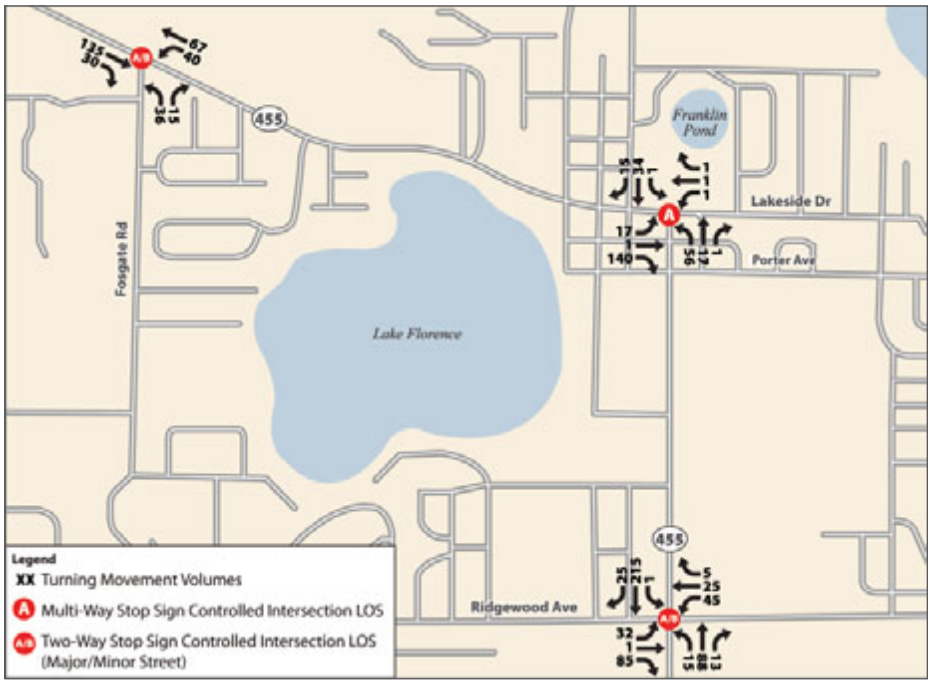


Figure 13 - Existing AM Peak Hour Turning Movement Volumes and Intersection LOS

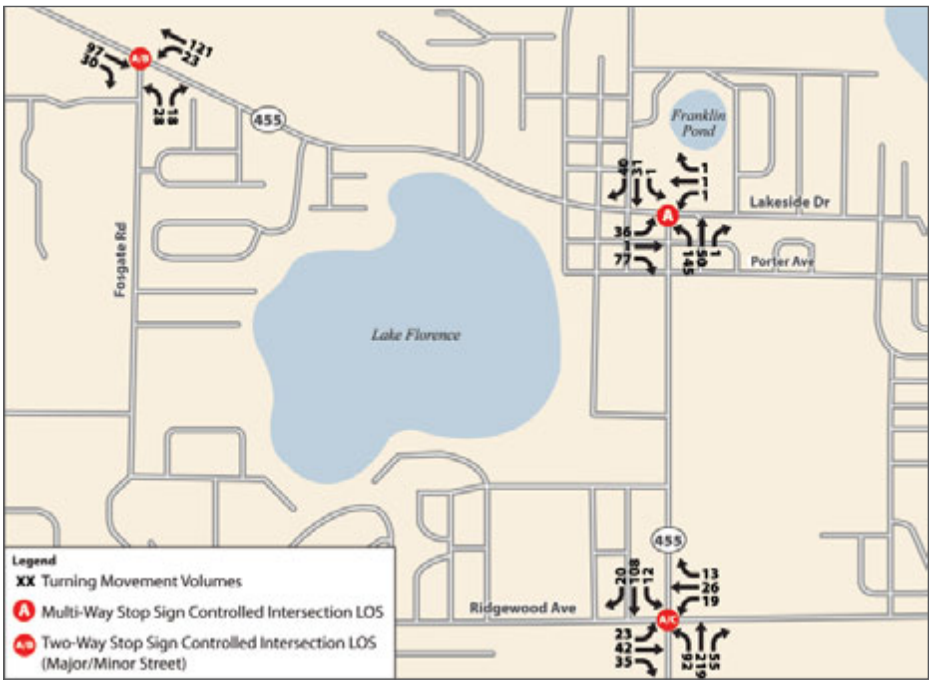


Figure 14 - Existing PM Peak Hour Turning Movement Volumes and Intersection LOS

As shown in *Figure 14*, during the p.m. peak hour conditions, the intersection of CR 455 at Ridgewood Avenue was found to operate at LOS A for the major street and at LOS C for the minor street, while the intersection at CR 455 and Fosgate Road was found to operate at LOS A for the major street and at LOS B for the minor street. The multi-way stop controlled intersection at CR 455 and Lakeside Drive was found to operate at LOS A for both the a.m. and p.m. peak hours. The year 2007 a.m. and p.m. peak hour intersection analysis HCM results are included in Appendix C of the Design Traffic Technical Memorandum.

Year 2007 Roadway Operational Level Of Service Analysis

The roadway segments LOS analysis was performed for the year 2007 peak hour peak direction conditions using the year 2007 generalized volumes from the FDOT Quality/ Level of Service Handbook. According to the latest Lake County Concurrency Management Systems (CMS), the LOS standard for CR 455 between Ridgewood Avenue and Fosgate Road and from Old Highway 50 till Ridgewood Avenue is LOS C and LOS D, respectively. It was also noted from the CMS that this project corridor is categorized as an interrupted flow arterial in a rural developed area. Since designated left turns are not present along CR 455 through the entire project corridor, the corresponding peak hour peak direction volumes for a two-lane undivided roadway from *Table 4-9* were reduced by 20% and the resultant volumes were used to determine roadway LOS.

After comparing the highest existing peak hour peak direction volume of 374 (see *Table 2*) occurring along the study corridor south of Ridgewood Avenue, with the volumes from *Table 4-9*, it can be determined that CR 455 within the study limits is currently operating at LOS C. *Table 4-9* from the FDOT LOS Manual is included in Appendix D of the Design Traffic Technical Memorandum.

3.5 Crash Data

Crash data was provided for CR 455 by Lake County from 1/1/2002 to 8/30/2007. The information reports 25 crashes along CR 455 within the study area from 1/1/2002 to 8/30/2007. Of these, seven occurred at an intersection, three at a driveway, one in a parking lot, and 14 along a segment of the roadway (one crash did not report a location relative to intersections).

Six crashes occurred at the intersection of Ridgewood Avenue and CR 455. The grades along CR 455 and some plantings at the intersection approaching this intersection are creating some sightline issues.

Of the crashes that did not occur at an intersection, seven of the 18 crashes occurred when the road was wet. In other words, almost 40% of the crashes that did not occur at an intersection took place when the road was wet. None of the crashes reported at an intersection occurred when the road was wet. The United States General Accounting Office *Highway Safety: Research Continues on a Variety of Factors That Contribute to Motor Vehicle Crashes*, based on NHTSA's data from 1997 through 2001, found that about 23 percent of crashes occurred when road surface conditions were either wet, snowy, slushy, or icy. The *Analysis of Weather-Related Crashes on U.S. Highways* by Lynette C. Goodwin with Mitretek Systems, Inc. suggests that 22 percent of crashes occur under wet conditions (in 2002). Therefore, improving drainage along the roadway may improve safety along the corridor.

Table 5: Location of Crashes

Location	Number
At Intersection	7
Not at intersection/ RRcrossinging/Bridge	14
Driveway Access	3
Other	1
Total	**25**

Table 6: Crash Types

Crash Type	Number
Angle	8
Hit fence	1
Overturned	2
Utility/light pole	1
Left-turn	2
Hit other fixed object	1
Head-on	1
Rear-end	2
Backed into	2
Hit guardrail	2
Sideswipe	1
Hit sign/sign post	1
All other (explain)	1
Total	**25**

Table 7: Contributing Cause of Crash

Contributing Cause	Number
Careless Driving	12
Improper Backing	1
Obstructing Traffic	0
Failed to yield	4
Exceed Stated Speed Limit	1
Followed too closely	0
No improper driving/act	1
All other (explain)	4
Failed to maintain Equipment/vehicle	0
Improper lane change	0
Improper load	0
Disregarded stop sign	0
Drove left of center	1
Alcohol-Under influence	0
Improper turn	1
None given	0
Total	**25**

3.6 Land Use Plans

Lake County is experiencing significant development pressures. The new residential communities of Bella Collina, Colina Bay, Sugarloaf Mountain Development, and Oakland Park are currently under construction. Planned developments surrounding the Town of Montverde include Montverde Estates, Plaza Collina, Black East and the Hills of Minneola.

At this time, Lake County is revising its future land use plan. The future zoning would restrict new development north of the Town of Montverde to Sugarloaf Mountain to large lot zoning.

The Town of Montverde has approved a 78 home development at Ridgewood Avenue and CR 455. Montverde Academy is developing a new sports complex, which would extend the campus south to Ridgewood Avenue west of CR 455.

Table 8
Approved Development

Development	Single-Family Dwelling Units	Multi-Family Dwelling Units	Hotel (rooms)	Industrial	Retail	Office	Other
				Square Feet			
Bella Collina	698	200	0	32,870	48,800	156,000	
Montverde Estates	78						
Sugarloaf	2,295	175	0	0	120,000		
Colina Bay	73						
Black East	215						
Oakland Park	675	75	7		25,000		
Plaza Collina/Verde Ridge		200	0	0	1,200,000	0	
Hills of Minneola	2,656	1,056	300	1,400,000	610,000	850,000	Golf

Source: Lake County/Glatting Jackson Kercher Anglin, Inc., June 2007

The Town of Montverde Future Land Use Map is presented on *Figure 15*. Based on the Future Land Use Map, much of the undeveloped land not currently approved for development is zoned wetland or agricultural. There are vacant parcels along the west side of CR 455 near Ridgewood Avenue that are zoned residential. Other infill residential development is possible near the Town Hall, between Lakeside Drive and Porter Avenue, where there are a number of vacant parcels zoned for single-family and multi-family development. Commercial redevelopment would occur on existing commercial sites.

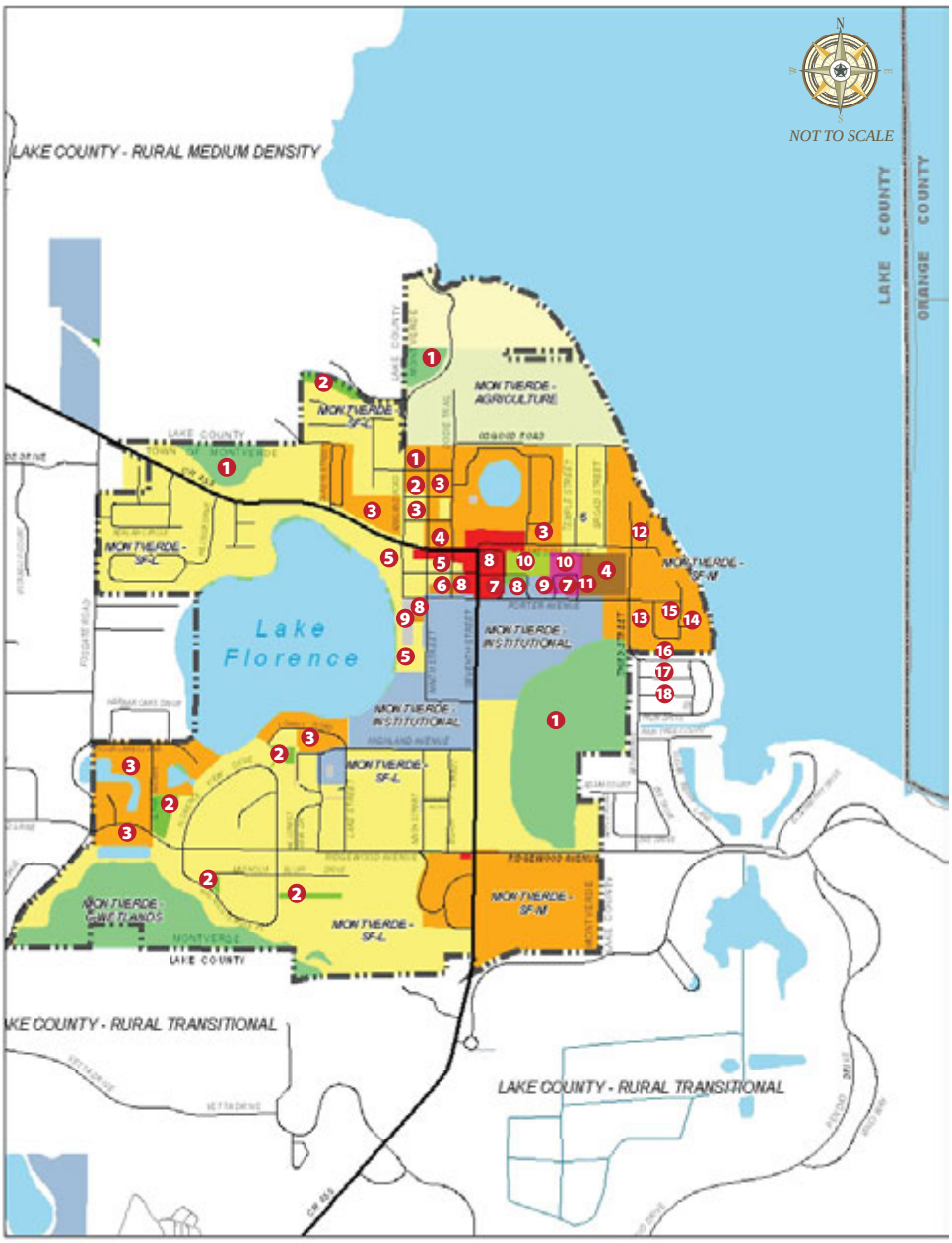


Figure 15 - Future Land Use Plan (Source: Lake County)

Montverde Future Land Use

1. Conservation - Wetlands
2. Open Space
3. Single Family - Medium
4. Single Family/Multi-Family
5. Single Family - Low
6. Commercial
7. Office, Residential, Commercial
8. Multi-Family
9. Right-of-Way/Utilities
10. Recreation

3.7 Transportation Plans

Due to the development patterns documented in the previous sections, CR 455 can expect to experience substantial growth in traffic volumes. Lake County, the Lake-Sumter MPO, and the development community are studying the addition of roadway network in this area to serve future development and reduce pressure on existing roadways. *Figure 16* shows one possible future roadway configuration currently under consideration by Lake-Sumter MPO.

CR 455 through the Town of Montverde is part of the Green Mountain Scenic Highway (see *Figure 16*). In Lake County, CR 455 from CR 561 to Old Highway 50 is policy constrained to 2 lanes. The roadway will not be widened regardless of future traffic volumes. Intersection modifications may be required to reduce delays. The Corridor Management Committee (CMC) for the Green Mountain Scenic Byway opposes signalized intersections along the Scenic Byway.

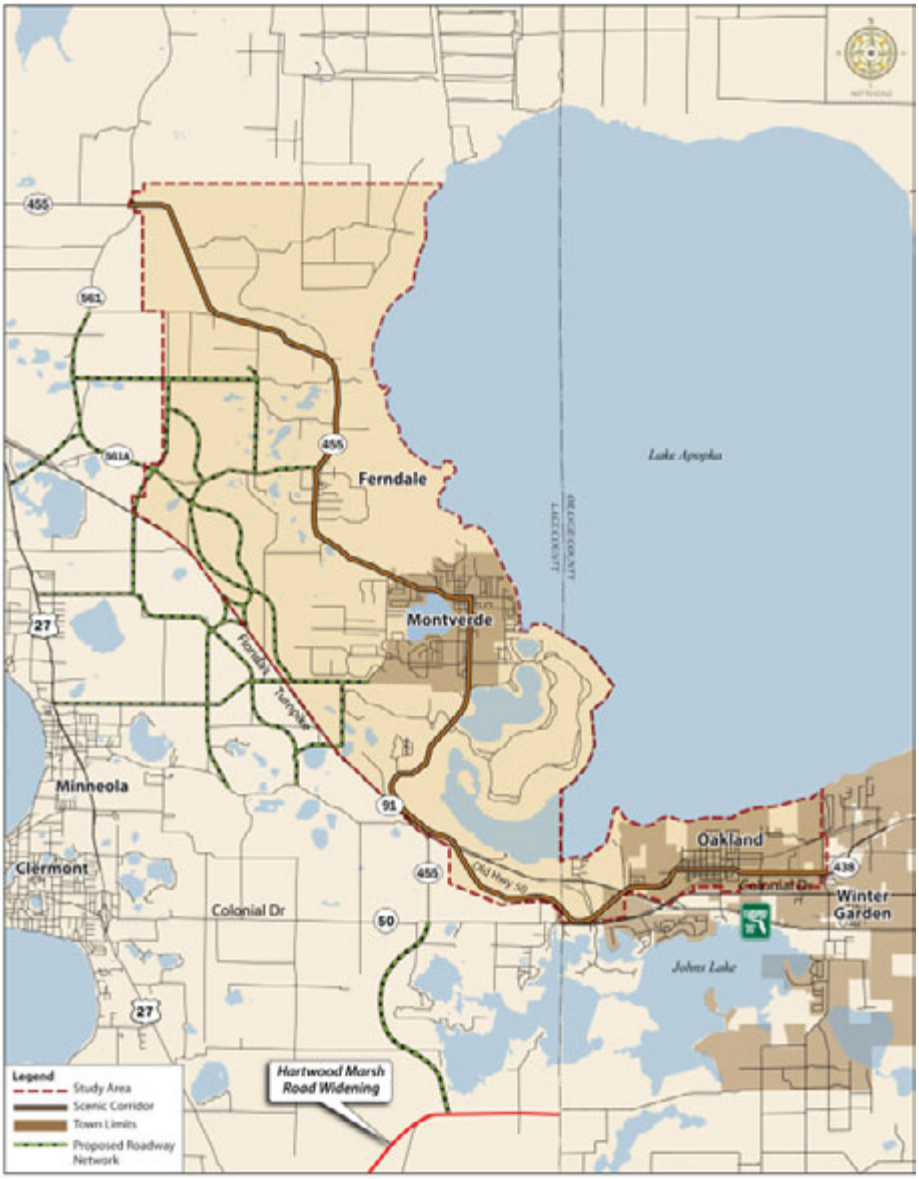


Figure 16 - Possible Future Roadway Network (Source: Glatting Jackson Kercher Anglin, Inc., July 2007)

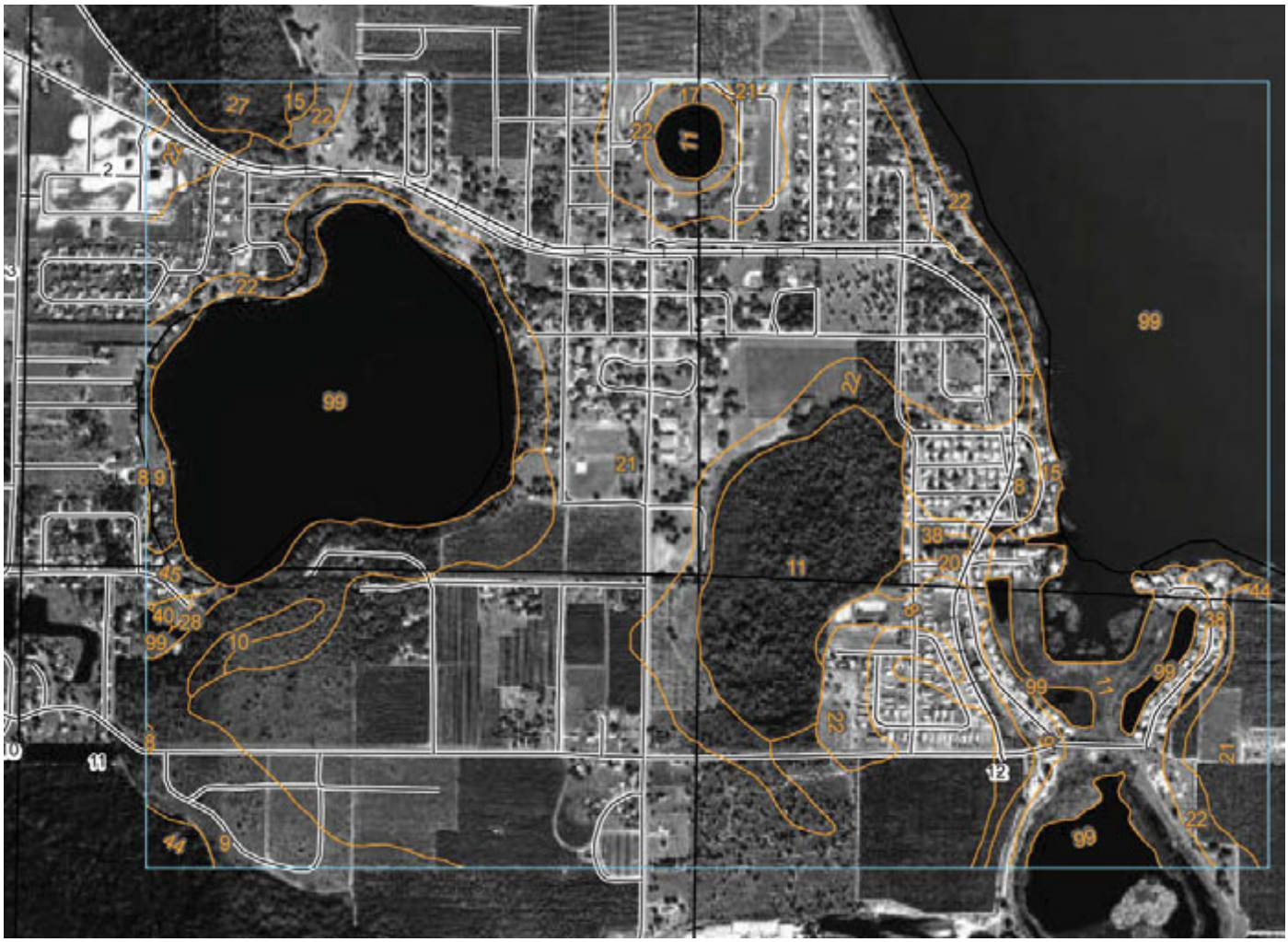


Figure 17 - Soils Map

3.8 Soil Survey and Geotechnical Data

According to the United States Department of Agriculture's (USDA) Soil Conservation Service (SCS) Soil Survey of Lake County (1975), the soil types known to occur within the Town of Montverde, are listed in *Table 9*.

The dominant soil underlying the Town of Montverde is lake sand 0-5% slopes, which are well drained and nearly level to gently sloping. Based on the Hydric Soils of Florida Handbook (1995), depressional mapping units and those areas designated as swamp are considered to be hydric in nature and typically underlie wetland areas subject to the jurisdiction of regulatory agencies.

Table 9
Soils Types
Lake County Area, Florida (FL607)

Map Unit	Symbol/Map Unit Name	Acres in AOI	Percent of AOI
8	Candler sand, 0 to 5 percent slopes	38.8	3.1%
9	Candler sand, 5 to 12 percent slopes	80.4	6.4%
10	Candler sand, 12 to 40 percent slopes	4.7	0.4%
11	Brighton muck, depressional	110.3	8.8%
15	Felda fine sand	6.0	0.5%
17	Arents	6.4	0.5%
20	Immokalee sand	7.1	0.6%
21	Lake sand, 0 to 5 percent slopes	503.9	40.4%
22	Lake sand, 5 to 12 percent slopes	118.9	9.5%
27	Everglades muck, depressional	7.6	0.6%
28	Myakka sand	2.4	0.2%
38	Placid sand, depressional	7.7	0.6%
40	Placid and Myakka sands, depressional	1.1	0.1%
44	Swamp	4.5	0.4%
45	Tavares sand, 0 to 5 percent slopes	4.0	0.3%
99	Water	344.5	27.6%
Totals for Area of Interest (AOI)		**1,248.2**	**100.0**

As previously stated, the CR 455 corridor within the Town of Montverde is located along the Lake Wales Ridge which is a high sandy ridge extending from southern Highlands County to the Ocala Uplands in northern Lake and southern Marion Counties (*Figure 18*). The Lake Wales Ridge is comprised of coarse to fine well-drained sands that provide significant recharge to the underlying Floridan Aquifer.

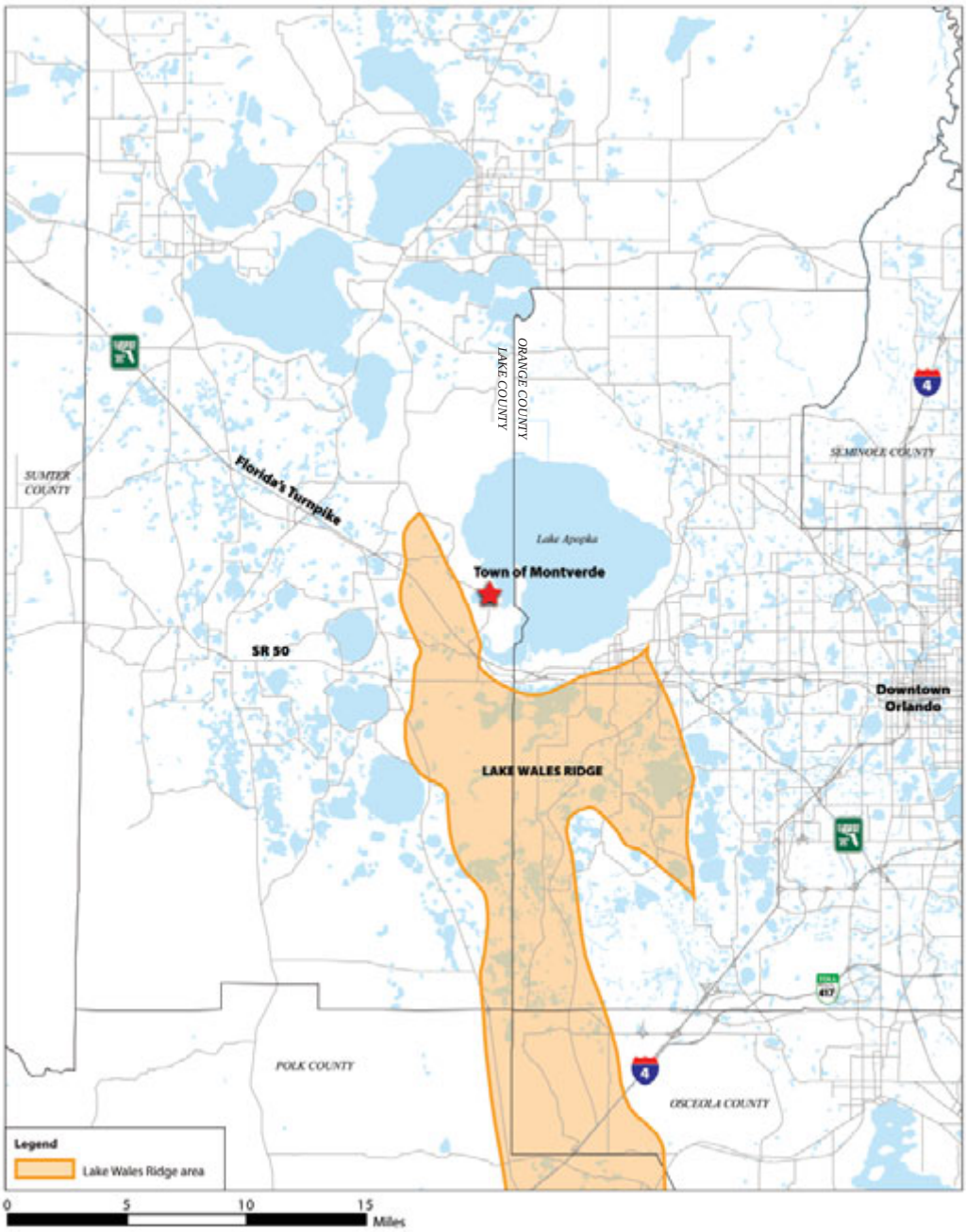


Figure 18 - Lake Wales Ridge Area in Lake County and Orange County

3.9 Contamination/Hazardous Materials Sites

The Florida Department of Environmental Protection provides a public notification process to advise property owners if pollution has been found on their property or in their neighborhood. The sites that were under assessment when the pollution was found are listed on the Property Owner Notification of Discovery of Pollution. These are sites for which site rehabilitation was being conducted when pollution was discovered at properties in the vicinity. This is not a complete list of all contaminated sites in this county, nor is it a complete list of all sites for which property owners will receive notification of pollution. A review of the Property Owner Notification of Discovery of Pollution found no listing in the Town of Montverde.

The Florida Department of Environmental Protection Hazardous Waste Facilities Search Results provides a database query for Resource Conservation and Recovery Act (RCRA) regulated facilities. Two sites are listed as being located within the Town of Montverde. The first, Circle K #7351, is listed at CR 455/Lakeside Drive, Montverde, FL 33619. The second, 16100 CR 455 Montverde, FL 34756, is located at the southern Town limits. Both sites are listed as Conditionally Exempt Small Quantity Generators (CES).

There are currently no petroleum contaminated sites listed by the FDEP. There is a solid waste facility located in Montverde, the Montverde Landfill, located on Fosgate Road. This landfill is closed. All of the above information was retrieved from the Florida Department of Environmental Protection Web Site in December 2007.

Contaminated sites are mapped on *Figure 19*.

The Florida Department of Environmental Protection Bureau of Petroleum Storage Systems Storage Tank/Contaminated Facility Search located six sites in the Town of Montverde.

1. 17502 CR 455 Montverde, FL 34756- 3114
Type: C-Fuel Users/Non-Retail
Status: Closed, removed from site.

2. Shaffner Citrus Groves, Ltd. Latitude: 28:25:59.7700, Longitude: 81:40:28.7500
Type: C-Fuel Users/Non-Retail
Status: Open

3. 17235 7th Ave Montverde, Fl 34756, Montverde Academy Inc.
Type: C-Fuel Users/Non-Retail
Status: Closed, removed from site.

4. Franklin Storage Building Inc. 16929 Lakeside Drive, Montverde, FL 34756
Type: A-Retail Station
Status: Open

5. Lake County Public Service Row, Franklin Street and 7th Avenue, Montverde FL 32756
Type: C-Fuel Users/Non-Retail
Status: Closed, removed from site.

6. Franklin Warehouse Inc, 455 E 9th Street, Montverde FL 34756
Type: C-Fuel Users/Non-Retail
Status: Closed, removed from site.

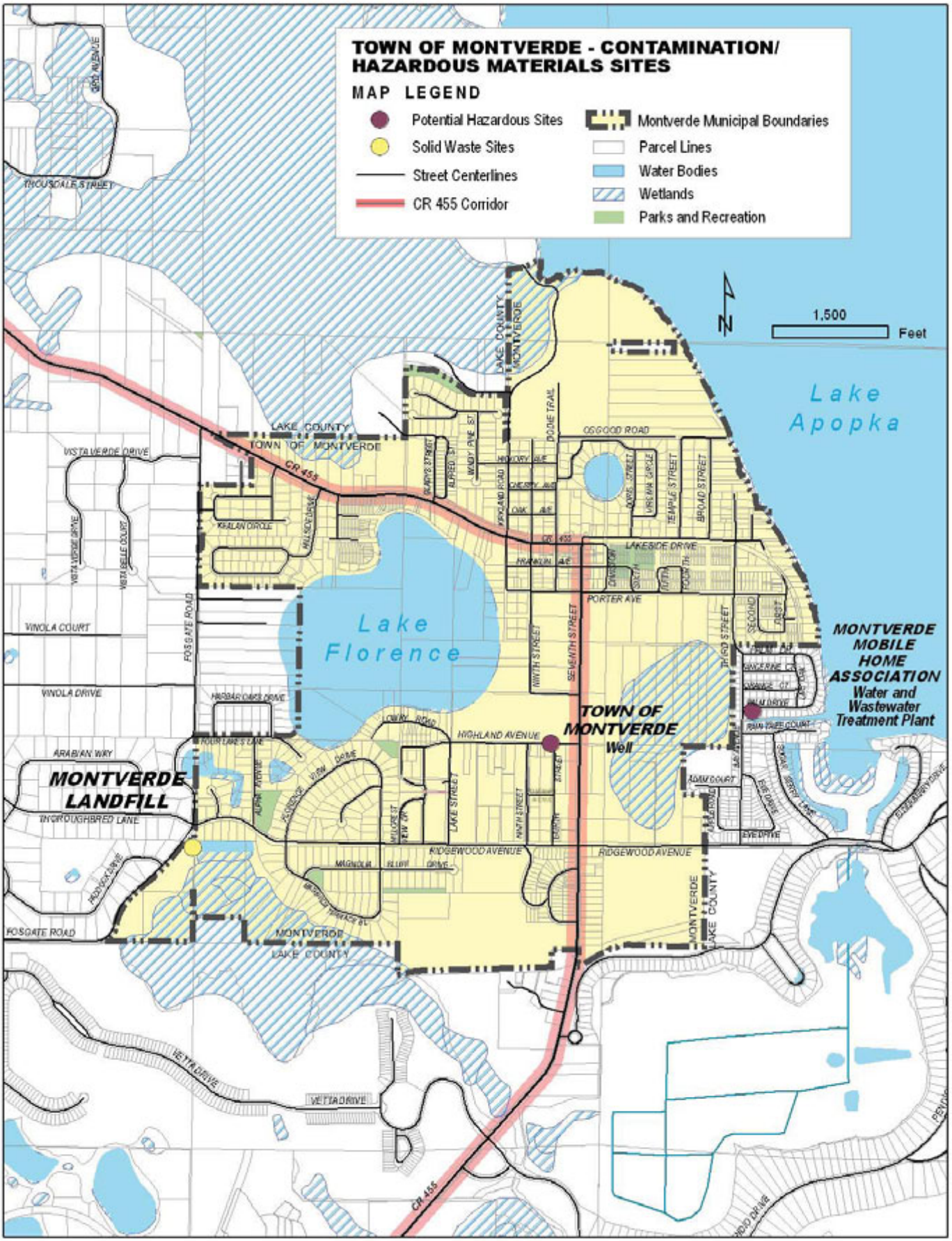


Figure 19 - Contaminated Sites

3.10 Cultural Features

The cultural center of the Town of Montverde is located off of CR 455. The Town Hall, community center, library, and Kirk Park are located east of CR 455 between Lakeside Drive and Porter Avenue. *Figure 20* shows the locations of civic facilities and parks.

3.11 Archaeological and Historic Features

The Lake Wales Ridge and the Lake Apopka shoreline were home to Native American communities.

There are five sites currently listed on the Florida Master Site File located within the Town of Montverde. CR 455 is located directly atop one of these sites. Two other archeological sites are located within 300 feet of CR 455.

In addition to these sites, The Osgood Property, located on the western bank of Lake Apopka, was listed on the Florida Master Site File as an archaeological site with the Florida Master Site File Number 8LA243. Phase III Mitigative Excavation has been completed on this site. Artifacts were recovered, and included ceramics, lithics, worked bones, and shells. Postholes from the Native American dwellings were mapped, as well as storage pits. The Phase III excavations and resultant analysis mitigates adverse impacts to the development of the Osgood site. Yet, the site still holds historic significance and may be eligible for listing on the National Register of Historic Places.

The Harper Home, located at 17408 Porter Avenue, was constructed c1880 and is listed in the Master Site file. It was home to Reuben Wyatt Harper, born June 30, 1863 in Belmont, Alabama. He and two partners formed the R.W. Harper Company, a fruit

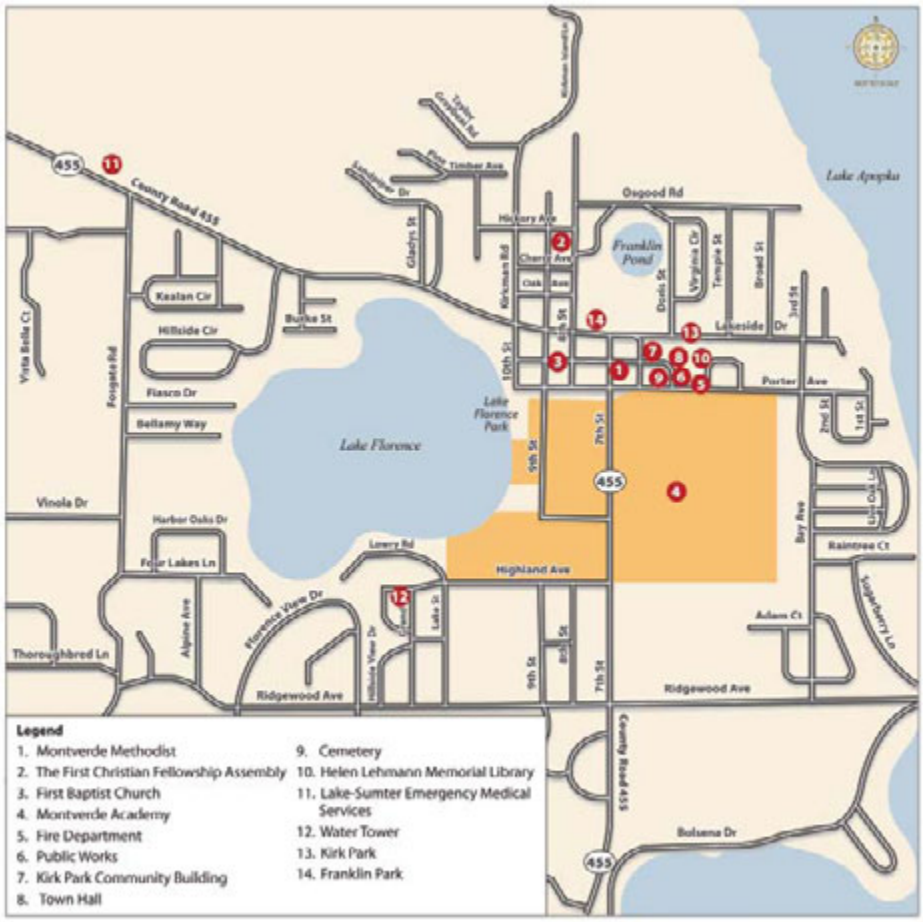


Figure 20 - Civic Facilities

brokerage company with its own groves and packinghouse. He was also one of the founders of the Montverde School. He served as the freight and express agent in Montverde for 22 years, beginning in 1892. He served as city councilman of Montverde and was a member of the Florida Citrus Mutual, Citrus Exchange and the Lake Region Packers Association. He was a Woodman of the World and a Mason of Winter Garden Lodge. Reuben Wyatt Harper died in 1960. His Great Floridian plaque is located at the R.W. Harper Home.

3.12 Hydraulic and Natural Features

The study area lies within the jurisdictional boundaries of the St. Johns River Water Management District (SJRWMD). Within the jurisdictional boundaries of the SJRWMD the study area lies within the Ocklawaha River Basin and can be further characterized by being included within the Lake Apopka Drainage Basin.

The corridor can be characterized as predominantly rural with surrounding residential areas except for a small urban downtown area and nearby private school development (Montverde Academy). Throughout the project corridor there is a limited amount of drainage infrastructure. Roadway and surface runoff mainly sheet flows to their respective outfall locations without receiving any water quality treatment.

The project area has three receiving bodies; Lake Apopka, Franklin Pond and Lake Florence. Franklin Pond and Lake Florence are landlocked. All three receiving bodies are considered distressed and subject to more stringent water

quality requirements. In general, west of the downtown area drains to Lake Florence, east of the downtown area and north of Porter Avenue drains to Franklin Pond and east of CR 455 and south of Porter Avenue drains to Lake Apopka. Since the described boundaries do not exactly follow the existing infrastructure a drainage basin map is provided in *Figure 3*.

The project corridor lies outside of a FEMA 100-year floodplain. However each of the three project receiving bodies has an associated 100-year flood elevation. Floodplain flood elevation information is located in FEMA's FIRM Map, 12069C0560 D, and is shown in *Figure 5*.

3.13 Threatened and Endangered Species

Ancient sea level increases during the Pleistocene and Recent epochs isolated the sand dunes and sand hills that comprise the Lake Wales Ridge from continental North America as narrow islands. During this period of isolation, various plants and animal species became adapted to the arid conditions of the scrub and longleaf pine *(Pinus palustris)*/ xeric oak conditions found on the Lake Wales Ridge. These adaptations led to the evolution of numerous endemic species, many of which are listed by state or federal agencies as threatened or endangered (*See Table 10*), for all listed species that are known to occur in Lake County).

Table 10

Wildlife and Plant Species Listed as Threatened, Endangered, and/or Species of Special Concern that Potentially Occur in the Study Area, Lake County, Florida

Common Name	Scientific Name	Florida Department of Agriculture (FDA)/ Fish and Wildlife Commission (FWC)	Fish and Wildlife Service (FWS)	Habitat Type (*)
Amphibian				
Gopher frog	Rana capito	SSC		4,6,9
Bird				
Aphelocoma coerulescens	Florida scrub jay	T	T	1
Aramus guarauna	limpkin	SSC		7,9,10,11
Dendroica kirtlandii	Kirtland's warbler	E	E	2,18
Egretta caerulea	little blue heron	SSC		7,9,10,11,12,13,14,15,16,17,21
Egretta thula	snowy egret	SSC		7,9,10,11,12,13,14,15,16,17,21
Egretta tricolor	tricolored heron	SSC		7,9,10,11,12,13,14,15,16,17,21
Eudocimus albus	white ibis	SSC		7,9,10,11,12,13,16,20
Falco peregrinus tundrius	peregrine falcon	E		6,9,10,12,15,16,17,18
Falco sparverius paulus	southeastern American kestrel	T		2,3,4,5,10,12,17
Grus canadensis pratensis	Florida sandhill crane	T		9,10,12,14,16,17
Haliaeetus leucocephalus	bald eagle	T	T	2,3,4,5,10,11,12,13,15,16,17,21
Mycteria americana	wood stork	E	E	7,9,10,11,12,13,14,15,17,21
Picoides borealis	red-cockaded woodpecker	T	E	2,3,4
Speotyto cunicularia	burrowing owl	SSC		2,9,17
Sterna antillarum	least tern	T		12,13,16,17
Fish				
Cyprinodon variegatus hubbsi	Lake Eustis pupfish	SSC		16
Pteronotropis welaka	bluenose shiner	SSC		16
Mammal				
Blarina carolinensis shermani	Sherman's short-tailed shrew	SSC		4,5,6,7,10
Podomys floridanus	Florida mouse	SSC		1,2,3
Sciurus niger shermani	Sherman's fox squirrel	SSC		2,3,4,5,6,7
Trichechus manatus	Florida manatee	E	E	16,25
Ursus americanus floridanus	Florida black bear	T		1,2,3,4,5,6,7,11,15
Reptile				
Alligator mississippiensis	American alligator	SSC	T(S/A)	11,12,15,16,17
Drymarchon corais couperi	eastern indigo snake	T	T	1,2,3,4,5,12,13
Gopherus polyphemus	gopher tortoise	SSC		1,2,3,4,6
Neoseps reynoldsi	sand skink	T	T	1,2,3
Pseudemys concinna suwanniensis	Suwannee cooter	SSC		16
Pituophis melanoleucus mugitus	Florida pine snake	SSC		2,3,6,17
Stilosoma extenuatum	short-tailed snake	T		1,2,6

...continued on next page

Table 10 continued…

Common Name	Scientific Name	Florida Department of Agriculture (FDA)/ Fish and Wildlife Commission (FWC)	Fish and Wildlife Service (FWS)	Habitat Type (*)
Plants				
Asclepias curtissii	Curtis' milkweed	E		1
Bonamia grandiflora	Florida bonamia	E	T	1
Calamintha ashei	Ashe's calamintha	T		1,3
Carex chapmanii	Chapman's sedge	E		8
Celosia nitida	slender celosia	E		7
Centrosema arenicola	sand butterfly pea	E		2
Chionanthus pygmaeus	pygmy fringe-tree	E	E	1
Cleistes divaricata	spreading pogonia	T		5,12,14,15
Clitoria fragrans	pigeon wings	E	T	1,2
Coelorachis tuberculosa	Florida joint-tail	T		12,16
Cucurbita okeechobeensis	Okeechobee gourd	E	E	4,5
Encyclia tampensis	Florida butterfly orchid	C		6,7,11,15,21,23
Epidendrum conopseum	green-fly orchid	C		7,15
Eriogonum floridanum	scrub-buckwheat	E	T	1,2
Garberia heterophylla	garberia	T		1
Hartwrightia floridana	hartwrightia	T		5,12,14
Hasteola robertiorum Gulf	hammock cacalia	E		7
Hexalectris spicata	crested coralroot	E		7
Illicium parviflorum	star anise	E		7,15
Justicia cooleyi	Cooley's justicia	E	E	7
Lechea cernua	scrub pinweed	T		1
Lilium catesbaei	pine lily	T		4,10
Listera australis	southern twayblade	T		7,15
Lobelia cardinalis	cardinal flower	T		11
Lycopodium cernuum	nodding club-moss	C		5,7,14,16
Matelea floridana	Florida spiny-pod	E		6,7
Matelea pubiflora	sandhill spiny-pod	E		2
Monotropa hypopithys	pine-sap	E		6,7
Najas filifolia	slender naiad	T		16
Nemastylis floridana	celestial lily	E		5,12,15
Nolina brittoniana	Britton's beargrass	E	E	1,2,3
Osmunda cinnamomea	cinnamon fern	C		12,14,15
Osmunda regalis	royal fern	C		12,14,15
Paronychia chartacea	papery whitlow-wort	E	T	1
Pecluma plumula	plume polypody	E		7,15,23
Pecluma ptilodon	swamp plume polypody	E		7,11,15,23
Pinguicula caerulea	blue butterwort	T		4,5,14
Pinguicula lutea	yellow butterwort	T		4,5,14
Platanthera blephariglottis	white-fringed orchid	T		10,14,15
Platanthera ciliaris	yellow-fringed orchid	T		5,12,14
Platanthera flava	gypsy-spikes	T		5,12,14
Platanthera nivea	snowy orchid	T		5,10,14
Pogonia ophioglossoides	rose pogonia	T		5,12,14
Polygala lewtonii	Lewton's polygala	E	E	1,2
Prunus geniculata	scrub plum	E	E	1
Pteroglossaspis ecristata	non-crested eulophia	T		1,2,3
Rhapidophyllum hystrix	needle palm	C		6,7
Sacoila lanceolata	leafless beaked orchid	T		4,5,6,17
Salix floridana	Florida willow	E		15,20
Sarracenia minor	hooded pitcher-plant	T		4,5,10,14
Spiranthes laciniata	lace-lip ladies'-tresses	T		12,15
Spiranthes tuberosa	little pearl-twist	T		3
Tillandsia utriculata	giant wild-pine	E		6,7,15,23
Triphora trianthophora	three-birds orchid	T		6,7
Vicia ocalensis	Ocala vetch	E		12,14
Warea amplexifolia	clasping warea	E	E	1,2
Zamia pumila	coontie	C		6,19,22
Zephyranthes atamasco	atamasco lily	T		4
Zephyranthes treatiae	Treat's zephyr-lily	T		5,10

SSC - Species of Special Concern (FWC) T(S/A) - Similarity of Appearance (FWS) C - Commercially Exploited CA - Candidate for Listing T - Threatened E - Endangered

*Habitat Types

1 - Scrub
2 - Sandhills
3 - Scrubby Flatwoods
4 - Mesic Flatwoods
5 - Wet Flatwoods
6 - Dry Hammocks
7 - Wet Hammocks
8 - Calcerous Hammocks
9 - Dry Prairie
10 - Wet Prairie
11 - Bottomland Hardwood
12 - Freshwater Marsh
13 - Saltwater Marsh
14 - Seepage Bog
15 - Swamp/Cypress Dome
16 - Ponds/Lakes/Streams
17 - Disturbed/Cultivated
18 - Sand Dunes/Beach
19 - Pinelands
20 - Banks of Streams
21 - Mangroves
22 - Shell middens
23 - Epiphyte
24 - Limestone Sink Edges
25 - Marine

Glatting Jackson Kercher Anglin, Inc.
Source: Wunderlin, R. 1998. Guide to the Vascular Plants of Florida. Univ. P of Florida
Various authors. Endangered Biota of Florida series. 1992-1996
Envirotools - Tess 2.0 - version 2000.

Historically, the Lake Wales Ridge was comprised of a mosaic of high pine, scrub, wet prairies, freshwater marshes, sinkhole lakes and forested wetlands. Frequent fires swept through the pyrogenic high pine areas, which maintained the high plant species diversity and open park-like appearance of these areas. Many of the plants and animals in this habitat were adapted to these frequent fires, exhibiting such characteristics as burrowing under the sand (wildlife) or being able to regrow quickly after a fire burned through an area (plants). Much of these historic areas, including the majority of the Town of Montverde, have been converted into residential or agricultural uses such as citrus groves or pine plantations, thereby fragmenting the remaining pieces of natural vegetation and causing long-term changes in the fire regimes of these pyrogenic communities. The lack of fire has compromised habitats utilized by populations of threatened and/or endangered species along the Lake Wales Ridge.

An evaluation of existing data pertaining to listed species found within the Florida Geographic Data Library (FGDL) was conducted. As depicted in *Figure 21*, this analysis revealed the presence of one bald eagle *(Haliaeetus leucocephalus)* nest within and one north of the Town of Montverde. Current regulations require a primary buffer zone of 330 feet and a secondary buffer zone of 660 feet from these nest locations. The improvements identified in this Master Plan do not appear to interfere with these regulatory requirements.

Aerials Express (3/2006)

Figure 21 - Bald Eagle Nests within and near the Town of Montverde (2006/2007 Nesting Season)

The United States Fish and Wildlife Service (USFWS), through the Endangered Species Act and other regulatory instruments, and the Florida Fish and Wildlife Conservation Commission (FFWCC), through Chapter 68 of the Florida Administrative Code, regulate activities that may affect protected species. Site specific investigations are likely to be required prior to the implementation of any planned improvements. Ultimately, the following permits may be required prior to construction:

- Environmental Resource Permit (ERP) – Florida Department of Environmental Protection/St. Johns River Water Management District
- Individual Permit/Nation Wide Permit – United States Army Corps of Engineers
- Gopher Tortoise (*Gopherus polyphemus*) Relocation Permit – Florida Fish and Wildlife Conservation Commission
- Section 7 or Section 10 Incidental Take Permit/Biological Opinion – United States Fish and Wildlife Service
- Building Permit - Lake County Government

3.14 Community Values

At the Design Workshop, participants were asked to identify three words that summarized the most important issues or qualities of their communities. They were then asked to write those words on post-its. The following table summarizes the number of times each of these general categories were mentioned on a post-it.

As meetings have been held over the course of the study, including Montverde Day, citizens continued to confirm the desire to maintain a small town identity with more local businesses to add life to the downtown. Likewise, when discussing the issue of traffic, there were numerous concerns expressed about traffic travelling too fast through Montverde.

Table 11
Issues Identified by the Community

Important Community Issue	Number of Attendees To Identifying Issue
Small town identity	15
Traffic	9
Open space/recreation	8
Environment	5
Safety	4
Aesthetics	3
Schools	1

Needs Assessment

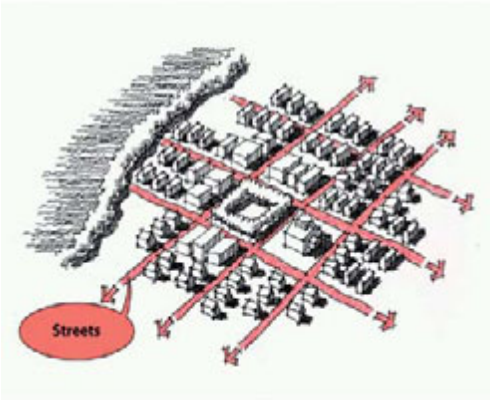
4. Needs Assessment

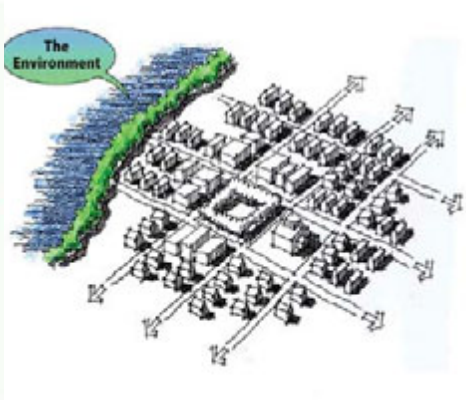
4.1 Elements of a Town

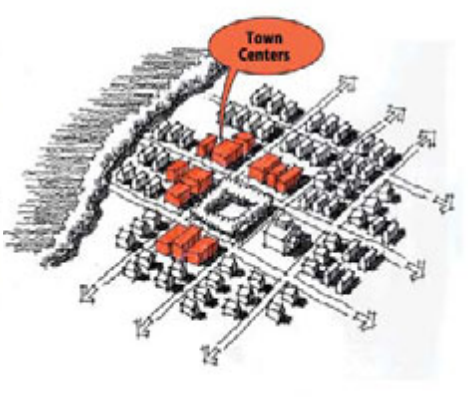
There are six structural elements that form the building blocks of a community. These include Town Centers, community buildings, neighborhoods, streets, parks and open space, and the environment. The health of each element adds to the vitality of the other elements. Conversely, deficiencies in any one area can diminish the quality or capacity of the other elements. The public elements (community buildings, streets and parks and open space) provide the framework for private investment.

The efforts put forth by the Town's citizens to create a vision for the community is but a starting point to shape how the Town will grow during coming years. Within the region, growth will certainly occur as is evidenced by the development planned all throughout the area, so the issue for the Town is how will it's growth take place? This report establishes goals for the community, which if implemented, can help to shape the Town in a fashion that reflects the citizen's vision.

As mentioned above, each element is important to achieving successful place making, so it is important for the Town to put some effort into each element. By developing an implementation plan with established priorities and goals for completion, the Town can accomplish it's goal of preserving the rural identity and lifestyle of the Town.







4.2 Town Center

There are a number of vacant or under utilized commercial buildings in the Town Center. *Figure 22* shows the current uses in the Town Center (as of January 2008).

Citizens have shared their interest in having a vital downtown with restaurants, sidewalk cafes, possibly a bike shop, other locally owned shops, and improved civic buildings to create a sense of place in the downtown and provide opportunity for interaction with their community.

Having healthy retail business will require on street parking since room for surface parking is not readily available. Likewise, sidewalks and shade trees are needed throughout the downtown on both sides of CR 455 to provide a comfortable place for pedestrian activity.

One issue related to the difficulty with development in the Town Center is the lack of a waste water treatment plant and the associated sanitary sewer system. There are potential resources available to assist smaller communities with funding the construction of the much needed waste water treatment plant. Coordination is underway to investigate the potential for securing this funding. This will also allow the Town to reduce the growth of septic tank systems which may be contributing to surface water pollution in the adjoining Lakes Apopka, Lake Florence and Franklin Pond.

Figure 22 - Current Uses in the Town Center

4.3 Parks and Open Space

Parks and public facilities within the town are mapped on *Figure 23*. There are no park facilities located on Lake Apopka. The Truskett Park site is in place, but has no facilities, nor is there any indication that the property is a park and therefore is not used by the community.

A public park, with benches and play equipment is located on Lake Florence. Ball fields, play equipment, and a community center are provided at Kirk Park. There is one existing boat launch, at the end of Abrams Avenue, which is in poor condition and lacks parking.

4.4 Community Buildings

The Town library is in need of a new site. The post office is also in need of a new site, and it is important to residents to maintain a functioning post office in the Town. Well designed and prominent community buildings are important civic landmarks, creating a sense of destination to those entering a community. They also contribute to the identity of a town, and provide a gathering place for social exchange. The need for new civic buildings provides an opportunity to add to the Town's sense of place.

4.5 Neighborhoods

The Town of Montverde benefits from established neighborhoods. The historic neighborhoods benefit from the existing interconnected street pattern. While many streets do not provide sidewalks, the narrow streets and block pattern provide a reasonably comfortable walking environment within the neighborhoods.

4.6 Streets

Due to topography, water bodies, and historic growth patterns, there is little regional roadway network parallel to CR 455. CR 561, approximately 4 miles to the west of the Town of Montverde, is the only alternative north-south corridor west of Lake Apopka.

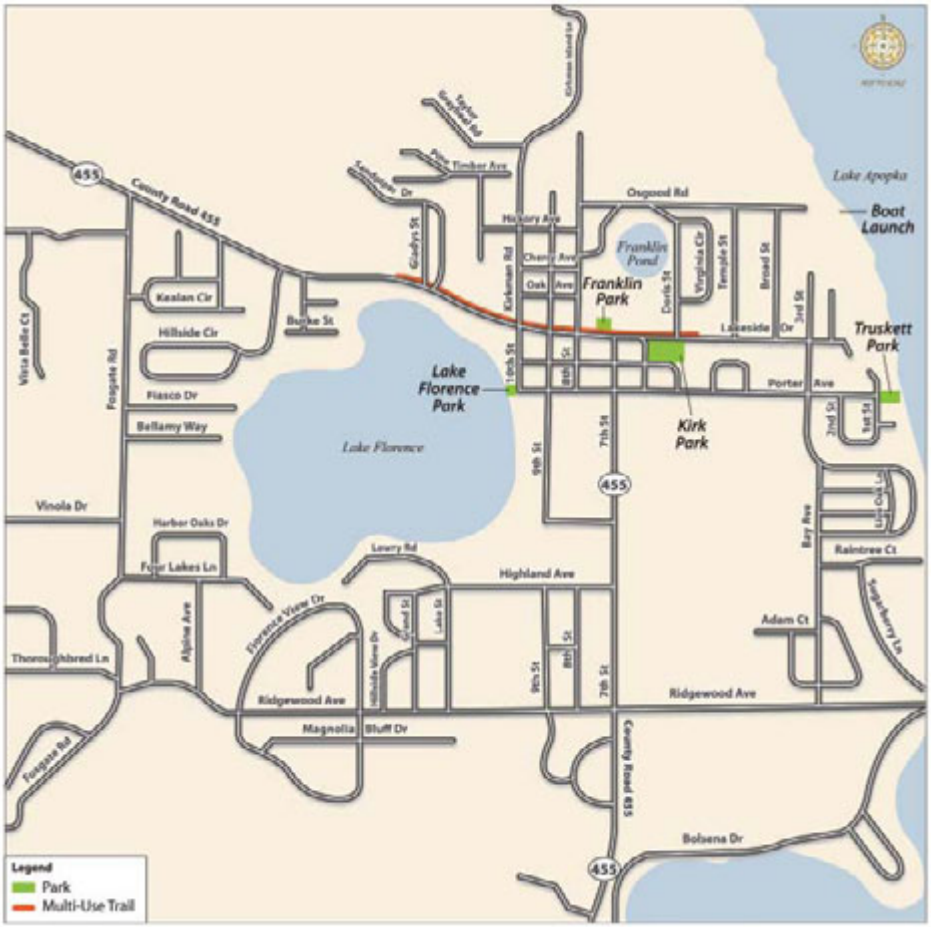


Figure 23 - Parks and Open Space

The historic center of the Town of Montverde maintains its interconnected street pattern. Newer development has followed a more disconnected, loops and lollypops street pattern. The new development pattern requires residents to access CR 455, Fosgate Road or Ridgewood Avenue for all vehicular trips.

There is a limited sidewalk network in the Town of Montverde. Newer developments tend to provide sidewalks. Sidewalks are not provided within older developments or along major roadways. Sidewalks are mapped on *Figure 24*.

4.7 Design Principles

During the Design Workshop, residents were asked to write down three words that summarized the most important issues or qualities of their communities. Based on this feedback the design team developed Design Principles that informed the design process and were used as a measure of effectiveness for the proposed investments and designs.

- Preserve small town identity
- Provide opportunities to learn and experience natural resources
- Design authentic to the Green Mountain Scenic Byway area
- Facilitate appropriate local businesses
- Create safe facilities for all users

4.8 Needs

The evaluation of the current Town structure, public input, projected traffic volumes, and crash analysis were all evaluated to develop the needs assessment for CR 455 within the Town of Montverde.

Figure 24 - Sidewalks

Table 12
Needs

Town Element	Need/Deficiency
Town Center	Lack of parking Lack of sanitary sewer system and waster water treatment plant Lack of sidewalks and streetscape Missing business that attracts a critical mass of activity
Parks and Open Space	Underutilized sites Lack of access to Lake Apopka
Community Buildings/ Civic Identity	Lack of gateway/introduction to Town CR 455 bisects community No community/public buildings located on CR 455 Need for new civic buildings (library and post office)
Streets	
Network	Lack of regional network
Speeding	Speeding through Town and the Academy
Congestion	Projected 2030 LOS F at Ridgewood Avenue
Safety	Crash data shows high crash rates at Ridgewood Avenue and a high percentage of crashes occurring under wet conditions
Noise	Increased vehicular travel will increase noise created by vehicular travel
Pedestrian Safety/Travel	Incomplete/absent sidewalk network No pedestrian crossings at intersections
Bicycle Safety/Travel	No facilities provided, bicyclists share vehicle travel lane
Drainage	Ponding at CR 455/Gladys Street, CR 455/10th Street Flooding at CR 455/Franklin to Porter and CR 455/Ridgewood Avenue Roadway modifications will need to meet current water quality and water quantity standards of the SJRWMD, as well as the Lake Apopka Drainage Basin more stringent water quality criteria
Neighborhoods	Lacks sidewalks New development disconnected from historic town sections

Recommendations

Table 13
Summary of Recommendations

Town Center	
1.	Porter Avenue to Lakeside Drive Streetscape
Community Buildings/Civic Identity	
2.	Post office/library building
3.	Wayfinding in Town Center
4.	Gateway features
Streets	
5.	Continue connected street pattern as Town develops
6.	Roundabout at Fosgate Road
7.	Roundabout at Lakeside Drive
8.	Roundabout at Ridgewood Avenue
9.	Bicycle Lanes North Section – from northern Town limits to 10th Street
10.	Town Center West Section – from 10th Street to Lakeside Drive
11.	Montverde Academy Section – from Porter Avenue to southern Montverde Academy gateway feature
12.	Curb and Gutter Section – from Highland Avenue to Ridgewood Avenue
13.	Pedestrian crossing treatments in Montverde Academy
14.	Extend School Zone
15.	Pave Park Lane
16.	Traffic calming on 9th Street
17.	CR 455 (Gladys Street) - side drainage under existing driveway
18.	CR 455(10th Street) - additional storage volume for drainage
19.	CR 455 (Lakeside Drive to Porter Avenue) - stormwater treatment for CR 455 from Porter to Lakeside Drive
20.	CR 455 (Porter Avenue to Ridgewood Avenue) - remove existing concrete ditch
Parks andOpen Space	
21.	Truskett Park
22.	Osgood Site
23.	Boat launch at the end of Abrams Avenue
Environment	
24.	Wastewater treatment plant

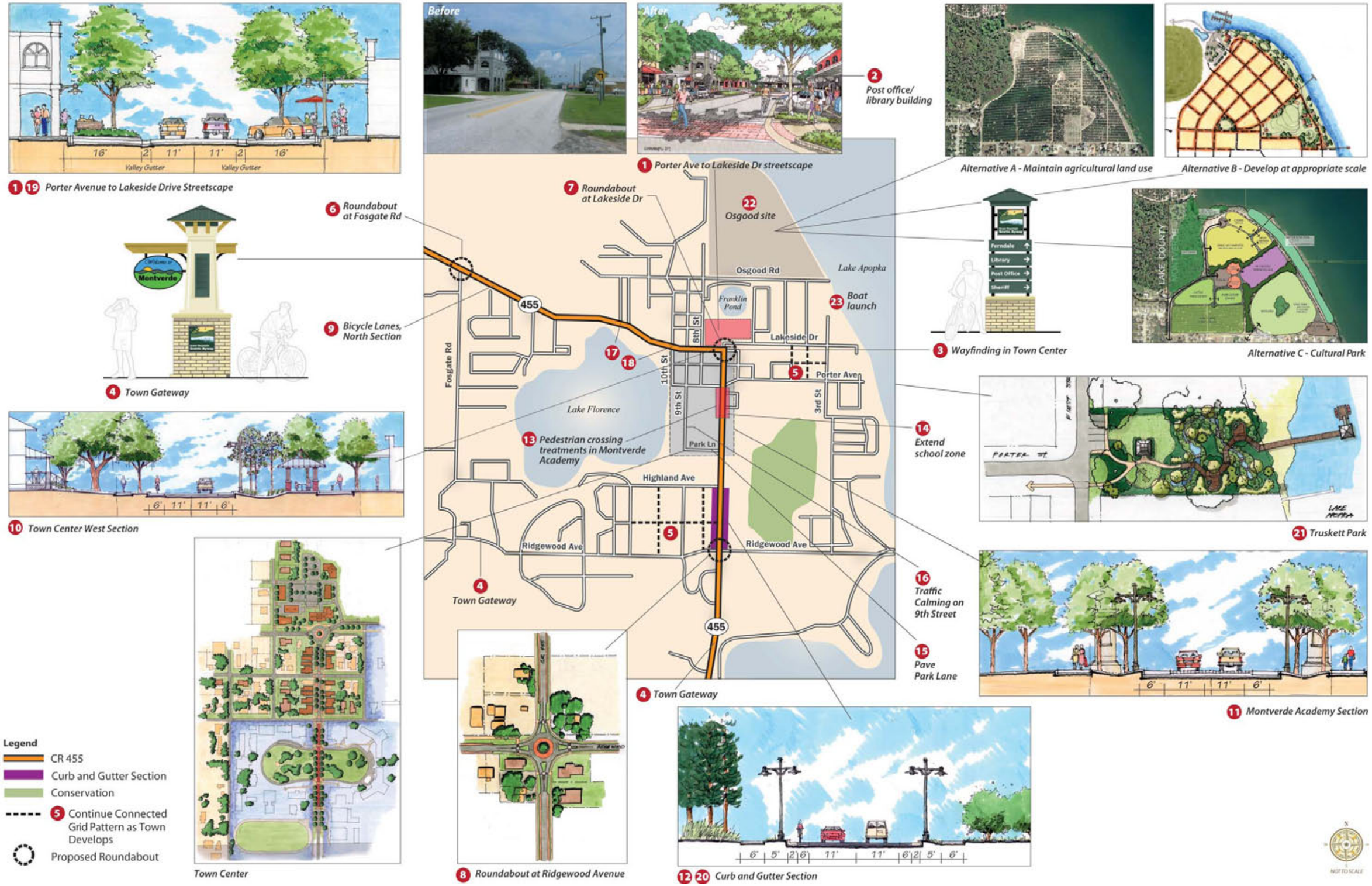


Figure 25 - Overview of Recommendations (see *Table 13* for List of Recommendations)

5.1 Descriptions of Recommendations

Town Center

Recommendation Number 1.

Porter Avenue to Lakeside Drive Streetscape

Enhancements to CR 455 in the Town Center are focused on revitalizing commercial development in the area, mitigating increased traffic, and providing safe and comfortable pedestrian travel. The streetscape includes landscaping, pedestrian scale lighting, sidewalks (to be introduced as development occurs), and on-street parking. Back in angled parking would introduce 54 on-street parking spaces which are critical to the success of retail business or restaurants in the Town Center.

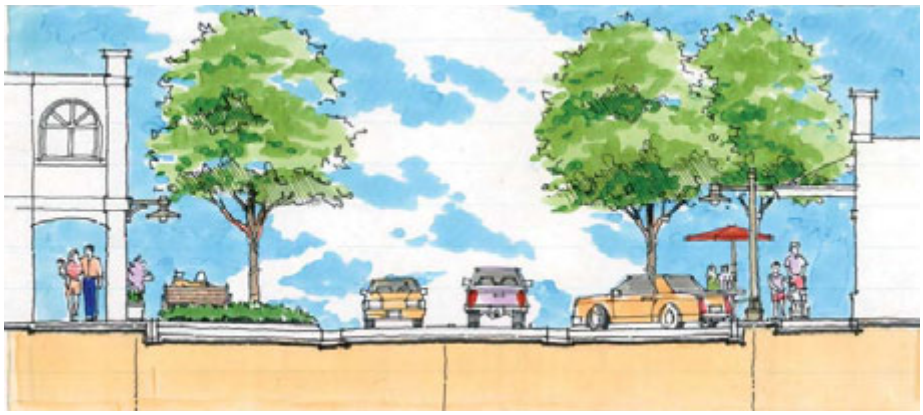


Figure 26 - Section View of Town Center, Porter Avenue to Lakeside Drive

Community Buildings/Civic Identity

Recommendation Number 2.

Post office/library building

The Town of Montverde has identified the need for a new library. The post office has expressed a need for a larger facility, and the Town has expressed the importance of keeping the post office in the town. These uses provide civic identity and a place for residents to congregate, formally or informally, and are important to building and supporting social capital within a community. A catalyst site and focal point is needed for the redevelopment of the Town Center. It may be possible to redevelop the current strip commercial site located at CR 455 and Lakeside Drive to serve as one or both of these uses. As an alternative, there are other vacant sites along CR 455 that could be utilized.

Figure 27 - Sketch of Town Center, Porter Avenue to Lakeside Drive heading northbound towards Lakeside Drive

Recommendation Number 3.
Wayfinding in Town Center
The Town's civic facilities are located off of CR 455. The current signage provided to those sites is cluttered, and disorganized *(see photo at right)*. An alternative signage system is presented below.

Recommendation Number 4.
Gateway Features
Residents expressed an interest in developing gateway features for the northern and southern limits of town along CR 455, and well as the western limits of town along Ridgewood Avenue. The gateway feature shown below provides cohesion with the Green Mountain Scenic Byway signage plan, while celebrating the unique character of the Town of Montverde.

Current Signage

Streets

Access Management Recommendations
As part of this study, the consultant was asked to review the current Florida Department of Transportation State Highway System Access Management Classification System and Standards and confirm the existing or recommended alternative access management classifications for the County that may be applicable to CR 455.

The Florida Department of Transportation State Highway System Access Management Classification System and Standards apply to the State Highway System. The implementation of the classification system and standards is intended to protect public safety and general welfare, provide for the mobility of people and goods, and preserve the functional integrity of the State Highway System.

Figure 28: Proposed Directional Sign and Town Gateway

Table 14

Figure 2 from FDOT 14-97.003 Access Management Classification System and Standards

Controlled Access Facilities

Access Class	Facility Design Features	Minimum Connection Spacing*	Minimum Median Opening Spacing*	Minimum Median Opening Spacing*	Minimum Signal Spacing*
	(Median Treatment and Access Roads)	(Feet)	Directional (Feet)	Full (Miles)	(Miles)
2	Restrictive with Service Roads	1320/660	1320	0.5	0.5
3	Restrictive	660/440	1320	0.5	0.5
4	Non-Restrictive	660/440	N/A	N/A	0.5
5	Restrictive	440/245	660	0.5/0.25	0.5/0.25
6	Non-Restrictive	440/245	N/A	N/A	0.25
7	Both	125	330	0.125	0.25

* (Greater than 45 MPH/Less than or = 45 MPH)

The Access Management Classifications for controlled access highways (Classes 2 through 7) are arranged from the most restrictive (Class 2) to the least restrictive (Class 7). Generally the highways serving areas without existing extensive development or properties without subdivided frontages will be classified at the top of the range (Classes 2, 3, and 4). Those roadways serving areas with existing moderate to extensive development or subdivided properties will generally be classified in the lower classes of the range (Classes 5, 6, and 7). If the FDOT classification standards were to be applied to CR 455, it would fall within the lower classes of the range (Classes 6, and 7), since most of the properties along the roadway are developed or subdivided into small lots.

CR 455, designated as the Green Mountain Scenic Byway, is policy constrained to two lanes. As stated in the Land Use section, the land use patterns within the Town, and specifically along CR 455 are established. Within the Town of Montverde's Town Center, the roadway serves as a main street. Through Montverde Academy, it serves as part of the campus. North of the Town Center it provides direct access to residents that front the roadway. A restrictive median would be inappropriate due to the development patterns currently located or planned along the corridor. Therefore, categories 6 or 7 could apply to CR 455.

"Access Class 7. This class shall only be used in urbanized areas where existing land use and roadway sections are built out to the maximum feasible intensity and where significant land use or roadway widening will be limited. This class shall be assigned only to roadway segments where there is little intended purpose of providing for high speed travel. Access needs, though generally high in those roadway segments, will not compromise the public health, welfare, or safety. Exceptions to standards in this access class will be considered if the applicant's design changes substantially reduce the number of connections compared to existing conditions. These highways can have either restrictive or non-restrictive medians."

-- FDOT 14-97.003 Access Management Classification System and Standards

Lake County, in coordination with the FDOT and LSMPO, maintains a functional classification system for collector and local roadways under its jurisdiction that is sensitive to the local dynamics of the County. CR 455 is classified a major collector extending from SR 50 in the south to SR 19 in the north in Lake County. Full connections are allowed every 660 feet.

New commercial development along CR 445 within the Town of Montverde is most likely to occur as reuse or redevelopment within the Town Center. Residential development may occur along the east and west side of CR 455 between Highland Avenue and Ridgewood Avenue. For the residential development along CR 455, the Town should promote an extension of the traditional grid street pattern, and possibly an alley system that will provide access to parcels from properly spaced street cross-section, instead of individual home sites. The Town should also promote new street connections to access other roadways in the area, such as 8th Street and Ridgewood Avenue, allowing residents alternative routes into and out of their homes.

Recommendation Number 5.
Continue connected grid pattern as Town develops.

New development should add to the efficiency of the street network by providing additional routes, or connections within the town. Connected street patterns also provide social cohesion, as well as efficient pedestrian and bicycle travel.

Recommendations 6, 7, 8
Roundabouts

Ridgewood Avenue is projected to fall below the adopted LOS standards by 2030 based on the current intersection configuration. Safety concerns have also been documented at the intersection. Residents expressed interest in gateway features and traffic calming devices entering the Town. Alternative improvements to reduce delays at the following intersections (see table below) were evaluated. It should be noted that the Green Mountain Scenic Highway CAC opposes any new signalized intersections along the corridor. Based on this, the available ROW, and the projected traffic volumes, roundabouts are recommended at each of the intersections listed below. The roundabouts evaluated for these intersections were designed with a 110' inscribed diameter, which allows for a WB-50 truck to negotiate safely.

Table 15
2030 PM Peak LOS Comparison of Alternative Improvements

Intersection	No Build* (Stop Control)			Signalized Intersection*		Roundabout**	
	LOS Major Street	LOS Minor Street	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)
CR 455 and Fosgate Road	A	C	3.9			A	7.5
CR 455 and Lakeside Drive	A	D	20.2			A	9.3
CR 455 Ridgewood Avenue	A	F	964.5	C	34.2	A	9.9

* HCM Analysis (Synchro 7)
** aaSIDRA 2.1

Table 16
CR 455 2030 PM Peak Hour LOS from South of Ridgewood Avenue to West of Fosgate Road – with Proposed Roundabouts at Fosgate Road, Lakeside Drive, and Ridgewood Avenue

	Average Speed (MPH)	LOS
AM Peak Hour		
CR 455 - EB/SB	27.0	B
CR 455 - WB/NB	27.0	B
PM Peak Hour		
CR 455 - EB/SB	30.0	B
CR 455 - WB/NB	30.0	C

Based on Scenario 3 Analysis. LOS is based on the arterial classification of Class III for CR 455.

Figure 29: Roundabout at Fosgate Road

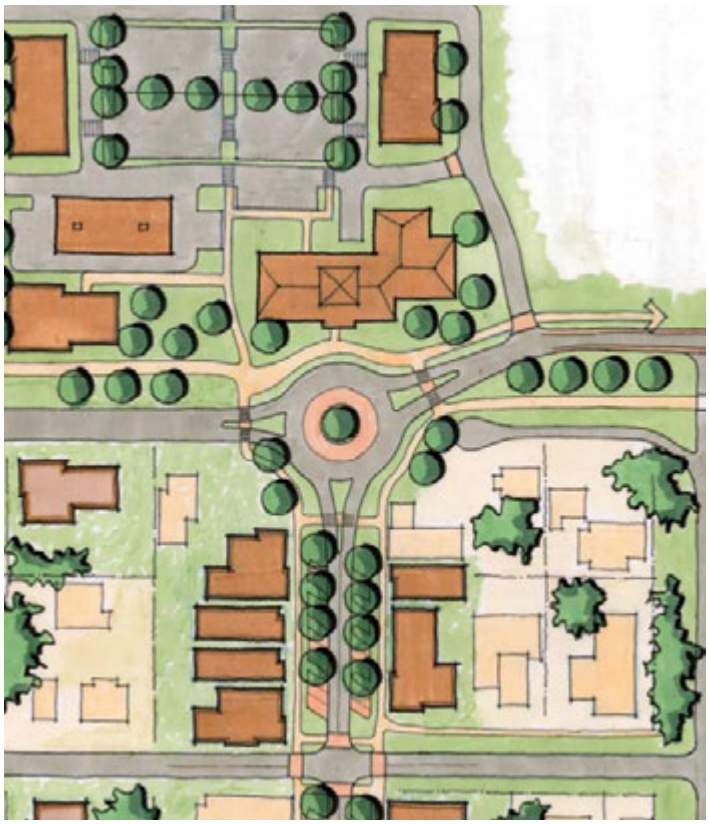


Figure 30: Roundabout at Lakeside Drive

Figure 31: Roundabout at Ridgewood Avenue (see inset, *top right*, for property information)

Cross-sections

Recommendation Number 9.
Bicycle Lanes North Section
CR 455 northbound, between the north City limits and 9th Street – add concrete bicycle lanes

Recommendation Number 10.
Town Center West Section
CR 455 northbound, between 9th Street and Lakeside Drive – 11 foot asphalt travel lanes, 6 foot concrete bicycle lanes, curb and gutter.

Recommendation Number 1.
Porter Avenue to Lakeside Drive
CR 455 northbound, between Lakeside Drive and Porter Avenue - 11 foot asphalt travel lanes, 2 foot valley gutter, 16 feet back-in angled parking with landscaped curb extensions, and 6 foot sidewalks on private property.

Recommendation Number 11.
Montverde Academy Section
CR 455 northbound, between Northern gateway feature and southern gateway feature for Montverde Academy - 11 foot travel lanes paved in brick or stamped concrete, 6 foot concrete bicycle lanes.

Recommendation Number 12. Curb and Gutter Section
CR 455 northbound, from Park Lane to southern Town limits - 11 foot asphalt travel lanes, 6 foot concrete bicycle lanes, curb and gutter, and sidewalks.

Recommendation Number 13.
Pedestrian crossing Treatments in Montverde Academy
Montverde Academy is a boarding facility, therefore there are children using the pedestrian crossings throughout the day and in the evenings. Light-Emitting Diodes (LEDs), lighting in pavement for pedestrians crossing at night, are recommended for every pedestrian crossing.

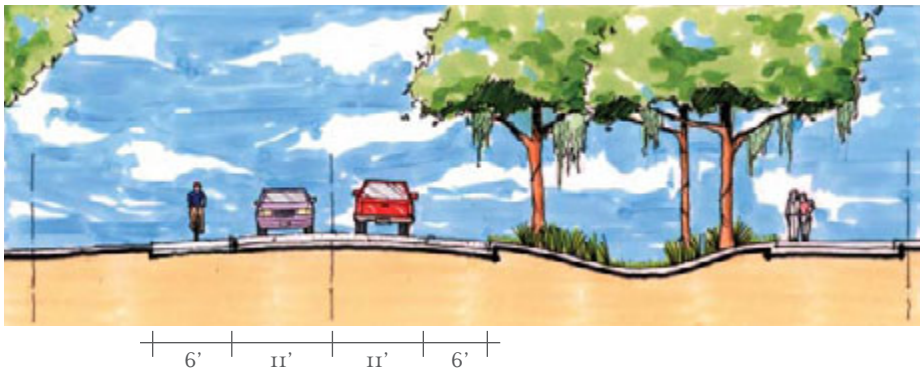


Figure 32: Bicycle Lanes North Section

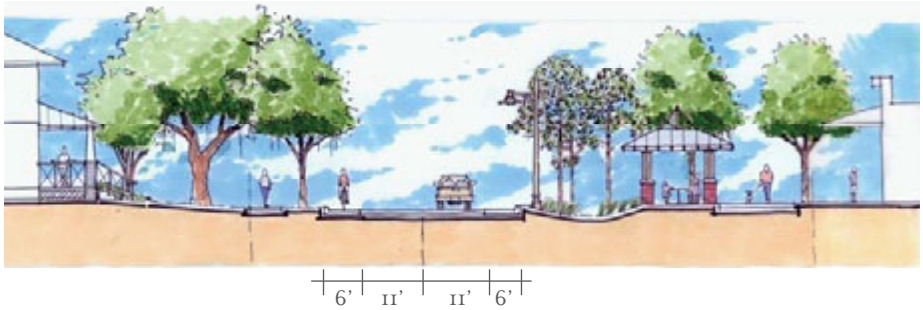


Figure 33: Town Center West Section

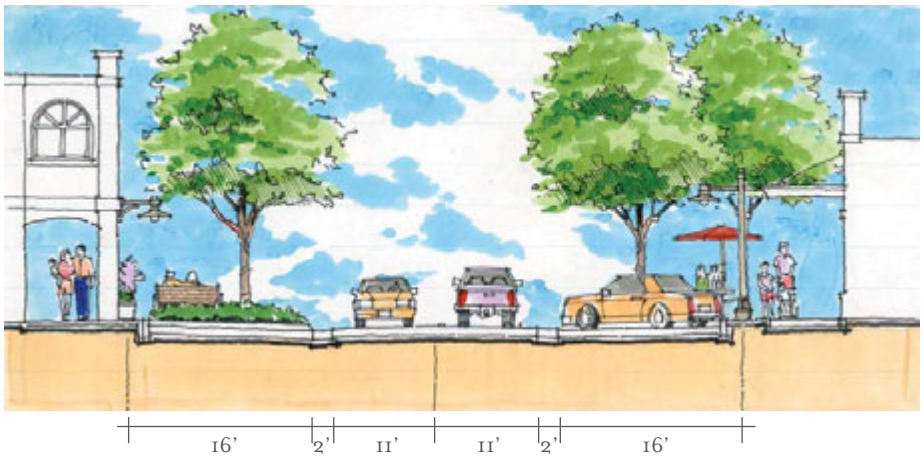


Figure 34: Porter Avenue to Lakeside Drive Section

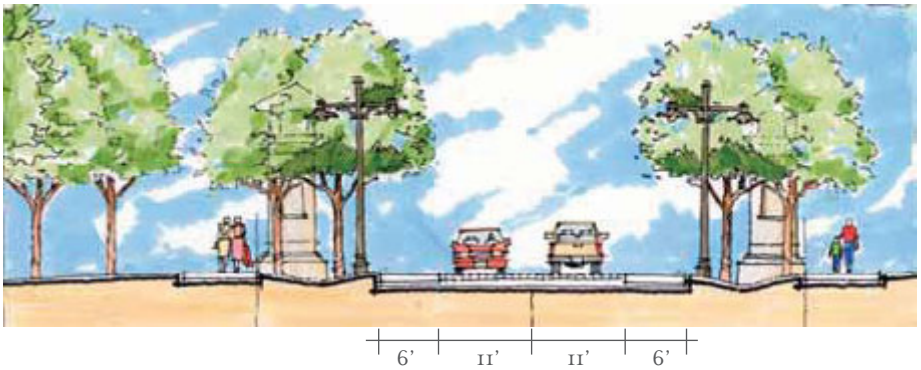


Figure 35: Montverde Academy Section

Recommendation Number 14.
Extend School Zone

Currently, the school zone signs are located immediately adjacent to the pedestrian crossings. The school zone signs should be relocated to ensure that vehicles have slowed to an appropriate speed before encountering a child in the crosswalk.

In Florida, there are no standards for the length or location of school speed zones. Research was conducted to provide guidance for a reasonable distance from a pedestrian crosswalk.

The *Safe Ways to School Tool Kit*, published by the Florida Traffic and Bicycle Safety Education Program, suggests:

- Increasing school zones beyond school property limits to include major crossings adjacent to the school.
- Special emphasis crosswalks (pavement color or texture change), raised pedestrian crossings, pavement markings, refuge islands, and/or bulbouts at corners.

Washington State requires the school zone start 300 feet from the pedestrian crossings.

Stopping sight distance may be a reasonable guide for the location of school zone signs as you would want to ensure a vehicle can stop before encountering a pedestrian. At 30 mph, the AASHTO A Policy on Geometric Design of Highways and Streets determines the stopping sight distance for arterials to be 200 ft. AASHTO does not provide a stopping sight distance at 20 mph, but it can be calculated to be 106 feet, which could be rounded to 125 feet for design purposes.

Therefore, it is recommended that the school speed zone be extended to the north side of Porter Avenue and 200 feet south of the southern pedestrian crossing. An alternative pavement pattern, brick or stamped concrete, should be used through the length of the school speed zone to highlight the length of the zone and to help reinforce the posted speed limit. A contrasting pavement surface is recommended for the pedestrian crossings.

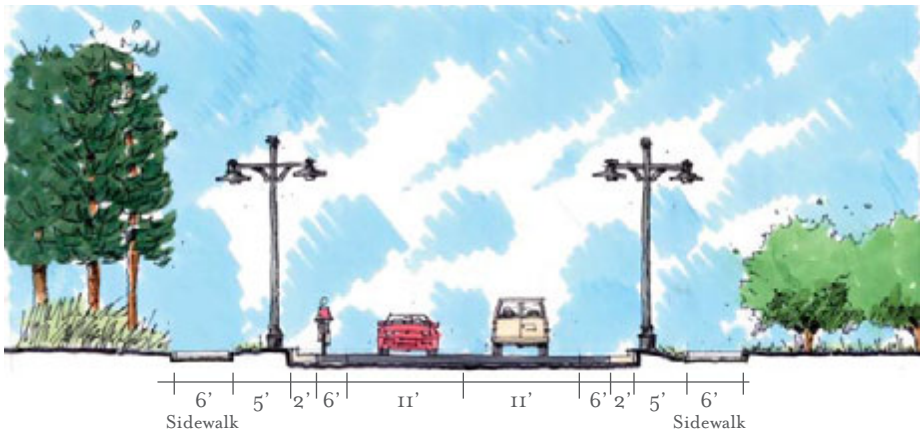


Figure 36: Curb and Gutter Section

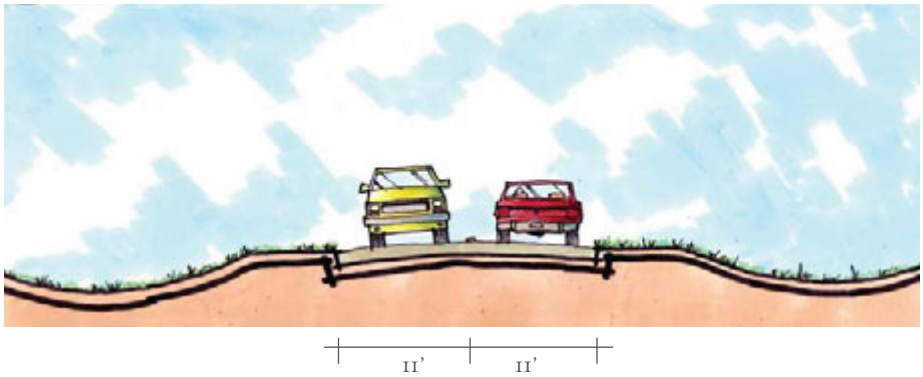


Figure 37: Park Lane section

Recommendation Number 15.
Pave Park Lane

Due to frequent flooding on this roadway, it is recommended that Park Lane be paved.

Recommendation Number 16 .
Traffic Calming on 9th Street

Paving Park Lane may cause drivers to divert off of CR 455 to avoid drop-off traffic at Montverde Academy. A before-and-after study should be done on 9th Street to measure daily traffic as well as 85% travel speed on 9th Street before and after Park Lane is paved. If a significant difference is found, traffic calming measures, such as raised speed tables and mini-circles, should be considered.

Figure 38: CR 455/Gladys Street Drainage Recommendations

Drainage

The majority of the project corridor has no water quality or water quantity storm water management facilities. The recommended corridor improvements will need to meet the current water quality and water quantity standards of the SJRWMD. Since the project area is within the Lake Apopka Drainage Basin, the proposed improvements will be held to the basin's more stringent water quality criteria. This will involve the use of wet detention, dry detention and/or underground exfiltration treatment systems. Specific descriptions for the proposed drainage improvements follow.

Recommendation Number 17.

CR 455 (Gladys Street)

Improvements to this section of CR 455 include 5 foot bicycle lanes. There exists drainage concerns as noted earlier. It appears the roadside swale flooding is a result of a blocked conveyance due to an existing driveway. The addition of a side drain under the existing driveway along with possible ditch bottom inlet modifications to the existing outfall will eliminate the swale flooding. See *Figure 38*.

Figure 39: CR 455/10th Street Drainage Recommendations

Recommendation Number 18.
CR 455(10th Street)
Improvements to this section of CR 455 includes 5 foot bicycle lanes. There exists drainage concerns as noted earlier. In order to alleviate the swale staging and overtopping of CR 455, additional storage volume is being proposed. The City of Montverde owns a parcel directly adjacent to CR 455 which will provide for underground storage of the runoff in the form of exfiltration pipe. A "bubble up" structure along with a spreader swale can be incorporated to provide for an outfall during extreme storm events. There are no water quality requirements for this improvement. See *Figure 39*.

Figure 40: CR 455/Lakeside Drive to Porter Avenue Drainage Recommendations

Recommendation Number 19.
CR 455 (Lakeside Drive to Porter Avenue)
The improvements to the section of CR 455 from Lakeside Drive to Porter Avenue will be included in the overall redevelopment of the downtown area of the City of Montverde. Roadway improvements will include the addition of roadside parking, sidewalks and travel lane reconstruction. See *Figure 34*. A closed storm sewer will be used to convey the roadway runoff to the basin's outfall, Franklin Pond. This same storm sewer system will be used to provide flooding relief at the intersection of CR 455 and Porter Avenue. Since there are no existing water quality treatment facilities along this section of CR 455, water quality will be required. Due to the lack of available right of way for detention facilities and the presence of favorable soil conditions, it is anticipated that an underground exfiltration system will be implemented to accommodate the stormwater water quality treatment and attenuation. See *Figure 40*.

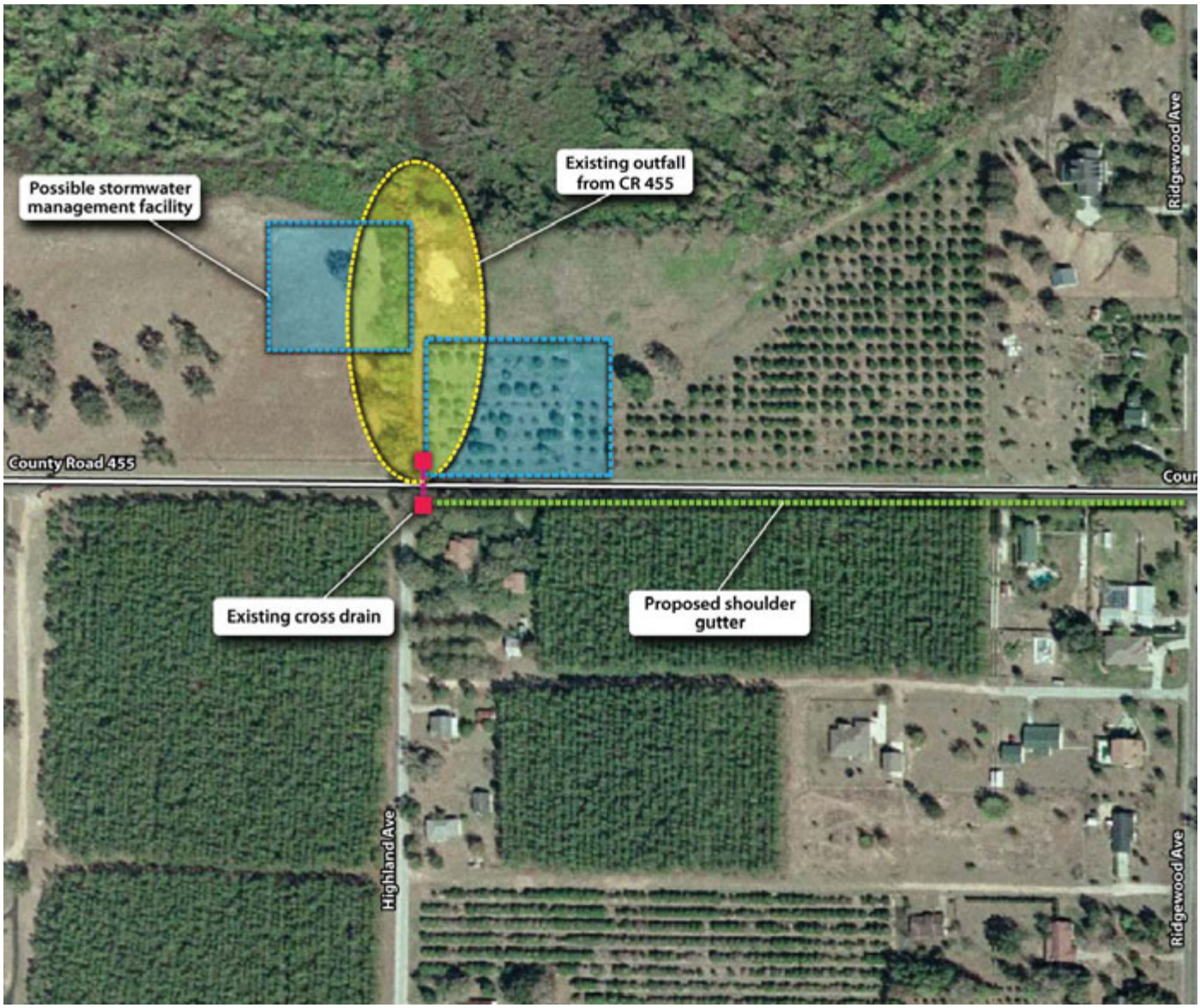


Figure 41: CR 455/Porter Avenue to Ridgewood Avenue Drainage Recommendations

Recommendation Number 20.
CR 455 (Porter Avenue to Ridgewood Avenue)
The improvements to the section of CR 455 from Porter Avenue to Ridgewood Avenue will include the addition of sidewalks, bike lanes and travel lane reconstruction. See *Figure 36*. These improvements will also include the removal of an existing concrete roadside ditch located along CR 455 just south of the Montverde Academy. A closed storm sewer with a combination of shoulder gutter and ditch bottom inlets will be used to convey roadway runoff to the basin's outfall, an existing cross drain located just south of the Montverde Academy under CR 455. This same storm sewer will be used to provide flooding relief at the CR 455 and Ridgewood Avenue intersection. Since there are no existing water quality treatment facilities along this section of CR 455, water quality treatment will be required. A detention facility that will provide both water quality and quantity is proposed just east of the existing cross drain. The City of Montverde currently possesses an easement to the proposed detention facility via the existing cross drain outfall. See *Figure 41*.

Recommendation Number 21.
Truskett Park

The conceptual plan for Truskett Park provides an example of what the park could be in the future. The current park has a large drainage area that provides stormwater treatment for the area before discharging to Lake Apopka. The proposed park design incorporates bio-swale retention (i.e. a vegetated swale for storage and conveyance) that would provide a more natural and sustainable method of providing necessary treatment and attenuation. A boardwalk would provide access to Lake Apopka through the bio-swale treatment area and provide an element of environmental education. Along the boardwalk, seating areas have been incorporated to take advantage of the shade provided by existing trees, and a pavilion with small boat mooring is planned at the end of the dock to tie into the byway area blueway. By relocating the stormwater treatment, the open area to the west becomes available for neighborhood park uses such as an open play area, a small pavilion and a swing area. Also, included are a small number of necessary parking spaces. The architectural style for the pavilion is inspired by the nearby Harper Home.

Figure 42 - Conceptual Plan for Truskett Park

Figure 43 - Sketch of Pavilion at Truskett Park

Recommendation Number 22.

Osgood Site

This site housed Native American artifacts (*see Archaeological and Historic Features*). Currently, this site is zoned for agricultural use. The owners of this site have proposed developing the site. Due to the archeological findings on the site and its location on the shore of Lake Apopka, the Green Mountain Scenic Byway Corridor Management Committee believes the site is of historic significance to the community, and could provide unique and regionally significant opportunities for the conservation of natural resources and open space, as well as public education and recreation.

Alternatives development programs for the site:

- Maintain agricultural designation
- Allow appropriate development
- Create a cultural park

Allow Appropriate Development

The Osgood site represents the last significant parcel within the Town of Montverde to develop along Lake Apopka. Therefore, it poses significant opportunities to reconnect the Town to the lake, reintroduce lake view to the residents of the Town of Montverde, and provide boat access to the lake. Regardless of its location, the Town of Montverde should promote interconnection between new developments and existing neighborhoods. If the site is developed, the following guidelines are recommended:

Existing Site

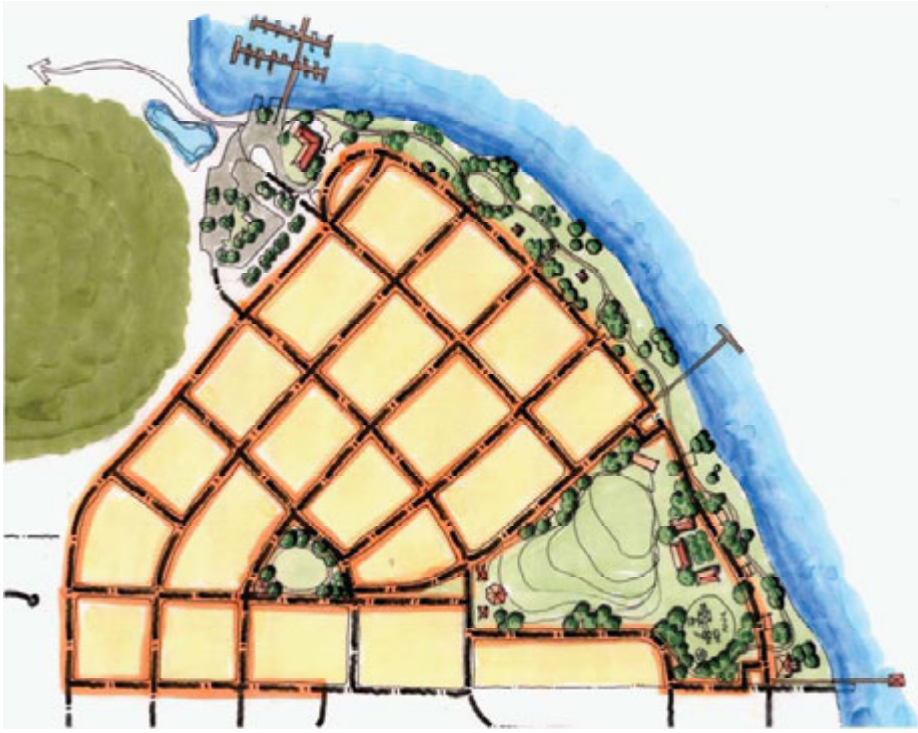


Figure 44 - Conceptual Plan for the Osgood Site if it Were to Develop

- Provide public lake front along length of site, with multiuse trails or wide sidewalks
- Include enhancements to existing boat launch to include parking
- Include appropriate scale single-family residential development
- Include small commercial development (fish camp) associated with lake activities. Alternative commercial development may detract from the Town Center and introduce inappropriate traffic into the existing neighborhoods
- Extend Town grid into site
- Develop roadway alignment that provides views to lake
- No gates or walls

Cultural Park

The Green Mountain Cultural Park is an alternative use for the Osgood Property that links the various historical eras of the Green Mountain area together, the historic, archeological, and recreational. This park concept was developed in response to the identification of this parcel of land as a place of historic significance. As a result of the archeological significance of this parcel, the park concept includes an archeological park component including a re-created Indian village based on the posthole locations within the property as well as a visitor center that would include historical interpretation and artifacts found throughout the Green Mountain area.

The park would also incorporate a working agricultural component illustrating the area's rich agricultural heritage. The conceptual plan calls for a portion of the existing citrus grove to remain in a functioning state as well as a development of a cattle farm exhibit that would include pasture area for cattle and typical structures associated with cattle farming. A third agricultural exhibit could either function as a seasonal installation or a permanent fixture demonstrating other types of agriculture present within the area. The agricultural area of the park would be accessed via an agricultural center building that would provide interpretation and examples of agricultural equipment.

A major component of the park would be a passive civic park and waterfront that would link the Town of Montverde to Lake Apopka. Program elements could include a Town amphitheater, playground spaces, walking trails, lake front overlooks, and ecological interpretation specific to Lake Apopka. Included as part of the civic portion of this park would be the redevelopment of the existing boat ramp on Lake Apopka which would provide

Figure 45 - Conceptual Plan of Green Mountain Cultural Park

dedicated trailer parking that is not currently available.

The final component of the park is the creation of a campground area along Lake Apopka that would include drive-up campsites, cabins, and walk-in group campsites. Bathhouse facilities, including hot shower facilities, could be located within the drive-up campsite area to service both the cabins and group campsites. Also, a small dock for mooring and/or a canoe and kayak launch area should be located nearby so that the campsite area can be accessible to boaters, canoes, and kayaks taking advantage of the blueway trail.

It should be noted that this plan is conceptual in nature, intended to illustrate opportunities that could be taken advantage of on this site. The location of postholes and archeological sites were not known at the time of plan development; therefore, the location of program elements within the park may need to be revised in order to make the village location more historically accurate. The program elements themselves will also need further evaluation based on funding and management partnerships.

Recommendation Number 23.
Boat Launch at end of Abrams Street

This site will be constructed as part of the final design for the Osgood Site.

Recommendation Number 24.
Wastewater Treatment Plant

The growth in restaurant and retail business in the downtown is significantly constrained due to the lack of wastewater treatment facilities. With most of the residential development and existing business on septic systems, the potential for causing surface water contamination in the lakes and ponds adjacent to Montverde exists. The Academy also has a potential need for a new treatment system. As a result, efforts to pursue state funding for the design and construction of a public or public/private wastewater treatment facility should be pursued.

5.2 Impact Analysis

Table 17
Impact Analysis

Type of Impact	Impact
ROW Required	Corner Clips at Fosgate Road and Ridgewood Avenue
Visual/Aesthetics	Enhancement
Social-economic Impacts	None
Pedestrian/Bicycle Circulation	Enhancement
Wetlands Impacts	None
Flood Plain Impacts	None
T&E Species Impacts	None
Archaeological and Historic Features Impacts	None
Contaminated Sites Impacts	None

Table 18
Measures of Effectiveness

Town Element	Goal/Need Addressed by Recommendations	Plan Element
Town Center	Parking provided at redevelopment site	2
	Sanitary sewer	24
	Water treatment plant	24
	Sidewalk network added	1, 10, 11
	Attract businesses	1,2
Community Buildings/Civic Identity	Gateway features	4
	Streetscaping	1, 3, 4, 13
	Locate/maintain library and post office on CR 455	2
	Increase access and visibility to existing civic facilities	2, 3
	Pedestrian crossings	1, 13
Streets	Regional Network	Not Addressed
	Reduce Congestion/Intersection Enhancements	6, 7, 8
	Drainage	17, 18, 19, 20
	Noise Impacts	Reduction in speed from streetscape and intersection enhancements
	Safe Pedestrian Travel	1, 6,7,8,11,13,14
	Increase pedestrian crossing opportunities	1, 6, 7, 8, 11, 14
	Increased sidewalk connectivity	1, 10, 11, 12
	Safe Vehicular Travel	6,7,8
	Bicycle Safety	1,9,10,11, 12
Parks and Open Space and the Environment	Park Enhancements	21, 22
	Views to Lake Apopka	21, 22
	Access to Lake Apopka	21, 22
	Preserve Wetlands and farmlands	22

Magnitude of Cost Estimate

6. Magnitude of Cost Estimate

Table 19
Magnitude of Cost Estimate

	Recommendation	Magnitude of Cost Estimate*
Town Center		
1.	Porter Avenue to Lakeside Drive Streetscape	$571,000
Community Buildings/Civic Identity		
2.	Post office/library building	N/A
3.	Wayfinding in Town Center	$4,500
4.	Gateway features	$12,000
Streets		
5.	Continue connected street pattern as Town develops	N/A
6.	Roundabout at Fosgate Road	$229,000
7.	Roundabout at Lakeside Drive	$229,000
8.	Roundabout at Ridgewood Avenue	$250,000
9.	Bicycle Lanes North Section - from northern Town limits to 10th Street	$228,000
10.	Town Center West Section – from 10th Street to Lakeside Drive	$430,000
11.	Montverde Academy Section – from Porter Avenue to southern Montverde Academy gateway feature	$800,000
12.	Curb and Gutter Section – from Highland Avenue to Ridgewood Avenue	$586,000
13.	Pedestrian crossing treatments in Montverde Academy	Included in #10
14.	Extend School Zone	Included in #10
15.	Pave Park Lane	$87,000
16.	Traffic calming on 9th Street	$20,000
17.	CR 455 (Gladys Street)	$22,000
18.	CR 455(10th Street)	$138,000
19.	CR 455 (Lakeside Drive to Porter Avenue)	$486,000
20.	CR 455 (Porter Avenue to Ridgemont Avenue)	$470,000
Parks and Open Space		
21.	Truskett Park	
22.	Osgood Site	$496,000
23.	Boat launch at the end of Abrams Avenue	N/A
		$273,000
Environment		
24.	Wastewater treatment plant	N/A

*2008 Dollars

Glatting Jackson Kercher Anglin, Inc. has no control over the cost of labor, materials, or equipment, the Contractor's method of determining prices or competitive bidding or market conditions. Therefore, our opinions of probable construction costs provided for herein are made on the basis of experience and represent our best judgement as professionals familiar with the construction industry. The firm cannot and does not guarantee that proposals, bids or the construction costs will not vary from our opinions of probable costs. If the Owner wishes greater assurances as to the construction cost, we recommend the employment of an independent cost estimator.

Drainage Estimate for CR 455 (Gladys Street)

NOT BASED ON DESIGN – ACTUAL CONSTRUCTION COSTS WILL VARY

Item No.	Pay Item	Description	Quantity	Unit	Unit Price	TOTALS
1	110-1-1	CLEARING AND GRUBBING	0.30	AC	$20,000.00	$6,000
2	120-1	REGULAR EXCAVATION	231	CY	$6.33	$1,462
3	160-4	STABILIZATION, TYPE "B"	33	SY	$4.11	$137
4	285-711	BASE, OPTIONAL	33	SY	$20.22	$674
5	334-1-13	SUPERPAVE ASPHALTIC CONCRETE (TRAFFIC C)	1.7	TN	$400.00	$680
6	337-7-7	ASPHALTIC CONCRETE FRICTION COURSE (INC RUBBER) FC-9.5	3.3	TN	$300.00	$999
7	425-1-52	INLET (DBI TYPE C) (< 10')	1	EA	$2,757.48	$2,757
8	430-174-101	PIPE CULVERT OPTIONAL MATERIAL (SIDEDRAIN) (0" - 24")	30	LF	$70.96	$2,129
9		**SUBTOTAL**				**$14,838**
10	102-1	MAINTENANCE OF TRAFFIC (10%)	1	LS	NA	$1,484
11		**SUBTOTAL**				**$16,322**
12	101-1	MOBILIZATION (10%)	1	LS	NA	$1,632
13		**SUBTOTAL**				**$17,954**
14		MISC CONST ITEMS & CONTINGENCY (20%)	1	LS	NA	$3,591
15		**TOTAL COST**				**$21,545**

Assumptions:

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Drainage Estimate for 10th Street

NOT BASED ON DESIGN – ACTUAL CONSTRUCTION COSTS WILL VARY

Item No.	Pay Item	Description	Quantity	Unit	Unit Price	TOTALS
1	110-1-1	CLEARING AND GRUBBING	1.00	AC	$20,000.00	$20,000
2	120-1	REGULAR EXCAVATION	116	CY	$6.33	$734
3	160-4	STABILIZATION, TYPE "B"	100	SY	$4.11	$411
4	285-711	BASE, OPTIONAL	100	SY	$20.22	$2,022
5	334-1-13	SUPERPAVE ASPHALTIC CONCRETE (TRAFFIC C)	5.1	TN	$400.00	$2,040
6	337-7-7	ASPHALTIC CONCRETE FRICTION COURSE (INC RUBBER) FC-9.5	10.2	TN	$300.00	$3,060
7	425-1-52	INLET (DBI TYPE C) (< 10')	2	EA	$2,757.48	$5,515
8	425-1-549	INLET (DBI TYPE D) (SPECIAL)(< 10')	1	EA	$4,436.49	$4,436
9	425-2-61	MANHOLE (TYPE P-8) (10')	1	EA	$3,659.70	$3,660
10	430-172-101	PIPE CULVERT OPTIONAL MATERIAL (CROSSDRAIN) (0" - 24")	50	LF	$74.74	$3,737
11	430-174-101	PIPE CULVERT OPTIONAL MATERIAL (SIDEDRAIN) (0" - 24")	100	LF	$70.96	$7,096
12	430-984-129	MITERED END SECTION OPTIONAL ROUND (SIDEDRAIN) (24")	4	EA	$1,525.43	$6,102
13	443-70-4	FRENCH DRAIN (24")	250	LF	$200.25	$50,063
14		**SUBTOTAL**				**$108,876**
15	102-1	MAINTENANCE OF TRAFFIC (10%)	1	LS	NA	$10,888
16		**SUBTOTAL**				**$119,763**
17	101-1	MOBILIZATION (10%)	1	LS	NA	$11,976
18		**SUBTOTAL**				**$131,740**
19		MISC CONST ITEMS & CONTINGENCY (20%)	1	LS	NA	$6,587
20		**TOTAL COST**				**$138,327**

Assumptions:

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Drainage Estimate for CR 455 (Lakeside Drive to Porter Avenue)

NOT BASED ON DESIGN - ACTUAL CONSTRUCTION COSTS WILL VARY

Item No.	Pay Item	Description	Quantity	Unit	Unit Price	TOTALS
1	110-1-1	CLEARING AND GRUBBING	1.00	AC	$20,000.00	$20,000
7	425-1-351	INLET (TYPE P5) (< 10')	14	EA	$4,348.14	$60,874
7	425-1-521	INLET (DBI TYPE C) (< 10')	6	EA	$2,757.48	$16,545
9	425-2-61	MANHOLE (TYPE P-8) (<10')	6	EA	$3,659.70	$21,958
9	425-2-101	MANHOLE (TYPE P-8) (SPECIAL) (10')	1	EA	$8,270.21	$8,270
10	430-172-201	PIPE CULVERT OPTIONAL MATERIAL (STORM SEWER) (0" - 24")	1000	LF	$103.51	$103,510
10	430-172-101	PIPE CULVERT OPTIONAL MATERIAL (CROSSDRAIN) (0" - 24")	50	LF	$74.74	$3,737
13	443-70-4	FRENCH DRAIN (24")	500	LF	$200.25	$100,125
14		**SUBTOTAL**				**$335,019**
15	102-1	MAINTENANCE OF TRAFFIC (10%)	1	LS	NA	$33,502
16		**SUBTOTAL**				**$368,521**
17	101-1	MOBILIZATION (10%)	1	LS	NA	$36,852
18		**SUBTOTAL**				**$405,373**
19		MISC CONST ITEMS & CONTINGENCY (20%)	1	LS	NA	$81,075
20		**TOTAL COST**				**$486,448**

Assumptions:

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

This estimate assumes the drainage improvements will be constructed as part of the roadway improvements for CR 455.

Drainage Estimate for CR 455 (Porter Avenue to Ridgement Avenue)

NOT BASED ON DESIGN - ACTUAL CONSTRUCTION COSTS WILL VARY

Item No.	Pay Item	Description	Quantity	Unit	Unit Price	TOTALS
1	110-1-1	CLEARING AND GRUBBING	2.50	AC	$20,000.00	$50,000
2	120-1	REGULAR EXCAVATION	15000	CY	$6.33	$94,950
3	160-4	STABILIZATION, TYPE "B"	67	SY	$4.11	$274
4	285-711	BASE, OPTIONAL	67	SY	$20.22	$1,348
5	334-1-13	SUPERPAVE ASPHALTIC CONCRETE (TRAFFIC C)	3.4	TN	$400.00	$1,360
6	337-7-7	ASPHALTIC CONCRETE FRICTION COURSE (INC RUBBER) FC-9.5	7.2	TN	$300.00	$2,160
7	425-1-521	INLET (DBI TYPE C) (< 10')	4	EA	$2,757.48	$11,030
6	425-1-701	INLET (TYPE S) (< 10')	4	EA	$4,248.62	$16,994
7	425-1-541	INLET (DBI TYPE D) (< 10')	1	EA	$3,418.08	$3,418
7	425-1-551	INLET (DBI TYPE E) (SPECIAL) (< 10')	1	EA	$3,625.79	$3,626
8	425-2-61	MANHOLE (TYPE P-8) (<10')	2	EA	$3,659.70	$7,319
9	430-172-201	PIPE CULVERT OPTIONAL MATERIAL (STORM SEWER) (0" - 24")	1000	LF	$103.51	$103,510
10	430-172-101	PIPE CULVERT OPTIONAL MATERIAL (CROSSDRAIN) (0" - 24")	50	LF	$74.74	$3,737
12	430-984-629	MITERED END SECTION OPTIONAL ROUND (CROSSDRAIN) (24")	2	EA	$1,555.89	$3,112
11	520-6	SHOULDER GUTTER CONCRETE	1000	LF	$20.27	$20,270
12		**SUBTOTAL**				**$323,108**
13	102-1	MAINTENANCE OF TRAFFIC (10%)	1	LS	NA	$32,311
14		**SUBTOTAL**				**$355,419**
15	101-1	MOBILIZATION (10%)	1	LS	NA	$35,542
16		**SUBTOTAL**				**$390,961**
17		MISC CONST ITEMS & CONTINGENCY (20%)	1	LS	NA	$78,192
18		**TOTAL COST**				**$469,153**

Assumptions:

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