

Orange County, Florida
Road Impact Fee Update

prepared by

Duncan Associates

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prepared by Duncan Associates
 Clancy Mullen, AICP, Principal Author
 13276 Research Boulevard, Suite 208, Austin, TX 78750
 (512) 258-7347x204, clancy@duncanplan.com

EXECUTIVE SUMMARY

This is the third update of Orange County's road impact fee study and ordinance, which was originally adopted in 1985 and went into effect in 1986. The first update occurred in 1990; the second update was in 1998. This update evaluates the impact fee methodology and finds that it is generally sound. The inputs into the road impact fee formula are revised based on current data to generate alternative fee schedules.

Summary of Revisions

In general, the basic road impact fee methodology has been retained and the inputs have been updated. However, changes have been made to the way some of the inputs are calculated and some minor changes to the impact fee formula have been recommended. The most significant changes from the way the impact fees were calculated in the 1998 study are summarized as follows:

- The cost per lane-mile, based on five projects completed since the 1998 update, was adjusted for inflation in construction and right-of-way costs. This was not done in the previous study.
- Motor fuel tax credits are provided for the total trip length, not just the portion of the trip that occurs on the non-freeway system.
- Motor fuel tax credits are not provided for Federal/State funding of improvements to the freeway system, since freeway improvement are not funded with impact fees.
- Motor fuel tax credits are provided for the entire six-cent local option gas tax, not just for the County's 60 percent share of those taxes.
- Motor fuel tax credits are provided only for the 60 percent of local option gas taxes that the County has historically been spending on capacity improvements.

In addition, the following changes were incorporated into the update:

- New trip factors were revised for some uses based on the 1998 ITE *Trip Generation Handbook*.
- Average trip lengths were revised based on data from the regional transportation model.

Major Findings

Table 1 compares the components of the net cost per single-family unit from this update with comparable figures from the last two updates. In the last update in 1998, the major change that had occurred since the fees were updated in 1990 was the substantial increase in roadway improvement costs. This had been driven primarily by soaring costs for right-of-way (ROW) acquisition. The cost per vehicle-mile increased by 53 percent. Revenue credits increased by the same percentage, average travel demand decreased slightly, and the net cost per single-family unit increased by 52 percent.

In this update, ROW costs have stabilized, and the 25 percent increase in the cost per vehicle-mile reflected in this update was driven primarily by the increase in road construction and design costs. There are several possible explanations for this shift. First, the County has made a conscious policy decision to try to avoid making improvements with excessive ROW costs. Second, construction and design costs were not adjusted for inflation in the last update, and consequently were likely underestimated. Finally, to a certain extent, the shift from ROW to construction costs may simply reflect the characteristics of the relatively small number of projects completed since 1998. However, while the component cost shares may fluctuate, the overall cost per lane-mile is more stable. An analysis that includes all projects completed since 1990, for example, found a cost per lane-mile, adjusted for inflation, similar to the one reported in this study (see Appendix B).

On the revenue credit side of the equation, a number of changes were made. The most significant change was to provide credit for the total trip length, not just the portion of the trip that occurs on the non-freeway system. Another was to give credit for the full six-cent local option gas tax. Counteracting these changes was ceasing to give credit for State and Federal funding for improvements to the freeway system (i.e., I-4) and giving credit only for that portion of the local option gas tax that has historically been used for capacity-expanding improvements.

Both the cost and revenue credit for a single-family unit increased by about one-third over the 1998 study. The net result is that the maximum fee per single-family unit increased by 19 percent, as shown in Table 1.

Table 1
CHANGE IN NET COST PER SINGLE-FAMILY UNIT, 1990-2004

	1990 Study	1998 Study	Percent Change	2004 Study	Percent Change
ROW Cost per Lane-Mile	\$235,252	\$594,557	153%	\$525,124	-12%
Design Cost per Lane-Mile	\$68,931	\$78,300	14%	\$131,018	67%
Construction Cost per Lane-Mile	\$476,880	\$611,232	28%	\$996,694	63%
Total Cost per Lane-Mile	\$781,063	\$1,284,089	64%	\$1,652,836	29%
Vehicles per Lane per Day	7,500	8,038	7%	8,249	3%
Cost per Vehicle-Mile	\$104.13	\$159.75	53%	\$200.37	25%
Revenue Credit per Vehicle-Mile	\$30.12	\$46.01	53%	\$44.41	-3%
Daily Vehicle-Miles per Unit (Net)	24.66	24.33	-1%	25.20	4%
Daily Vehicle-Miles per Unit (Total)	24.66	24.33	-1%	39.42	62%
Cost per Single-Family Unit	\$2,568	\$3,887	51%	\$5,049	30%
Credit per Single-Family Unit	\$743	\$1,120	51%	\$1,752	56%
Net Cost per Single-Family Unit	\$1,825	\$2,767	52%	\$3,299	19%

Source: 1990 study; 1998 study; Tables 12 and 21.

Policy Options

The current fees were adopted at 75 percent of the net costs calculated in the 1998 study. If the fees are based on the full net costs identified in this report, fees for most land use categories would increase by 60 percent or more from current levels. If adopted at 75 percent of the full cost, the fees would increase by about one-fifth for most land uses. The current fees (adopted at 75 percent of 1998 net costs) and potential fees for typical land use types at 75 and 100 percent of the net cost are presented in Table 2. (Potential fees for all 41 land use categories at 75 and 100 percent are presented in Table 22.)

Table 2
CHANGE IN FEES FOR SELECTED LAND USES, 1998-2004

	Single-family (dwelling)	Multi-family (dwelling)	Retail* (1000 sf)	Office* (1000 sf)	Industrial (1000 sf)
Current Fee**	\$2,075	\$1,439	\$6,716	\$2,783	\$1,742
Revised Fee at 75%	\$2,474	\$1,735	\$8,213	\$3,512	\$2,213
Revised Fee at 100%	\$3,299	\$2,313	\$10,950	\$4,682	\$2,950
Change at 75%	19%	21%	22%	26%	27%
Change at 100%	59%	61%	63%	68%	69%

* assumes 100,001-200,000 square foot building

**adopted at 75% of net cost identified in 1998 study

Source: Table 22.

INTRODUCTION

Growth Context

Impact fees are best suited for communities experiencing rapid growth. During the last decade, Orange County's population grew by approximately 2.8 percent annually, significantly higher than the 2.2 percent annual growth experienced by the state as a whole. The unincorporated area, which is where the County's road impact fee applies, contains two-thirds of the county's population and grew at a faster rate than the population of the municipalities. At the rate of growth experienced over the last decade, the population of the unincorporated area would double in 22 years.

Table 3
ORANGE COUNTY POPULATION GROWTH, 1990-2000

Jurisdiction	Population		% of 2000 Population	Annual Growth
	1990	2000		
Municipalities	245,186	300,180	33.5%	2.04%
Unincorporated	432,305	596,164	66.5%	3.27%
Total County	677,491	896,344	100.0%	2.84%

Source: 1990 and 2000 U.S. Census.

Brief History of County Road Fees

Orange County originally adopted its road impact fee ordinance in 1985, and it became effective in 1986. On December 9, 1985, the Orange County Board of County Commissioners adopted Ordinance #85-34, which was effective on January 1, 1986. The Ordinance, which has since been codified as *Article IV: Road Impact Fees of Chapter 23: Impact Fees*, was based on a study prepared in 1985 (the "1985 study"). A policy decision was made by the Board of County Commissioners to fund 52 percent of the net growth-related cost identified in the 1985 study.

Based on the 1990 *Road Impact Fee Study* (the "1990 study"), the first update made the following major changes to the road impact fee system.

- The share of net costs assessed by the fee schedule was increased from 52 to 75 percent.
- The cost per lane-mile was increased from \$600,600 to \$781,000.
- Average trip lengths were reduced by removing travel on freeways.
- The requirement for annual review was changed to every three years.

In 1998, the second update was initiated with the completion of the *Orange County Road Impact Fee Update* (the "1998 study") in September 1998 by Duncan Associates. Ordinance #98-27, adopted on October 10, 1998 and effective on January 1, 1999, made the following major changes.

- The fees, still assessed at 75 percent of net costs, were increased by an average of 47 percent.
- The increase was phased in over a two-year period.
- Ten new land uses were added to the fee schedule to reduce the need for alternative studies.
- The requirement for annual review was changed to every five years.

Design of the Road Impact Fee System

The County's road impact fee program funds the roadway needs created by new development according to the philosophy that growth should pay its way. The fees are calculated according to the "rational nexus" standards for impact fees and development exactions that have been laid down by the courts. Orange County's road impact fee system is based on a "consumption-based" model. This approach basically charges a new development the cost of replacing the roadway capacity that the new development will consume.

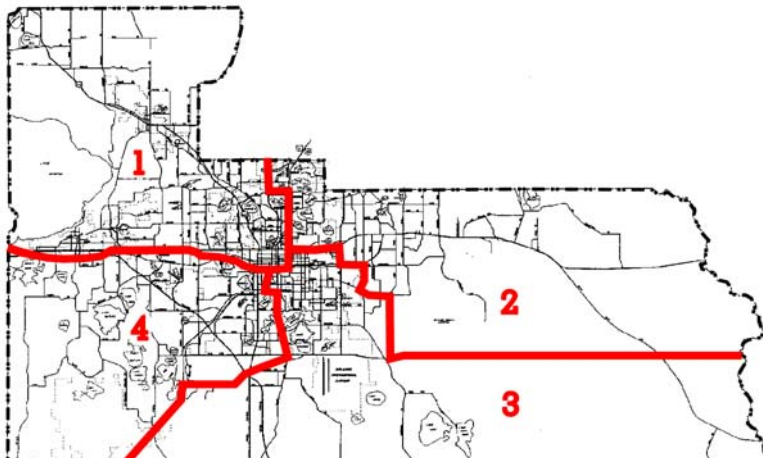
The major characteristics of the road impact fee system include the following.

- **Major Road Network.** The fees are based on new development's impact on arterial roads in Orange County. State roads as well as County roads are included in the funded major road network. Limited-access facilities are excluded from the major road network funded by the road impact fees.
- **Growth Need.** The fees are based on a demonstrated need to expand the County's major road network (including State roads) to accommodate the traffic generated by new development.
- **Actual Costs.** The fees are based on actual road improvement costs derived from recent County projects.
- **Growth-Related.** The fees are directly related to growth-related costs imposed because they are designed to fund replacement of the capacity consumed by new development.
- **No Funding of Deficiencies.** Road impact fee revenues are restricted from funding the portion of any improvement that remedies existing deficiencies attributable to existing development at the time the impact fees were initiated.
- **Proportionality to Impact.** The fees are proportional to the costs imposed by different types of development because they are based on professionally-accepted measures of travel demand: trip generation rates, new trip factors and average trip lengths.
- **Benefit.** The fees provide benefit to the fee-paying developments by being earmarked for capacity-expanding improvements to the major road network in Orange County. Reasonable benefit is also ensured through the earmarking of funds to four benefit areas (see Figure 1).
- **Revenue Credits.** The assessed fees have already been reduced to account for the portion of capital road funds that will be generated by new development through other taxes and fees, such as the gasoline tax and vehicle license fee.
- **Construction Credits.** Credit against the assessed impact fees is provided on a case-by-case basis for the cost of arterial road improvements and right-of-way contributed by the developer.

Benefit Areas

**Figure 1
ROAD IMPACT FEE BENEFIT AREAS**

Road impact fee revenues are spent in the benefit area in which they are collected. Orange County is divided into four benefit areas, which are illustrated in Figure 1. The benefit areas follow commuting patterns by including both outlying suburban areas as well as corridors into the urban area.



Road impact fee collections over the last five years since the fees were last updated are shown for each benefit area in Table 4. The County's road impact fees have been generating over \$14 million annually, and there have been sufficient collections in each area to fund projects. All four of the current benefit areas are reasonable from a transportation planning perspective and generate significant impact fee revenue. It is recommended that the current benefit areas be retained.

**Table 4
ROAD IMPACT FEE REVENUE BY BENEFIT AREA, 1999-2003**

Benefit Area	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Area 1	\$1,546,374	\$898,029	\$1,837,978	\$2,004,227	\$1,261,974
Area 2	\$8,326,646	\$5,681,579	\$6,793,698	\$4,370,714	\$7,063,195
Area 3	\$5,868,853	\$7,034,854	\$4,259,872	\$3,644,156	\$3,684,170
Area 4	\$7,194,573	\$4,371,559	\$5,043,232	\$4,645,919	\$3,341,518
Total	\$22,936,446	\$17,986,021	\$17,934,780	\$14,665,016	\$15,350,857

Source: Orange County Public Works Division, Traffic Engineering Department, November 14, 2003.

LEVEL-OF-SERVICE ANALYSIS

The calculation of the road impact fee is based on maintaining a certain service standard. The concept of level-of-service (LOS) is used to define the service standard. LOS is associated with the different operating conditions that occur on a roadway. It defines qualitative and quantitative roadway characteristics for factors such as travel speed, travel time, traffic interruptions, freedom to maneuver, safety, driver comfort and convenience, and vehicle operating costs.

The LOS standards used for evaluating acceptable levels of congestion on Orange County's major road network are the same ones used by the Florida Department of Transportation (FDOT). The maximum number of vehicles per day that can be accommodated at a given LOS on a particular roadway are also defined by FDOT's generalized planning standards. In this section, when we speak of roadway "capacity," we are really referring to the generalized maximum volume that can be accommodated on the roadway based on the desired LOS.

As with the previous update, the proposed road impact fee methodology is based on a "consumption-based" model, which basically charges a new development the cost of replacing the capacity that it consumes on the major roadway system. That is, for every vehicle-mile of travel (VMT) generated by the development, the road impact fee charges the net cost to construct an additional vehicle-mile of capacity (VMC).

Since travel is never evenly distributed throughout a roadway system, actual roadway systems require more than one unit of capacity for every unit of demand in order for the system to function at an acceptable level of service. This is because traffic on every road does not precisely match the available capacity. Consequently, the standard consumption-based model generally underestimates the full cost of accommodating new development at the existing level of service. Nevertheless, it is a conservative, legally-defensible approach that has been upheld by the Florida courts, and this update recommends that the basic formula be retained. The following brief description of some alternatives is intended to heighten appreciation for the conservative nature of the current road impact fee system, and not to suggest that the current approach be changed.

While the consumption-based model is the most commonly-used approach for road impact fees in Florida and probably the nation, many communities have used other models. The most common alternative is the "improvements-driven" model. The improvements-driven approach essentially divides the cost of growth-related improvements required over a fixed planning horizon (or to build-out) by the number new service units (e.g., VMT) projected to be generated by growth over the same planning horizon in order to determine a cost per service unit. This approach requires a sophisticated level of planning, as well as consideration of fiscal constraints in developing the capital improvement plan to ensure that it does not include low priority, marginally-needed improvements. Despite these difficulties, the improvements-driven model can come closer to capturing the full cost of maintaining desired levels of service on most roadway segments than the consumption-based approach.

The consultant has developed a modified consumption-based road impact fee model that more accurately identifies the full growth-related cost of maintaining desired service levels, while avoiding the difficulties associated with the improvements-driven approach. Essentially, the idea is that new development should be required to pay for the cost to construct more capacity than it directly consumes in order to maintain the system-wide ratio of capacity to demand. In this system, the cost per VMC is

multiplied by the system-wide ratio of VMC/VMT. This approach has been implemented by the City of Atlanta, Georgia; Larimer County, Colorado; the City of Rio Rancho, New Mexico and other jurisdictions. The purpose of describing it here is simply to emphasize how conservative is the County's current impact fee methodology.

In most rapidly growing communities, some roadways will be experiencing an unacceptable level of congestion at any given point in time. One of the principles of impact fees is that new development should not be charged for a higher level of service than is provided to existing development. In the context of road impact fees, this has sometimes been interpreted to mean that impact fees should not be spent on roadways that are already over-capacity. Actually, it is not necessary to address segment-specific existing deficiencies in a consumption-based system, which, unlike an improvements-driven system, is not really designed to recover the full costs to maintain the desired LOS on all roadway segments. Instead, it is only designed to maintain a minimum one-to-one overall ratio between system demand and system capacity. Virtually all major roadway systems have more capacity (VMC) than demand (VMT) on a system-wide basis. Consequently, under the standard consumption-based system, the level of service standard is really a systemwide VMC/VMT ratio of one. Since the County's major roadway system currently operates at better than this LOS, there are no existing deficiencies on a system-wide basis.

The County's current approach to determining LOS deficiencies on some roadway segments is unnecessary and overly conservative in the context of a consumption-based road impact fee methodology. Nevertheless, the County desires to continue restricting impact fees from being spent on what it has defined as existing deficiencies. In the County's road impact fee system, only pre-existing deficiencies at the time of the original adoption of the road impact fee system are deemed ineligible for impact fee funding. The growth-induced percentage, which defines the maximum impact fee funding for the project, is calculated as the portion of the total capacity of the improved road in excess of 1986 volumes, according to the following formula:

$$\text{Growth Percent} = (\text{Improved Capacity} - 1986 \text{ Volume}) \div \text{Improved Capacity.}$$

This is a conservative approach to defining deficiencies, as can be made clear with a simplified example. Assume a road segment is currently operating at capacity, but must be widened to double the current capacity to accommodate projected volumes. Since it is not deficient under existing conditions, 100 percent of the cost of the improvement can be attributed to growth. However, if a similar segment is 10 percent over existing capacity, only 45 percent of the improvement cost would be attributed to growth. An alternative approach would be to define the deficiency portion as the ratio of existing excess volume to the capacity added by the improvement. Thus, if a road segment was 10 percent over existing capacity and the improvement doubled the road's capacity, the growth portion would be 90 percent, rather than 45 percent under the current approach.

Despite the fact that segment-specific existing deficiencies are not necessary in a consumption-based road impact fee system, and that the County's approach to calculating the deficiency percentage is overly conservative, County staff has indicated a desire to continue to restrict impact fees from being used to fund some portion of the cost of capacity expanding improvements to the major roadway system. The list of potential projects indicating the percent eligible to be funded with road impact fees, sorted by road impact fee benefit area, is shown in Table 5.

**Table 5
ROAD IMPROVEMENT NEEDS BY BENEFIT AREA**

Name	From	To	Min LOS	Type	1986 Volumes	Improved Capacity	Growth Percent
Impact Fee Area 1 - Northwest Orange County							
All American Blvd	Edgewater Dr	Kennedy Blvd	E	0L>4L	N\A	35,700	100%
Apopka Blvd	Piedmont Wekiva Rd	US 441	E	2L>4L	2,900	35,700	92%
Apopka Bypass	South US 441	North US 441	E	0L>4L	N\A	35,700	100%
Apopka-Vineland Rd	Balboa Rd	A.D. Mims Rd	E	2L>4L	8,400	35,700	76%
Apopka-Vineland Rd	A.D. Mims Rd	Clarcona-Ocoee Rd	E	2L>4L	8,400	35,700	76%
Clarcona-Ocoee Rd	Ocoee-Apopka Rd	Hiawassee Rd	E	2L>4L	6,900	35,700	81%
Edgewater Dr	Pine Hills Rd	Clarcona-Ocoee Rd	E	2L>4L	10,500	35,700	71%
Good Homes Rd	West SR 50	Balboa Rd	E	2L>4L	790	35,700	98%
Hiawassee Rd	Clarcona-Ocoee Rd	US 441	E	2L>4L	N\A	35,700	100%
Keller Rd	Kennedy Blvd	Maitland Exchange	E	2L>4L	N\A	35,700	100%
Kennedy Blvd	Forest City Rd	Wymore Rd	E	2L>4L	14,650	35,700	59%
Lake Destiny Dr	Lee Rd	Kennedy Blvd	E	2L>4L	N\A	35,700	100%
Lake Pleasant	Apopka Blvd	US 441	E	2L>4L	7,125	35,700	80%
Mount Plymouth Rd	Orange County Line	Rock Springs Rd	D	2L>4L	5,200	29,400	82%
Ocoee-Apopka Rd	Silver Star Rd	Clarcona-Ocoee Rd	D	2L>4L	8,600	29,400	71%
Pine Hills Rd	Silver Star Rd	North Lane	E	2L>6L	15,400	53,500	71%
Pine Hills Rd Extension	North Lane	Apopka Bypass	E	0L>4L	N\A	35,700	100%
Plymouth Sorrento Rd	US 441	Ponkan Rd	D	2L>4L	4,300	29,400	85%
Plymouth Sorrento Rd	Ponkan Rd	Kelly Park Rd	D	2L>4L	4,300	29,400	85%
Plymouth Sorrento Rd	Kelly Park Rd	Orange County Line	D	2L>4L	5,100	29,400	83%
Rock Springs Rd	Ponkan Rd	Kelly Park Rd	D	2L>4L	7,600	29,400	74%
West SR 50	Lake\Orange Co Line	Florida Turnpike	D	4L>6L	18,900	78,600	76%
West SR 50	Florida Turnpike	Winter Garden Vineland	E	4L>6L	22,000	53,500	59%
West SR 50	Winter Garden Vineland	Beulah Rd	E	4L>6L	27,400	49,300	44%
West SR 50	Beulah Rd	Apopka Vineland Rd	E	4L>6L	27,400	53,500	49%
West SR 50	Apopka Vineland Rd	Hiawassee Rd	E	4L>6L	24,300	51,800	53%
West SR 50	Hiawassee Rd	Pine Hills Rd	E	4L>6L	31,500	53,500	41%
Impact Fee Area 2 - Northeast Orange County							
Alafaya Tr	Curry Ford	Stoneybrook Blvd	E	2L>4L	3,000	32,900	91%
Alafaya Tr	N.of University Blvd	McCulloch Rd	E	4L>6L	12,500	53,500	77%
Alafaya Tr	Avalon Park Blvd	Stoneybrook Blvd	E	2L>4L	3,000	32,900	91%
Alafaya Tr Extension	Beeline Expressway	Avalon Park Blvd	E	0L>4L	N\A	35,700	100%
Avalon Parkway	Alafaya Tr	East SR 50	E	0L>4L	N\A	35,700	100%
Chickasaw Tr	Lake Underhill Rd	El prado Dr	E	2L>4L	7,400	32,900	78%
Chuluota Rd	East SR 50	Orange County Line	D	2L>4L	4,200	29,400	86%
Curry Ford Rd	Goldenrod Rd	Eastern Beltway	E	2L>4L	14,700	35,700	59%
Curry Ford Rd	Eastern Beltway	Andover Lakes S\D	E	2L>4L	N\A	35,700	100%
Curry Ford Rd	Andover Lakes S\D	Alafaya Tr	E	0L>4L	N\A	35,700	100%
Dean Rd	University Blvd	Orange County Line	E	2L>4L	9,600	35,700	73%
Dean Rd	Curry Ford	Lake Underhill Rd	E	2L>4L	6,600	32,900	80%
East SR 50	SR 436	SR417	E	4L>6L	32,000	53,500	40%
East SR 50	Little Econ River	Dean Rd	E	4L>6L	48,900	53,500	9%
East SR 50	East of SR 417	Old Cheney Highway	E	4L>6L	45,400	53,500	15%
Echonlockatchee Tr	Lake Underhill Rd	SR 50	E	2L>4L	8,000	32,900	76%
Echonlockatchee Tr	Curry Ford Rd	Lake Underhill Rd	E	2L>4L	2,000	32,900	94%

Name	From	To	Min LOS	Type	1986 Volumes	Improved Capacity	Growth Percent
Echonlockatchee Tr	Trevarthon Rd	University Blvd	E	2L>4L	3,800	32,900	88%
Econolockatchee Tr	SR 50	Trevarthon Rd	E	2L>4L	6,000	35,700	83%
Forsyth Rd	East SR 50	Aloma Avenue	E	2L>4L	12,700	35,700	64%
Hall Rd	Aloma Avenue	University Blvd	E	2L>3L	11,600	32,900	65%
Lake Pickett Rd	East SR 50	Chuluota Rd	D	2L>4L	4,200	29,400	86%
Lake Underhill Rd	Goldenrod Rd	Chickasaw Tr	E	2L>4L	19,500	35,700	45%
Lake Underhill Rd	Chickasaw Tr	Echonlockatchee Tr	E	2L>4L	10,100	35,701	72%
Lake Underhill Rd	Echonlockatchee Tr	Rouse Rd	E	2L>4L	8,900	35,702	75%
Lake Underhill Rd	Dean Rd	Alafaya Trail	E	2L>4L	10,800	35,700	70%
Lake Underhill Rd	Eagle Chase Terminus	Avalon Parkway	E	2L>4L	N\A	35,700	100%
New E-W Rd	Semorán Blvd	Dean Rd	E	0L>4L	N\A	35,700	100%
New E-W Rd	Dean Rd	Alafaya Trail	E	0L>4L	N\A	35,700	100%
New E-W Rd	Alafaya Trail	N. Tanner Rd	E	0L>4L	N\A	35,700	100%
Rouse Rd	Lake Underhill Rd	Corporate Blvd	E	2L>4L	3,300	32,900	90%
Valencia College Lane	Goldenrod Rd	Econlockatchee Tr	E	2L>4L	2,780	32,900	92%
Woodbury Rd	SR 50	Lake Underhill Rd	E	2L>4L	N\A	32,900	100%
Woodbury Rd	SR 50	Challenger Parkway	E	0L>4L	N\A	32,900	100%
Wymore Rd	Fairbanks Avenue	Kennedy Blvd	E	2L>4L	9,400	32,900	71%
Wymore Rd	Lake Avenue	Orange County Line	E	2L>4L	9,400	32,900	71%
Impact Fee Area 3 - Southeast Orange County							
Alafaya Tr Extension	SR 417	Beeline Expressway	E	0L>4L	N\A	32,900	100%
Boggy Creek Rd	SR 417	County Line	E	2L>4L	4,300	32,900	87%
Boggy Creek Rd	SR 417	Wetherbee Rd	E	2L>4L	3,500	32,900	89%
Chickasaw Tr (VA)	Chickasaw Tr	Lee Vista Blvd	E	0L>4L	N\A	32,900	100%
Conway Rd	Hoffner Rd	Bee Line Exwy	E	2L>4L	15,500	35,700	57%
Econlockahatchee (VA)	Econlockahatchee Tr	Lee Vista Blvd	E	0L>4L	N\A	32,900	100%
Hoffner Avenue	Conway Rd	Goldenrod Rd	E	2L>4L	11,700	32,900	64%
I-Drive	Canadian Court	Sea Harbour Dr	E	2L>4L	N\A	35,700	100%
I-Drive	SR 535 \ SR 536	Orange County Line	E	2L>4L	N\A	35,700	100%
John Young Parkway	Orange County Line	Bee Line Exwy	E	4L>6L	N\A	35,700	100%
J Young Pky Connector	I-Drive	John Young Parkway	E	0L>4L	N\A	35,700	100%
Landstreet Rd	US 441	Orange Avenue	E	2L>4L	5,000	35,700	86%
Moss Park Rd	Narcoossee Rd	2.5 km N. of Lake Mary	E	2L>4L	1,300	32,900	96%
Narcoossee Rd	Orange County Line	Southern Connector	E	2L>4L	6,000	29,400	80%
Orange Avenue I	Zell Dr	Bridge N. of Palmbay Dr	E	4L>6L	6,600	53,500	88%
Orange Avenue II	Fairway Woods\ Bridge	Taft Vineland Rd\Zell Dr	E	4L>6L	6,600	53,500	88%
Orange Avenue III	Florida Turnpike	Fairway Woods Blvd	E	4L>6L	6,600	53,500	88%
Poinciana Blvd	SR 535	Osceola County line	E	2L>4L	N\A	32,900	100%
Southchase Rd	US 441	Landstar Blvd	E	2L>4L	N\A	35,700	100%
Taft-Vineland Rd	US 441	Orange Avenue	E	2L>4L	9,500	35,700	73%
Taft-Vineland Rd Ph 1a	John Young Parkway	WD Canal	E	0L>4L	N\A	35,700	100%
Taft-Vineland Rd Ph 1b	WD Canal	US 441	E	0L>4L	N\A	35,700	100%
Taft-Vineland Rd Ph 2	1200 West of JYP	John Young Parkway	E	0L>4L	N\A	35,700	100%
US 441	Orange County Line	Taft Vineland Rd	E	4L>6L	30,600	53,500	43%
Westwood Blvd Ext	Southern Connector	I-Drive	E	0L>4L	N\A	35,700	100%
Wetherbee Rd	Orange Avenue	Landstar Rd	E	2L>4L	N\A	32,900	100%
Wetherbee Rd	Landstar Rd	Boggy Creek Rd	E	2L>4L	N\A	32,900	100%
Wetherbee Rd	US 441	Orange Avenue	E	2L>4L	5,900	32,900	82%

Name	From	To	Min LOS	Type	1986 Volumes	Improved Capacity	Growth Percent
Wildwood Extension	CR 535	International Dr	E	0L>4L	N\A	35,700	100%
Impact Fee Area 4 - Southwest Orange County							
Americana Blvd	Orlando-Vineland Rd	Texas Avenue	E	2L>4L	N\A	35,700	100%
Apopka-Vineland Rd	Westover Roberts Rd	Chelsworth Dr	E	2L>4L	3,800	35,700	89%
Apopka-Vineland Rd	Chelsworth Dr	Old Winter Garden Rd	E	0L>4L	N\A	35,700	100%
Apopka-Vineland Rd	Conroy-Windermere Rd	Westover Roberts Rd	E	2L>4L	4,800	35,700	87%
CR 535	Chase Rd	Magnolia Park Court	E	2L>4L	5,400	32,900	84%
CR 535	Magnolia Park Court	SR 429	E	2L>4L	3,300	32,900	90%
CR 535 (Phase II)	Buena Vista Dr	South lake	E	2L>4L	15,700	35,700	56%
CR 535 (Phase IV)	Apopka-Vineland Blvd	Buena Vista Dr	E	2L>4L	15,700	35,700	56%
CR 545	Tilden Rd	Porter Rd	E	2L>4L	900	32,900	97%
CR 545	Porter Rd	Seidel Rd	E	2L>4L	1,100	32,900	97%
CR 545	Seidel Rd	Orange County Line	E	2L>4L	1,100	32,900	97%
CR 545	West SR 50	Tilden Rd	E	2L>4L	3,100	32,900	91%
Daniels Rd	New Stone Crest Rd	Florida Turnpike	E	2L>4L	N\A	35,700	100%
Daniels Rd	SR 429	New Stone Crest Rd	E	2L>4L	N\A	35,700	100%
Daniels Rd	Florida Turnpike	SR 50	E	2L>4L	N\A	35,700	100%
Dr Phillips Blvd	Woodgreen Dr	Conroy-Windermere	E	2L>4L	4,100	35,700	89%
Ficquette Rd	Reams Rd	CR 535	E	2L>4L	4,300	32,900	87%
Good Homes Rd	Old Winter Garden Rd	West SR 50	E	2L>4L	1,900	35,700	95%
Hartzog Rd	CR 545	SR 429	E	2L>4L	N\A	32,900	100%
Holden Avenue	Texas Avenue	John Young Parkway	E	2L>4L	N\A	32,900	100%
Holden Avenue	US 441	Texas Avenue	E	2L>4L	8,600	32,900	74%
John Young Parkway	Beeline Expressway	Florida Turnpike	E	4L>6L	N\A	53,500	100%
John Young Parkway3	Florida Turnpike	Interstate 4	E	4L>6L	N\A	53,500	100%
Kaley	Rio Grande Avenue	Interstate 4	E	2L>4L	9,300	34,500	73%
L.B.Mcleod	John Young Parkway	Rio Grande Avenue	E	2L>4L	12,000	34,500	65%
Lake Avenue	Apopka-Vineland Rd	Turkey Lake Rd	E	2L>4L	N\A	35,700	100%
Lancaster Rd	US 441	Orange Avenue	E	2L>4L	12,500	35,700	65%
Oakridge Rd	Texas Avenue	US 441	E	2L>4L	26,100	35,700	27%
Old Winter Garden Rd	Hempel Avenue	Apopka Vineland Rd	E	2L>4L	5,800	35,700	84%
Old Winter Garden Rd	West SR 50	Hemple Avenue	E	2L>4L	6,900	35,700	81%
Old Winter Garden Rd	Apopka Vineland Rd	Hiawasse Rd	E	2L>4L	15,200	35,700	57%
Pine Hills Rd	Conroy-Windermere Rd	Old Winter Garden Rd	E	2L>4L	N\A	35,700	100%
Porter Rd	CR 545	Ficquette Rd	E	2L>4L	N\A	32,900	100%
Porter Rd	Orange County Line	CR 545	E	2L>4L	N\A	32,900	100%
Reams Rd	Ficquette Rd	CR 535	E	2L>4L	N\A	32,900	100%
Sand Lake Rd	President Dr	Orange Blossom Tr	E	4L>6L	26,500	53,500	50%
Seidel Rd	Orange County Line	CR 545	E	2L>4L	9,200	32,900	72%
Texas Avenue	Oakridge Rd	Holden Avenue	E	2L>4L	14,900	35,700	58%
Turkey-Lake Rd	Central Florida Parkway	Sand Lake Rd	E	2L>4L	N\A	35,700	100%

Source: Orange County Public Works Division, Traffic Engineering Department, April 7, 2004.

TRAVEL DEMAND BY LAND USE

The amount of an impact fee must be reasonably related to the cost to serve a new development. For the purpose of road impact fees, the cost to serve a new development is assumed to be proportional to the traffic generated by the new development. An appropriate measure of travel demand is the average number vehicle-miles traveled during a typical weekday. Vehicle-miles of travel (VMT) is the product of the number of vehicle trips generated during a given time period and the average distance (in miles) that those vehicles travel. The VMT generated by specific land use types is a product of three factors:

- trip generation,
- percent primary trips, and
- trip length.

Trip Generation

Trip generation rates are well documented in the professional literature, and the average trip generation characteristics identified in studies of communities around the nation should be reasonably representative of trip generation characteristics in Orange County. The trip generation rates are based on information published in the current edition of *Trip Generation*, published by the Institute of Transportation Engineers (ITE). The 1998 study was based on trip generation rates from the sixth edition of the ITE manual published in 1997. This study is based on the seventh edition of the ITE manual, published in 2003.

A select group of land uses exhibit unique characteristics in Orange County. These include time share, tourist retail, tourist hotel, drug store and auto service. Trip generation rates for these land uses were based on trip generation studies conducted at select locations in Orange County.

Published trip generation rates are available for a variety of time periods, but the most commonly used for community-level planning are 1) average daily trips (ADT) and 2) PM peak hour trips (PHT). Orange County's road impact fees are currently based on daily trip generation rates and roadway capacities.

Trip generation rates published in the ITE manual represent trip ends. Every trip has two trip ends—an origin and a destination. Thus, a round trip from home to work and back home would be counted as four trip-ends: two trip ends for the residence and two trip ends for the work place. To avoid over-counting, trip rates are divided by two. This places the burden of travel equally between the origin and destination of the trip and eliminates double-charging for any particular trip.

Percent New Trips

Trip rates also need to be adjusted by a “new trip” factor to exclude pass-by and diverted trips. This adjustment is intended to reduce the possibility of over-counting by only including primary trips generated by the development. Pass-by trips are those trips that are already on a particular route for a different purpose and simply stop at a another business on that route. For example, a stop at a convenience store on the way home from the office is a pass-by trip for the convenience store. A pass-

by trip does not create an additional burden on the street system and therefore should not be counted in the assessment of impact fees. A diverted trip is similar to a pass-by trip, but a diversion is made from the regular route to make an interim stop.

The land use types most likely to serve as destinations for pass-by or diverted trips are retail uses, banks and restaurants. New trip factors were developed for these uses in Orange County by Kimley-Horn and Associates in 1985. In addition, new trip factors were derived from alternative impact fee assessments for three land use types: tourist retail, auto service and drug store. Since the last update, however, better national data had become available for new trip factors from ITE. In this update, ITE data is used for all land use categories for which it is available, while the new trip factors for several other land uses are retained from the previous study. The comparison between new trip factors used in the 1998 study and revised factors recommended in this update are shown in Table 6.

**Table 6
NEW TRIP FACTORS FOR SELECTED USES, 1998-2004**

Land Use	2004	1998	Change
Retail, 50,000 sf or less	32%	49%	-35%
Retail, 50,001-100,000 sf	48%	48%	0%
Retail, 100,001-200,000 sf	55%	61%	-10%
Retail, 200,001-300,000 sf	60%	74%	-19%
Retail, 300,001-400,000 sf	63%	74%	-15%
Retail, 400,001-500,000 sf	65%	74%	-12%
Retail, 500,001-1,000,000 sf	68%	81%	-16%
Retail, 1,000,001-1,200,000 sf	71%	81%	-12%
Retail, more than 1,200,000 sf	72%	81%	-11%
Bank	27%	30%	-10%
Day Care Center	24%	30%	-20%
Restaurant, Quality	38%	52%	-27%
Restaurant, High-Turnover	37%	52%	-29%
Restaurant, Fast Food	30%	40%	-25%
Supermarket	34%	48%	-29%

Source: 2004 update figures from Institute of Transportation Engineers, *Trip Generation Handbook*, 2001 (new trip factor for retail uses based on non-pass-by trips from formula less assumed 10% for diverted trips); 1998 figures from 1998 study.

Trip Length

The trip lengths calculated in the 1985, 1990 and 1998 studies were derived from the Orlando Urban Area Transportation Study (OUATS) model. In the 1990 study, travel on freeways was excluded from the trip length. In addition, trip length data from origin-destination studies conducted at sites within Orange County as part of alternative impact fee assessments was used for five specific land use types.

For this update, the trip lengths were determined from output for the year 2000 generated by the OUATS three-county regional model by trip purpose and by facility type, including total trips, travel time (in minutes) and average travel speed. The percentage of travel on limited access facilities (freeways

and toll roads) was calculated to obtain the adjustment factor of 36.1 percent used to exclude freeway travel from the average trip lengths. While the actual percentage of freeway travel is higher than 36.1 percent, it was estimated that 20 percent of all vehicle-miles of travel (VMT) on freeways is through traffic without an origin or destination in the Orlando urban area, and this external-to-external VMT was excluded from development of the adjustment factor. The adjusted average trip lengths by trip purpose are shown below.

**Table 7
AVERAGE TRIP LENGTHS BY TRIP PURPOSE**

Trip Purpose	No. of Trips	Total Trip Length (miles)	Limited-Access Portion	Adjusted Trip Length (miles)
Home-Based Work	906,333	10.85	36.1%	6.93
Home-Based Shopping	850,387	7.00	36.1%	4.47
Home-Based Social/Recreational	649,009	8.34	36.1%	5.33
Home-Based Misc.	1,696,884	7.41	36.1%	4.73
Non-Home-Based	2,132,680	8.49	36.1%	5.43
Truck-Taxi	428,256	8.56	36.1%	5.47
Disney Tourist	90,451	7.74	36.1%	4.95
Disney Resident	40,850	23.07	36.1%	14.74
Disney External-Internal	13,619	31.01	36.1%	19.82
Internal-External	344,214	18.52	36.1%	11.83

Source: Orange County Public Works Division, Traffic Engineering Department, October 31, 2003.

The data on trip lengths by trip purpose was then converted to trip lengths by generalized land use categories. This was accomplished by identifying the typical kinds of trip purposes associated with the generalized land use category, then calculating the average trip length of the identified trip purposes, weighting the average by the number of trips for each identified trip purpose. Two trip lengths were calculated for each land use category—a “total” trip length, which includes travel on freeways and will be used in calculating the motor fuel tax credit, and a “net” trip length, which excludes freeway travel and will be used in calculating the cost to improve the non-freeway road system. The resulting trip lengths by generalized land use category are shown in Table 8.

The trip lengths for the nine generalized land use categories are used for most of the specific land use categories included in the fee schedule. The only exceptions were where better data was available from alternative fee assessment studies conducted in Orange County. The land uses for which alternative assessment data on trip lengths was used are tourist hotel, time share, tourist retail, auto service and drug store.

**Table 8
AVERAGE TRIP LENGTHS BY LAND USE**

Land Use	Trip Purposes Averaged	Avg. Trip Length (mi.)	
		Total	Net
Residential	Home-Based Work & Shop & Soc/Rec & Misc.	8.23	5.26
Office	Home-Based Work & Non-Home-Based	9.19	5.88
Retail/Commercial	Home-Based Shop & Non-Home-Based	8.07	5.16
Hospital/Day Care	Home-Based Misc. & Non-Home-Based	8.01	5.12
Industrial/Warehouse	Home-Based Work & Truck-Taxi	10.12	6.46
Hotel/Motel	Non-Home-Based & Truck-Taxi & Disney Tourist	8.48	5.42
Public Assembly/Recreational	Home-Based Soc/Rec & Misc.	7.67	4.90
Restaurant	Home-Based Soc/Rec & Misc. & Non-Home-Based	8.06	5.15
Fast Food Restaurant	½ of Restaurant Trip Length*	4.03	2.58

* Nicholas, James, et. al., *A Practitioner's Guide to Development Impact Fees*, 1991.

Source: Trip lengths are average of trip lengths for identified trip purposes from Table 7 weighted by number of trips from Table 7.

The net trip lengths are the ones that are directly comparable to the trip lengths used in the 1998 study, which used the trip length excluding freeway travel in both the cost and credit calculations. As shown in Table 15, net trip lengths increased by about 4 percent from the 1998 study for residential uses, 3 percent for public assembly/recreational uses, and 9 to 18 percent for all other uses. The total trip lengths, which will be used to calculate the revenue credits in this update, were not used in the 1998 study calculations.

**Table 9
NET AVERAGE TRIP LENGTHS BY LAND USE, 1998-2004**

Land Use	2004	1998	Change
Residential	5.26	5.08	4%
Office	5.88	5.41	9%
Retail/Commercial	5.16	4.39	18%
Hospital/Day Care	5.12	4.57	12%
Industrial/Warehouse	6.46	5.85	10%
Hotel/Motel	5.42	4.63	17%
Public Assembly/Recreational	4.90	4.76	3%
Restaurant	5.15	4.68	10%
Fast Food Restaurant	2.58	2.34	10%

Source: 2004 net trip lengths from Table 15; 1998 trip lengths from 1998 study.

Travel Demand Summary

The road impact of new development is measured in terms of the daily vehicle-miles of travel (VMT) placed on the non-freeway portion of Orange County's major road network, which is the product of trip generation, percent new trips and the "net" trip length. Credits will be based on the "total" trip length, which includes travel on freeways, since motorists pay gas tax for fuel used to travel on freeways. For the 41 individual land use types included in the fee schedule, the average daily travel demand on the County's major road network is calculated based on data on trip generation rates, new trip factors and average trip lengths (see Table 10).

**Table 10
DAILY TRAVEL DEMAND BY LAND USE**

Land Use Type	Unit	Trip		Percent New	Trip Miles		Daily VMT	
		Ends	Trips		Total	Net	Total	Net
Single-Family Detached	Dwelling	9.57	4.79	100%	8.23	5.26	39.42	25.20
Multi-Family	Dwelling	6.72	3.36	100%	8.23	5.26	27.65	17.67
Mobile Home Park	MH Site	4.99	2.50	100%	8.23	5.26	20.58	13.15
Retirement Housing	Dwelling	2.15	1.08	100%	8.23	5.26	8.89	5.68
Hotel/Motel	Room	6.90	3.45	100%	8.48	5.42	29.26	18.70
Tourist Hotel	Room	5.96	2.98	100%	3.83	2.45	11.41	7.30
Time Share	Dwelling	7.01	3.51	100%	3.97	2.54	13.93	8.92
Retail, 50,000 sf or less	1,000 sq. ft.*	110.32	55.16	32%	8.07	5.16	142.45	91.08
Retail, 50,001-100,000 sf	1,000 sq. ft.*	75.10	37.55	48%	8.07	5.16	145.45	93.00
Retail, 100,001-200,000 sf	1,000 sq. ft.*	58.93	29.47	55%	8.07	5.16	130.80	83.64
Retail, 200,001-300,000 sf	1,000 sq. ft.*	49.28	24.64	60%	8.07	5.16	119.31	76.29
Retail, 300,001-400,000 sf	1,000 sq. ft.*	43.80	21.90	63%	8.07	5.16	111.34	71.19
Retail, 400,001-500,000 sf	1,000 sq. ft.*	40.12	20.06	65%	8.07	5.16	105.22	67.28
Retail, 500,001-1,000,000 sf	1,000 sq. ft.*	33.55	16.78	68%	8.07	5.16	92.08	58.88
Retail, 1,000,001-1,200,000 sf	1,000 sq. ft.*	29.34	14.67	71%	8.07	5.16	84.05	53.75
Retail, more than 1,200,000 sf	1,000 sq. ft.*	27.67	13.84	72%	8.07	5.16	80.42	51.42
Retail, Tourist	1,000 sq. ft.*	74.99	37.50	40%	3.33	2.13	49.95	31.95
Auto, New Car Sales	1,000 sq. ft.	33.34	16.67	49%	8.07	5.16	65.92	42.15
Auto Service	1,000 sq. ft.	25.67	12.84	51%	7.97	5.09	52.19	33.33
Bank	1,000 sq. ft.	246.49	123.25	27%	8.07	5.16	268.55	171.71
Day Care Center	1,000 sq. ft.	79.26	39.63	24%	8.01	5.12	76.18	48.70
Drug Store	1,000 sq. ft.	88.46	44.23	50%	3.88	2.48	85.81	54.85
Racquet Club	1,000 sq. ft.	17.14	8.57	49%	8.06	5.15	33.85	21.63
Restaurant, Quality	1,000 sq. ft.	89.95	44.98	38%	8.06	5.15	137.76	88.03
Restaurant, High-Turnover	1,000 sq. ft.	127.15	63.58	37%	8.06	5.15	189.61	121.15
Restaurant, Fast Food	1,000 sq. ft.	496.12	248.06	30%	4.03	2.58	299.90	192.00
Supermarket	1,000 sq. ft.	102.24	51.12	34%	8.07	5.16	140.26	89.68
Office, 100,000 sf or less	1,000 sq. ft.	15.65	7.83	100%	9.19	5.88	71.96	46.04
Office, 100,001-200,000 sf	1,000 sq. ft.	12.15	6.08	100%	9.19	5.88	55.88	35.75
Office, more than 200,000 sf	1,000 sq. ft.	10.81	5.41	100%	9.19	5.88	49.72	31.81
Office, Medical/Dental	1,000 sq. ft.	36.13	18.07	100%	9.19	5.88	166.06	106.25
Light Industrial	1,000 sq. ft.	6.97	3.49	100%	10.12	6.46	35.32	22.55
Manufacturing	1,000 sq. ft.	3.82	1.91	100%	10.12	6.46	19.33	12.34
Warehousing	1,000 sq. ft.	4.96	2.48	100%	10.12	6.46	25.10	16.02
Mini-Warehouse	1,000 sq. ft.	2.50	1.25	100%	8.07	5.16	10.09	6.45
Hospital	1,000 sq. ft.	17.57	8.79	100%	8.01	5.12	70.41	45.00
Nursing Home	1,000 sq. ft.	6.10	3.05	100%	8.01	5.12	24.43	15.62
Library	1,000 sq. ft.	54.00	27.00	49%	7.67	4.90	101.47	64.83
Post Office	1,000 sq. ft.	108.19	54.10	49%	8.07	5.16	213.93	136.79
Public Assembly	1,000 sq. ft.	9.11	4.56	100%	7.67	4.90	34.98	22.34
School	1,000 sq. ft.	13.78	6.89	100%	7.67	4.90	52.85	33.76

* gross leasable area (all others are gross floor area)

Source: "Trip ends" is average daily trip ends during a weekday from Institute of Transportation Engineers (ITE), *Trip Generation, Seventh Edition*, 2003; "trips" is 1/2 trip ends; "percent new trips" from ITE, *Trip Generation Handbook*, 2001 (retail assumes 10% diverted-link trips in addition to pass-by trips from formula) and Kimley-Horn (see 1985 study); "trip length" is average trip length in miles from Table 8; "VMT" is vehicle-miles of travel, which equals trips x % new trips x average trip length; data for tourist hotel, time share, tourist retail, auto service and drug store from alternative assessments.

COST PER VEHICLE-MILE

As noted in the previous section, the demand for roadway facilities generated by new development is expressed in vehicle-miles of travel (VMT). Similarly, roadway capacity can be expressed in vehicle-miles of capacity (VMC), which is calculated by multiplying the capacity of a roadway segment at the desired level-of-service by the length of the segment in miles.

In this section, the average cost per VMC is calculated. The first step is to determine the average cost per lane-mile based on recently-completed road improvements in Orange County. The average cost per lane-mile is then divided by the average capacity of a lane to determine the cost per VMC.

Average Cost Per Lane-Mile

The average cost of new roadway capacity is commonly expressed as a cost per new lane-mile. As the name implies, the number of new lane-miles added by a roadway improvement can be calculated by multiplying the number of new lanes times the length of the roadway improvement in miles. The cost is then divided by the number of lane-miles added to determine the cost per lane-mile. While the cost per lane-mile will differ depending on the nature of each project, the average cost derived from recently completed roadway improvements provides the best available indicator of current road improvement costs in Orange County.

While the above description accurately describes how Orange County's approach calculates the cost per lane-mile for a new road, a more conservative approach is used for widening projects, which constitute most of the County's capacity-expanding road projects. In the case of widening projects, the cost per lane-mile is determined by dividing the total improvement cost by the total number of lane-miles of improved roadway, rather than by the new lane-miles added by the improvement. Thus, a \$4 million project to widen one mile of roadway from 2 to 4 lanes is determined to cost \$1 million per lane-mile, instead of \$2 million per new lane-mile. The County has elected to be conservative on this issue, and to essentially charge only half the cost of a two-lane to four-lane improvement to growth.

The cost per lane-mile for this update is based on five major road improvements completed or substantially completed by the County since the 1998 update. Since some of the improvements were completed several years ago, the costs have been adjusted for inflation, something that was not done in the last update. Bridge costs were also included in this update. Based on the County's major road improvements completed since 1998, the revised cost per lane-mile is \$1.65 million (see Table 11).

**Table 11
AVERAGE COST PER LANE-MILE**

Roadway Improvement	Year	Miles	Lanes	Lane-Miles	ROW Cost	Design Cost	Constr. Cost	Total Cost
Winter Garden Vineland Rd (1)	1998-2001	5.55	4	22.20	\$13,801,650	\$1,514,998	\$16,098,021	\$31,414,669
Apopka Vineland Road (2)(6)	2000-2005	3.51	4	14.04	\$8,689,907	\$2,786,093	\$25,858,961	\$37,334,961
Curry Ford Road (3)(6)	2000-2003	5.29	4	21.16	\$7,629,311	\$2,564,361	\$17,375,296	\$27,568,968
Old Winter Garden Road (4)	2003	1.65	4	6.60	\$3,411,316	\$990,638	\$5,910,874	\$10,312,828
Hiawassee Road (5)(6)	2003	2.88	4	11.52	\$6,125,146	\$2,038,417	\$10,027,210	\$18,190,773
Total		18.88		75.52	\$39,657,330	\$9,894,507	\$75,270,362	\$124,822,199
Average Cost per Lane-Mile					\$525,124	\$131,018	\$996,694	\$1,652,836

Notes: Costs expressed in 2003 dollars using average annual increase of 3% for design and construction costs and 9% for ROW costs; (1) Chase to Buena Vista; (2) Conroy Windemere to Old Winter Garden; (3) Beltway (SR 417) to Alafaya; (4) Apopka Vineland to Hiawassee; (5) Clarcona Ocoee to US 441; (6) includes bridge costs.

Source: Orange County Public Works Division, Traffic Engineering Department, September 3, 2003 and October 30, 2003.

The average cost per lane-mile used in the original 1985 study was \$600,600. This figure was revised for the 1990 study by examining the design, construction, and acquisition costs for representative County roadway projects, which resulted in an average cost per lane-mile of \$781,000. When the fees were revised eight years later, the average cost had increased to \$1.28 million per lane-mile. Most of the increase between 1990 and 1998 was due to higher ROW costs. The cost per lane-mile identified in this study is 29 percent higher than in the 1998 study. Whereas increased right-of-way (ROW) costs were primarily responsible for the increased cost per lane-mile in the last update, average ROW costs have actually declined for projects constructed in the last five years, as shown in Table 12.

**Table 12
COST PER LANE-MILE, 1990-2004**

Cost Component	1990 Study	1998 Study	% Change 1990-1998	2004 Study	% Change 1998-2004
Average ROW Cost per Lane-Mile	\$235,252	\$594,557	153%	\$525,124	-12%
Average Design Cost per Lane-Mile	\$68,931	\$78,300	14%	\$131,018	67%
Average Construction Cost per Lane-Mile	\$476,880	\$611,232	28%	\$996,694	63%
Average Total Cost per Lane-Mile	\$781,063	\$1,284,089	64%	\$1,652,836	29%

Source: The 1990 study, the 1998 study and Table 7.

There are several possible explanations for this shift. First, the County has made a conscious policy decision to try to avoid making improvements with excessive ROW costs. Second, construction and design costs were not adjusted for inflation in the last update, and consequently were likely underestimated. Finally, to a certain extent, the shift from ROW to construction costs may simply reflect the characteristics of the relatively small number of projects completed since 1998. However, while the component cost shares may fluctuate, the overall cost per lane-mile is more reliable. An analysis that includes all projects completed since 1990, for example, found a cost per lane-mile, adjusted for inflation, even higher than the one reported above (\$1.74 million, see Appendix B).

Cost per Vehicle-Mile

As described earlier, the average cost per vehicle-mile is calculated by dividing the average cost of a lane-mile by the average capacity of a lane. In the original 1985 study, an average maximum of 7,500 vehicles per day per lane was determined to be an acceptable level-of-service and was adopted by the Board of County Commissioners for the purposes of the study. This same figure was used in the 1990 study. For the 1998 update, an analysis of recently-constructed County roads identified an average capacity of 8,038. In this update, the average capacity will be based on the same list of recently-constructed projects used to determine the average cost per lane-mile. The weighted average capacity of a lane at the County's minimum level of service standard is just over 8,000 vehicles per day, as shown in Table 13.

Table 13
AVERAGE CAPACITY PER LANE

Project Roadway	Begin	End	Lanes	Miles	Area	Signal Group	Min. LOS	Daily Capacity	Capacity/Lane
Winter Garden-Vineland	Chase Rd	Buena Vista Blvd	4	5.55	U	II	E	32,775	8,194
Apopka Vineland	Conroy-Windemere	Westover Roberts	4	1.75	U	II	E	32,775	8,194
Apopka Vineland	Westover Roberts	Chelsworth Drive	4	1.38	U	II	E	32,775	8,194
Apopka Vineland	Chelsworth Dr	Old Winter Garden	4	0.38	U	II	E	32,775	8,194
Curry Ford Road	Beltway	Dean Ridge Rd	4	1.50	U	I	E	33,915	8,479
Curry Ford Road	Dean Ridge Rd	Andover Lakes	4	0.50	U	I	E	33,915	8,479
Curry Ford Road	Andover Lakes	Alafaya Tr	4	3.29	U	II	E	32,775	8,194
Old Winter Garden	Apopka Vineland	Hiawassee Rd	4	1.65	U	I	E	33,915	8,479
Hiawassee Road	Clarcona-Ocoee	US 441	4	2.88	U	II	E	32,775	8,194
Total Miles				18.88					
Average Weighted Capacity per Lane-Mile									8,249

Source: Segment descriptions and adopted LOS from Orange County Public Works Division, Traffic Engineering Department, August 20, 2003; daily capacities from Florida Department of Transportation, 2002 *Quality/Level of Service Handbook* (capacities for urban segments from Table 4-1 and for rural segments from Table 4-2, based on State two-way arterials reduced by 5% per recommendation on page 104).

Dividing the average lane-mile cost by the average capacity of a newly-constructed lane results in an average cost of \$200.37 per vehicle-mile, as shown in Table 14. This represents an increase of 25 percent from the 1998 study.

Table 14
AVERAGE COST PER VEHICLE-MILE, 1998-2004

	2004	1998	Change
Average Cost per Lane-Mile	\$1,652,836	\$1,284,089	29%
Average Daily Vehicles per Lane	8,249	8,038	3%
Average Cost per Daily Vehicle-Mile	\$200.37	\$159.75	25%

Source: 2004 cost from Table 11; 2004 capacity per lane from Table 13; 1998 figures from 1998 study.

CREDIT CALCULATION

In the calculation of the road impact fee, credit must be given for the motor fuel revenues and the motor vehicle license fee revenues generated by new development. A credit is necessary for two reasons. First, a certain percentage of gas tax and motor vehicle license fee revenues generated by new development will be used for capital improvements to the roadway system in Orange County. Second, the credit mechanism avoids the possibility of a new development being forced to pay more than its fair share for future roadway improvements through the combination of impact fees and other taxes and fees.

Credits should also be provided for other funds that will be generated by new development and used to retire outstanding debt for road improvements that predate the impact fees. The County has only one outstanding bond issue that predates the original 1986 road impact fee ordinance. However, the revenues pledged to retire the Series 1977 Gas Tax Revenue Bonds are County gas tax revenues, for which credit is already being provided. Consequently, no additional revenue credit for the repayment of outstanding road improvement bonds is warranted.

Motor Fuel Tax Credit

The revenues generated by Federal, State and local gasoline and motor fuel taxes fund the construction of capital projects as well as the maintenance of existing roads in Orange County. An impact fee credit should only be granted for the portion that funds capacity-expanding roadway improvements. In order to determine what portion of Federal and State gas taxes fund capital projects, the Orange County sections of the 1997-2001 *Transportation Improvement Programs* (TIP) were examined. The TIPs contain Federal and State funded road projects for Orange County by name, description, phase, and funding source.

The Federal fuel excise tax is currently at 18.4 cents per gallon of gasoline. State fuel taxes consist of a motor fuel sales tax and the State Comprehensive Enhanced Transportation System (SCETS) tax. The amount of these taxes are indexed to inflation and increase annually. For 2004, the State motor fuel sales tax is 14.3 cents and the SCETS tax is 5.7 cents per gallon of gasoline. These funds are earmarked for transportation purposes, and at least 14.3 percent of all FDOT receipts must be spent on public transportation. In addition, SCETS net tax receipts must be spent in the district where they were generated.

Motor fuel tax rates charged by the Federal and State governments over the last eight years are summarized in Table 15.

Table 15
FEDERAL/STATE MOTOR FUEL TAX PER GALLON, 1997-2003

Fiscal Year	Federal	State	SCETS	Total
FY 96-97	\$0.183	\$0.128	\$0.048	\$0.359
FY 97-98	\$0.184	\$0.130	\$0.050	\$0.364
FY 98-99	\$0.184	\$0.131	\$0.050	\$0.365
FY 99-00	\$0.184	\$0.133	\$0.051	\$0.368
FY 00-01	\$0.184	\$0.136	\$0.053	\$0.373
FY 01-02	\$0.184	\$0.139	\$0.055	\$0.378
FY 02-03	\$0.184	\$0.141	\$0.056	\$0.381
FY 03-04	\$0.184	\$0.143	\$0.057	\$0.384

Source: Florida Department of Revenue.

Total motor fuel tax revenues collected in Orange County for each year are estimated based on the gallons of motor fuels sold in Orange County and the Federal/State tax rate per gallon in effect at the time. On average over the five-year period from 1998-2002, it is estimated that 15 percent of Federal and State motor fuel taxes collected in Orange County have been spent on capacity-expanding improvements to the major roadway system in the county, as shown in Table 16. This represents a significant reduction from the 1998 study, which found that an average of 42.8 percent of Federal and State funding was used for capacity-expanding road improvements over the preceding five years. A major reason for this reduction is that in this update we are not giving credit for improvement to I-4, since it is not part of the non-highway system for which the impact fees are being charged. To be conservative, it will be assumed that 20 percent of Federal/State funding will be available for capacity improvements.

Table 16
PERCENT OF FEDERAL/STATE FUEL TAX FUNDING TO CAPACITY, 1998-2002

Fiscal Year	Gallons Sold in Orange Co.	Fed/State Tax/Gallon	Fed/State Taxes Paid	FDOT Capacity Funding	Percent Capacity
FY 1997-1998	541,862,849	\$0.364	\$197,238,077	\$10,716,000	5%
FY 1998-1999	567,175,056	\$0.365	\$207,018,895	\$11,678,000	6%
FY 1999-2000	577,200,856	\$0.368	\$212,409,915	\$15,907,000	7%
FY 2000-2001	613,879,513	\$0.373	\$228,977,058	\$88,587,000	39%
FY 2001-2002	641,571,832	\$0.378	\$242,514,152	\$47,426,000	20%
Five-Year Average					15%
Assumed Percent to Capacity					20%

Source: Total gallons of fuel sold in Orange County (includes diesel) from the Florida Department of Revenue; Federal/State motor fuel tax per gallon from Table 15; FDOT capacity-expanding improvement funding based on first year of the each of the last five TIPs from Tables 23 through 27.

A portion of automobile license tag fee revenues are mingled with gasoline tax revenues and are spent on transportation improvements (another portion is earmarked for education). While automobile license tag fees are not based on gallons of motor fuels consumed, the fee revenues that are used for transportation are included in the FDOT capacity funding on which the above percentages are based. Consequently, credit for automobile license tag fees is included in the motor vehicle tax credit. However, it is possible to approximate what portion of the credit is due to license tag fees.

The percent of all state revenues spent on capital road projects over the last five years was calculated above in Table 11. While license renewal fees are not paid on a per gallon basis, total revenues can be divided by total gasoline consumption to determine the amount generated per gallon sold. As shown in Table 17, license fees paid in Orange County amount to 3.4 cents per gallon of motor fuel sold. Multiplying this by the percent of combined state motor fuel tax and license fee revenues used for capital projects yields a license fee credit of 0.9 cents per gallon.

Table 17
LICENSE FEE CREDIT PER GALLON

Orange County License Fee Revenue, FY 2002	\$21,647,262
Orange County Fuel Consumption (gal.), FY 2002	641,571,832
License Fee Revenue per Gallon	\$0.034
Percent to Roads (Rest to Education)	74.5%
License Fee Revenue per Gallon for Roads	\$0.025
Percent Used for Capital Road Projects	20%
License Fee Revenue Credit per Gallon	\$0.005

Source: FY 2002 license fee revenue from Florida Department of Highway Safety and Motor Vehicles, *Revenue Report, July 1, 2001 - June 30, 2002*; gasoline consumption and average percent to capital from Table 11; percent to roads from Florida Department of Transportation; *Florida's Transportation Tax Sources: A Primer*, January 2004.

In addition to the Federal and State motor fuels taxes, the State imposes a four-cent per gallon excise tax on motor fuels that is distributed to local governments. Two cents of this tax, referred to as the Constitutional Fuel Tax, is distributed to counties for transportation purposes. Historically, 80 percent of the Orange County's two-cent Constitutional Fuel Tax revenues has been used for capital projects, but for the purposes of this update it will be assumed that all of these funds are available for capital improvements. The third and fourth cents are referred to as the County Fuel Tax and the Municipal Fuel Tax, respectively. The County Fuel Tax has not been used for any capital roadway improvements in recent years. The Municipal Fuel Tax revenues are joined with other non-transportation revenues and distributed to the cities from the Revenue Sharing Trust Fund for Municipalities. Consequently, only the two-cent Constitutional Fuel Tax needs to be provided as a credit against the road impact fees.

Finally, the State levies a six-cent per gallon local option gasoline tax, of which Orange County receives 60 percent, the City of Orlando receives 30 percent, and the remaining municipalities share 10 percent. In the 1998 update, 100 percent credit was given for County's 60-percent share, and no credit for the municipalities' share, on the assumption that the portion of the gas tax going to municipalities would not be available for improvements in the unincorporated area. In this update, it is acknowledged that credit should probably be given for the entire six-cent local option tax, since this amount is being paid by all motorists. However, the County has been programming less than 60 percent of its local option gas tax revenues for capacity-expanding projects, as shown in Table 18. Assuming this percentage will be used for capacity-expanding improvements, the net result is that the amount of credit for the local option gas tax remains at 3.6 cents per gallon.

Table 18
PERCENT OF LOCAL OPTION GAS TAX FUNDING TO CAPACITY, 2002-2003

Project Description	FY 2001-02	FY 2002-03
Roadside Hazard Elimination County-wide	\$85,000	\$85,000
Pave Dirt Roads County-wide	\$4,769	\$170,769
Sidewalk Program County-wide	\$2,604,400	\$2,654,693
Major Drainage Structure Replacement	\$202,139	\$578,356
Pine Hills Landfill Closure	\$0	\$151,000
Thorpe Road Bridge Replacement	\$5,000	\$10,000
Skyview Drive Bridge Replacement	\$291,862	\$211,507
Taylor Creek Bridge Replacement	\$5,000	\$10,000
Campo Way Bridge Replacement	\$5,000	\$5,000
Harrell Road Bridge Replacement	\$25,000	\$6,834
Street Lights	\$400,000	\$400,100
Alternative Surfaces Program	\$806,144	\$153,037
Maintenance Roads Improvement	\$2,430,418	\$1,279,739
Road Rehabilitation County-wide	\$9,115,400	\$11,818,449
Drainage Rehabilitation County-wide	\$5,115,009	\$4,526,419
Sandbar Removal County-wide	\$0	\$0
Neighborhood Traffic Studies	\$25,072	\$38,000
Traffic Sign Inventory	\$25,000	\$0
Traffic Calming Program	\$149,692	\$229,108
Subtotal, Non-Capacity Projects	\$21,294,905	\$22,328,011
Remainder, Capacity Projects	\$22,703,603	\$23,483,780
Total Local Option Gas Tax (Fund 1004)	\$43,998,508	\$45,811,791
Percent to Capacity-Expanding Projects	52%	51%
Assumed Percent to Capacity		60%

Source: Orange County, "Constitutional Gas Tax and Local Option Gas Tax Budget for Fiscal Years 00-01 to 02-03," November 14, 2003.

The revenue credits are summarized in Table 19. For every gallon of gasoline sold in Orange County, motorists currently pay 48.4 cents in motor fuel taxes. Of this, 13.3 cents is available for capital roadway improvements to the major road network. This revenue funding per gallon includes both motor fuel taxes and license tag fees.

Table 19
TOTAL REVENUE CREDIT PER GALLON

Source	Tax Rate per Gallon	Percent Capital	Credit per Gallon
Federal Fuel Excise Tax	\$0.184		
State Fuel Sales Tax	\$0.143		
SCETS Tax	\$0.057		
Subtotal, Federal/State Tax	\$0.384	20%	\$0.077
Constitutional Fuel Tax	\$0.020	100%	\$0.020
County Fuel Tax	\$0.010	0%	\$0.000
Municipal Fuel Tax	\$0.010	0%	\$0.000
Local Option Fuel Tax	\$0.060	60%	\$0.036
Total	\$0.484	27%	\$0.133

Source: Current tax rates from Florida Department of Revenue (see Table 15); percent of Federal/State tax to capital from Table 16; percent of local option fuel tax from Table 18; for other percents, see text.

Revenue Credit per Vehicle-Mile

To this point, the motor vehicle fuel tax and license fee credits have been calculated on a per gallon basis. Several additional steps are required to translate this into a credit per daily vehicle-mile of travel (VMT). The credits are calculated as an annual contribution paid for 25 years, which is the expected life of a roadway improvement. First, the total revenue credit per gallon must be divided by average fuel efficiency to determine the credit per mile of travel. In this update, the average fuel efficiency of the entire U.S. motor vehicle fleet, including trucks and buses, is used instead of automobile fuel efficiency. This is probably more accurate and has the effect, other things being equal, of increasing the credit. Second, the credit per mile must be multiplied by the number of days in a year to derive the annual credit. Finally, the annual payments over the next 25 years are discounted to an equivalent lump sum present value. A larger present value factor, reflecting lower interest rates, has been used in the update, which again would lead, other things equal, to a higher revenue credit.

These calculations are shown in the following table, where they are compared to the calculations from the previous update. Overall, the revenue credit per vehicle-mile in the current update has decreased 3 percent since the 1998 update. However, since the credit in this update is based on the total trip length, rather than the net trip length, the credit per single-family unit has increased by 56 percent since the 1998 update, as shown in Table 20.

Table 20
REVENUE CREDIT PER VEHICLE-MILE, 1998-2004

	2004	1998	Change
Motor Fuel Tax Credit per Gallon	\$0.1280	\$0.1874	-32%
License Fee Credit per Gallon	\$0.0050	\$0.0144	-65%
Total Revenue Credit per Gallon	\$0.1330	\$0.2018	-34%
Average Miles per Gallon	16.9	21.5	-21%
Revenue Credit per Vehicle-Mile	\$0.0079	\$0.0094	-16%
Days per Year	365	365	0%
Annual Revenue Credit per Daily Vehicle-Mile	\$2.88	\$3.43	-16%
Present Value Factor	15.42	13.41	15%
Motor Fuel Tax Credit per Daily Vehicle-Mile	\$44.41	\$46.01	-3%
Daily Vehicle-Miles of Travel per Single-Family Unit	39.42	24.33	62%
Motor Fuel Tax Credit per Single-Family Unit	\$1,751	\$1,120	56%

Source: 2004 license fee credit from Table 17; 2004 total revenue credit from Table 19 (2004 motor fuel tax credit is difference between total credit and license fee credit); 2004 average miles per gallon is average for all motor vehicles for 2000 from US Census Bureau, *Statistical Abstract of the United States*, 2002, Table 1082; present value factor for 2004 update based on 25 years and discount rate based on blended average interest rates on 5-year (2.1%) and 20-year (4.3%) AAA municipal bonds (blended by assuming 5-year rate for first five years and 20-year rate for final 20 years) cited on bloomberg.com, bondsonline.com and fmsbonds.com on March 15, 2004; 1998 figures from 1998 study.

NET COST SCHEDULE

In Table 21, the maximum potential road impact fees that can be assessed by Orange County based on the data, assumptions and analysis contained in this update study are shown. The net cost per unit of development by land use shown in that table is the product of the number of vehicle-miles of travel (VMT) generated during an average weekday and the net cost to construct a daily vehicle-mile of roadway capacity. The formula used to calculate the net cost schedule is shown below.

Figure 2
ROAD IMPACT FORMULA

NET COST = COST - CREDIT
COST = NETVMT x COST/VMT
CREDIT = VMT x CREDIT/VMT
<u>Where:</u>
VMT = ADT x % NEW x ATL ÷ 2
NETVMT = ADT x % NEW x NETATL ÷ 2
ADT = Trip ends during a weekday
% NEW = Percent of trips that are primary trips, as opposed to passby or diverted-link trips
ATL = Average trip length
NETATL = Average trip length on the non-freeway system
÷ 2 = Avoids double-counting trips for origin and destination
COST/VMT = COST/LANE-MILE ÷ CAPACITY
COST/LANE-MILE = Average cost to add a new lane to the major roadway system
CAPACITY = Average daily capacity of a lane at desired LOS
CREDIT/VMT = \$/GAL ÷ MPG x 365 x NPV
\$/GAL = Capacity-expanding funding for roads per gallon of gasoline consumed
MPG = Miles per gallon, average for U.S. motor vehicle fleet
365 = Days per year (used to convert daily VMT to annual VMT)
NPV = Net present value factor

Orange County has assessed only a percentage of the maximum road impact fees identified in the previous studies. The original fees adopted in 1985 were assessed at 52 percent of the full net cost. At the time of the 1990 update, the assessment level was increased to 75 percent, and this same percentage was applied to the maximum fees calculated in the 1998 study.

In Table 22, the current fees, which represent 75 percent of the net costs identified in the 1998 study, are compared with the revised fees, assuming that they are assessed at 75 and 100 percent of the full net costs identified in this update. If the revised fees are adopted at 75 percent, the fee for most land use categories would increase between 15 and 27 percent, with an average increase of about 18 percent. Adoption of the revised fees at 100 percent would result in an average fee increase of about 57 percent over current fees.

**Table 21
ROAD IMPACT FEE NET COST SCHEDULE**

Land Use Type	Unit	Daily VMT		Cost/ Net VMT	Credit/ Ttl VMT	Net Cost per Unit
		Total	Net			
Single-Family Detached	Dwelling	39.42	25.20	\$200.37	\$44.41	\$3,299
Multi-Family	Dwelling	27.65	17.67	\$200.37	\$44.41	\$2,313
Mobile Home Park	Site	20.58	13.15	\$200.37	\$44.41	\$1,721
Retirement Housing	Dwelling	8.89	5.68	\$200.37	\$44.41	\$743
Hotel/Motel	Room	29.26	18.70	\$200.37	\$44.41	\$2,447
Tourist Hotel	Room	11.41	7.30	\$200.37	\$44.41	\$956
Time Share	Room/Unit	13.93	8.92	\$200.37	\$44.41	\$1,169
Retail, 50,000 sf or less	1,000 sq. ft.*	142.45	91.08	\$200.37	\$44.41	\$11,923
Retail, 50,001-100,000 sf	1,000 sq. ft.*	145.45	93.00	\$200.37	\$44.41	\$12,175
Retail, 100,001-200,000 sf	1,000 sq. ft.*	130.80	83.64	\$200.37	\$44.41	\$10,950
Retail, 200,001-300,000 sf	1,000 sq. ft.*	119.31	76.29	\$200.37	\$44.41	\$9,988
Retail, 300,001-400,000 sf	1,000 sq. ft.*	111.34	71.19	\$200.37	\$44.41	\$9,320
Retail, 400,001-500,000 sf	1,000 sq. ft.*	105.22	67.28	\$200.37	\$44.41	\$8,808
Retail, 500,001-1,000,000 sf	1,000 sq. ft.*	92.08	58.88	\$200.37	\$44.41	\$7,709
Retail, 1,000,001-1,200,000 sf	1,000 sq. ft.*	84.05	53.75	\$200.37	\$44.41	\$7,037
Retail, more than 1,200,000 sf	1,000 sq. ft.*	80.42	51.42	\$200.37	\$44.41	\$6,732
Retail, Tourist	1,000 sq. ft.*	49.95	31.95	\$200.37	\$44.41	\$4,184
Auto, New Car Sales	1,000 sq. ft.	65.92	42.15	\$200.37	\$44.41	\$5,518
Auto Service	1,000 sq. ft.	52.19	33.33	\$200.37	\$44.41	\$4,361
Bank	1,000 sq. ft.	268.55	171.71	\$200.37	\$44.41	\$22,479
Day Care Center	1,000 sq. ft.	76.18	48.70	\$200.37	\$44.41	\$6,375
Drug Store	1,000 sq. ft.	85.81	54.85	\$200.37	\$44.41	\$7,179
Racquet Club	1,000 sq. ft.	33.85	21.63	\$200.37	\$44.41	\$2,831
Restaurant, Quality	1,000 sq. ft.	137.76	88.03	\$200.37	\$44.41	\$11,521
Restaurant, High-Turnover	1,000 sq. ft.	189.61	121.15	\$200.37	\$44.41	\$15,854
Restaurant, Fast Food	1,000 sq. ft.	299.90	192.00	\$200.37	\$44.41	\$25,152
Supermarket	1,000 sq. ft.	140.26	89.68	\$200.37	\$44.41	\$11,740
Office, 100,000 sf or less	1,000 sq. ft.	71.96	46.04	\$200.37	\$44.41	\$6,029
Office, 100,001-200,000 sf	1,000 sq. ft.	55.88	35.75	\$200.37	\$44.41	\$4,682
Office, more than 200,000 sf	1,000 sq. ft.	49.72	31.81	\$200.37	\$44.41	\$4,166
Office, Medical/Dental	1,000 sq. ft.	166.06	106.25	\$200.37	\$44.41	\$13,915
Light Industrial	1,000 sq. ft.	35.32	22.55	\$200.37	\$44.41	\$2,950
Manufacturing	1,000 sq. ft.	19.33	12.34	\$200.37	\$44.41	\$1,614
Warehousing	1,000 sq. ft.	25.10	16.02	\$200.37	\$44.41	\$2,095
Mini-Warehouse	1,000 sq. ft.	10.09	6.45	\$200.37	\$44.41	\$844
Hospital	1,000 sq. ft.	70.41	45.00	\$200.37	\$44.41	\$5,890
Nursing Home	1,000 sq. ft.	24.43	15.62	\$200.37	\$44.41	\$2,045
Library	1,000 sq. ft.	101.47	64.83	\$200.37	\$44.41	\$8,484
Post Office	1,000 sq. ft.	213.93	136.79	\$200.37	\$44.41	\$17,908
Public Assembly	1,000 sq. ft.	34.98	22.34	\$200.37	\$44.41	\$2,923
School	1,000 sq. ft.	52.85	33.76	\$200.37	\$44.41	\$4,417

* gross leasable area (all others are gross floor area)

Source: Total and net daily vehicle-miles of travel (VMT) from Table 10; cost per VMT from Table 14; credit per VMT from Table 20.

**Table 22
ROAD IMPACT FEE ALTERNATIVES**

Land Use Type	Unit	Current Fee (@ 75%)	Revised Fee @ 75%	Percent Change @ 75%	Revised Fee @ 100%	Percent Change @ 100%
Single-Family Detached	Dwelling	\$2,075	\$2,474	19%	\$3,299	59%
Multi-Family	Dwelling	\$1,439	\$1,735	21%	\$2,313	61%
Mobile Home Park	Site	\$1,040	\$1,291	24%	\$1,721	65%
Retirement Housing	Dwelling	\$468	\$557	19%	\$743	59%
Hotel/Motel	Room	\$1,762	\$1,835	4%	\$2,447	39%
Tourist Hotel	Room	\$623	\$717	15%	\$956	53%
Time Share	Room	\$761	\$877	15%	\$1,169	54%
Retail, 50,000 sf or less	1,000 sq. ft.*	\$10,327	\$8,942	-13%	\$11,923	15%
Retail, 50,001-100,000 sf	1,000 sq. ft.*	\$6,691	\$9,131	36%	\$12,175	82%
Retail, 100,001-200,000 sf	1,000 sq. ft.*	\$6,716	\$8,213	22%	\$10,950	63%
Retail, 200,001-300,000 sf	1,000 sq. ft.*	\$6,785	\$7,491	10%	\$9,988	47%
Retail, 300,001-400,000 sf	1,000 sq. ft.*	\$6,019	\$6,990	16%	\$9,320	55%
Retail, 400,001-500,000 sf	1,000 sq. ft.*	\$5,504	\$6,606	20%	\$8,808	60%
Retail, 500,001-1,000,000 sf	1,000 sq. ft.*	\$5,072	\$5,782	14%	\$7,709	52%
Retail, 1,000,001-1,200,000 sf	1,000 sq. ft.*	\$4,389	\$5,278	20%	\$7,037	60%
Retail, more than 1,200,000 sf	1,000 sq. ft.*	\$4,083	\$5,049	24%	\$6,732	65%
Retail, Tourist	1,000 sq. ft.*	\$2,725	\$3,138	15%	\$4,184	54%
Auto Sales, New Cars	1,000 sq. ft.	\$3,440	\$4,139	20%	\$5,518	60%
Auto Service	1,000 sq. ft.	\$2,843	\$3,271	15%	\$4,361	53%
Bank	1,000 sq. ft.	\$14,897	\$16,859	13%	\$22,479	51%
Day Care Center	1,000 sq. ft.	\$4,634	\$4,781	3%	\$6,375	38%
Drug Store	1,000 sq. ft.	\$4,679	\$5,384	15%	\$7,179	53%
Racquet Club	1,000 sq. ft.	\$1,676	\$2,123	27%	\$2,831	69%
Restaurant, Quality	1,000 sq. ft.	\$9,338	\$8,641	-7%	\$11,521	23%
Restaurant, High-Turnover	1,000 sq. ft.	\$13,529	\$11,891	-12%	\$15,854	17%
Restaurant, Fast Food	1,000 sq. ft.	\$19,806	\$18,864	-5%	\$25,152	27%
Supermarket	1,000 sq. ft.	\$10,023	\$8,805	-12%	\$11,740	17%
Office, 100,000 sf or less	1,000 sq. ft.	\$3,734	\$4,522	21%	\$6,029	61%
Office, 100,001-200,000 sf	1,000 sq. ft.	\$2,783	\$3,512	26%	\$4,682	68%
Office, more than 200,000 sf	1,000 sq. ft.	\$2,303	\$3,125	36%	\$4,166	81%
Office, Medical/Dental	1,000 sq. ft.	\$8,339	\$10,436	25%	\$13,915	67%
Light Industrial	1,000 sq. ft.	\$1,742	\$2,213	27%	\$2,950	69%
Manufacturing	1,000 sq. ft.	\$963	\$1,211	26%	\$1,614	68%
Warehousing	1,000 sq. ft.	\$1,238	\$1,571	27%	\$2,095	69%
Mini-Warehouse	1,000 sq. ft.	\$468	\$633	35%	\$844	80%
Hospital	1,000 sq. ft.	\$3,271	\$4,418	35%	\$5,890	80%
Nursing Home	1,000 sq. ft.	n/a	\$1,534	n/a	\$2,045	n/a
Library	1,000 sq. ft.	\$5,372	\$6,363	18%	\$8,484	58%
Post Office	1,000 sq. ft.	\$9,927	\$13,431	35%	\$17,908	80%
Public Assembly	1,000 sq. ft.	\$1,852	\$2,192	18%	\$2,923	58%
School	1,000 sq. ft.	\$2,420	\$3,313	37%	\$4,417	83%
Average Fee Increase				18%		57%

* gross leasable area (all others are gross floor area)

Source: Current fees from Sec. 23-92, Orange County Road Impact Fee Ordinance; revised fees from Table 21.

APPENDIX A: STATE/FEDERAL ROAD FUNDING

1997-2001 Transportation Improvement Programs

Table 23
1998 CAPITAL PROJECTS FROM 7/1/97 T.I.P.

Project	Description	Project Phase	Local Funding	State/Federal	Total Funding
SR 500/US 441	Widen to 6 Lanes	Incentive	\$0	\$500,000	\$500,000
SR 436	Widen to 6 Lanes	PE	\$0	\$200,000	\$200,000
SR 435/Kirkam Rd.	Widen to 6 Lanes	ROW	\$0	\$2,297,000	\$2,297,000
SR 438/Silver Star	Widen to 4 Lanes	PE	\$0	\$1,725,000	\$1,725,000
SR 520	Widen to 4 Lanes	PE.	\$0	\$2,500,000	\$2,500,000
SR 520	Widen to 4 Lanes	PE.	\$0	\$1,200,000	\$1,200,000
SR 536	Add Trough Lanes	Const	\$0	\$2,294,000	\$2,294,000
Subtotal, Non-Freeways			\$0	\$10,716,000	\$10,716,000
Interstate 4	Major Interchange	PE	\$0	\$1,735,000	\$1,735,000
Interstate 4	Add Reversible HOV Lane	PLN	\$0	\$5,000	\$5,000
Total			\$0	\$12,456,000	\$12,456,000

Source: Orange County Public Works Division, Traffic Engineering Department, October 24, 2003.

Table 24
1999 CAPITAL PROJECTS FROM 7/1/98 T.I.P.

Project	Description	Project Phase	Local Funding	State/Federal	Total Funding
SR 520	Widen to 4 Lanes	ROW	\$0	\$532,000	\$532,000
SR 482/ Sand Lake Rd.	Widen Bridge	Const	\$0	\$3,707,000	\$3,707,000
SR 438/Silver Star	Add left Turn Lane	Const	\$0	\$252,000	\$252,000
SR 436	PD&E	PD&E	\$0	\$600,000	\$600,000
SR 436	Widen to 6 Lanes	PE	\$0	\$3,050,000	\$3,050,000
SR 500/US 441	Add left Turn Lane	Const	\$0	\$307,000	\$307,000
SR 50	Drainage Improvement	Const	\$0	\$302,000	\$302,000
SR 50	Drainage Improvement	Const	\$0	\$684,000	\$684,000
CR 506, Conway Rd.	Widen to 4 Lanes	PE	\$107,000	\$744,000	\$851,000
Kirkam Rd. Extension	PD&E	PD&E	\$0	\$1,500,000	\$1,500,000
Subtotal, Non-Freeways			\$107,000	\$11,678,000	\$11,785,000
Interstate 4	Interim Interchange Impvnt	PE	\$0	\$5,300,000	\$5,300,000
Interstate 4	Major Interchange	Const	\$0	\$2,500,000	\$2,500,000
Interstate 4	Major Interchange	Const	\$0	\$2,200,000	\$2,200,000
Interstate 4	Add Reversible HOV Lane	Const	\$0	\$5,989,086	\$5,989,086
Interstate 4	Add Auxiliary Lanes	PE	\$0	\$15,000	\$15,000
Total			\$107,000	\$27,682,086	\$27,789,086

Source: Orange County Public Works Division, Traffic Engineering Department, October 24, 2003.

Table 25
2000 CAPITAL PROJECTS FROM 7/1/99 T.I.P.

Project	Description	Project Phase	Local Funding	State/Federal	Total Funding
SR 50	PD&E	PE	\$150,000	\$0	\$150,000
SR 50	Widen to 6 Lanes	PE	\$0	\$25,000	\$25,000
SR 50	Widen to 6 Lanes	PE	\$0	\$25,000	\$25,000
SR 50	Widen to 6 Lanes	PE	\$0	\$25,000	\$25,000
SR 436	Widen to 6 Lanes	INC	\$0	\$2,300,000	\$2,300,000
SR 435/Kirkam Rd.	Widen to 6 Lanes	ROW	\$0	\$3,843,000	\$3,843,000
SR 438/Silver Star	Widen to 4 Lanes	PE	\$0	\$200,000	\$200,000
SR 520	Widen to 4 Lanes	ROW	\$0	\$1,542,000	\$1,542,000
SR 482/Sand Lake Rd	Widen Bridge	Const	\$0	\$3,642,000	\$3,642,000
SR 500/US 441	Widen to 6 Lanes	ROW, ENV	\$0	\$4,217,000	\$4,217,000
SR 50	PD&E	PD&E	\$2,000,000	\$0	\$2,000,000
CR 506, Conway Rd.	Widen to 4 Lanes	PE	\$0	\$88,000	\$88,000
Subtotal, Non-Freeways			\$2,150,000	\$15,907,000	\$18,057,000
Interstate 4	Add 2 HOV Lanes/Rehab	PE	\$0	\$25,000	\$25,000
Interstate 4	Interchange Improvements	ENV., ROW,	\$0	\$863,000	\$863,000
Interstate 4	Add Auxiliary Lanes	PE, Const, Misc	\$0	\$20,829,000	\$20,829,000
Interstate 4	Add Auxiliary Lanes	PE	\$0	\$300,000	\$300,000
Total			\$2,150,000	\$37,924,000	\$40,074,000

Source: Orange County Public Works Division, Traffic Engineering Department, October 24, 2003.

Table 26
2001 CAPITAL PROJECTS FROM 7/1/00 T.I.P.

Project	Description	Project Phase	Local Funding	State/ Federal	Total Funding
SR 436	Widen to 6 Lanes	INC	\$0	\$750,000	\$750,000
SR 435/Kirkman Rd.	Widen to 6 Lanes	Const	\$0	\$15,159,000	\$15,159,000
SR 438/Kirkman Rd.	Widen to 4 Lanes	Const	\$1,128,000	\$15,119,000	\$16,247,000
SR 520	Widen to 4 Lanes	Const	\$0	\$20,637,000	\$20,637,000
SR 520	Drainage Imprvmts	ROW, Const	\$0	\$1,285,000	\$1,285,000
SR 520	Widen to 4 Lanes	PE, and ROW	\$0	\$522,000	\$522,000
Apopka Bypass	Prel. Engineering	PE	\$0	\$1,100,000	\$1,100,000
SR 500/US 441	Widen to 6 Lanes	ROW	\$0	\$24,538,000	\$24,538,000
SR 434/ Alafaya Trail	Widen to 6 Lanes	Const	\$0	\$605,000	\$605,000
SR 50	Add Right Turn Lane	Const	\$0	\$168,000	\$168,000
SR 434/Forest City Rd.	Add Turn Lanes	Const	\$0	\$300,000	\$300,000
Americana Blvd.	Add Turn Lanes	PE, Const	\$0	\$163,000	\$163,000
CR 482/ Sand Lake Rd.	Add Turn Lanes	PE, Const	\$0	\$524,000	\$524,000
SR 50	Add Turn Lanes	Const	\$0	\$302,000	\$302,000
Old Winter Garden Rd.	Widen to 4 lanes	Const	\$4,605,000	\$0	\$4,605,000
StoneyBrook West Pkwy	New Road	Const	\$0	\$4,815,000	\$4,815,000
SR 423/John Young Pkwy	Widen to 6 Lanes	PD&E	\$0	\$500,000	\$500,000
SR 50	Widen to 6 Lanes	PE	\$0	\$2,100,000	\$2,100,000
Subtotal, Non-Freeways			\$5,733,000	\$88,587,000	\$94,320,000
Interstate 4	Interchange Imprvmts	ROW	\$0	\$7,671,000	\$7,671,000
Interstate 4	Add Auxiliary Lanes	Const	\$3,250,000	\$552,000	\$3,802,000
Total			\$8,983,000	\$96,810,000	\$105,793,000

Source: Orange County Public Works Division, Traffic Engineering Department, October 24, 2003.

Table 27
2002 CAPITAL PROJECTS FROM 7/1/01 T.I.P.

Project	Description	Project Phase	Local Funding	State/Federal	Total Funding
SR 50	PD&E	Pay Back	\$0	\$300,000	\$300,000
SR 50	Widen to 6 Lanes	PE	\$0	\$1,250,000	\$1,250,000
SR 50	Widen to 6 Lanes/Rehab	PE, ROW	\$0	\$135,000	\$135,000
SR 50	Widen to 6 Lanes/Rehab	PE, ROW	\$0	\$857,000	\$857,000
SR 50	Widen to 6 Lanes/Rehab	ENV	\$0	\$1,332,000	\$1,332,000
SR 520	Widen to 4 Lanes	PE, ROW	\$0	\$981,000	\$981,000
SR 520	Widen to 4 Lanes	PE, ROW	\$0	\$300,000	\$300,000
SR 500/US 441	Widen to 6 Lanes	ROW, Const	\$1,789,000	\$860,000	\$2,649,000
SR 436	Widen to 6 Lanes	ENV, ROW, Const	\$7,300,000	\$32,196,000	\$39,496,000
SR 423	New 6-Lane & Grade Sep	ENV	\$0	\$9,000	\$9,000
SR 50	PD&E	Pay Back	\$0	\$2,000	\$2,000
SR 50	Widen to 6 Lanes	PE	\$0	\$2,300,000	\$2,300,000
CR 506, Conway Rd	Widen to 4 Lanes	ROW	\$282,000	\$5,967,000	\$6,249,000
CR 482/Sand Lake Rd	Add Turn Lanes	PE, Const	\$0	\$524,000	\$524,000
SR 482/Sand Lake Rd	Widen to 6 Lanes/Resurf	Const	\$2,500,000	\$0	\$2,500,000
Americana Blvd.	Add Turn Lanes	PE, Const	\$0	\$163,000	\$163,000
SR 50	Widen to 6 Lanes/Resurf	PE	\$0	\$250,000	\$250,000
Subtotal, Non-Freeways			\$11,871,000	\$47,426,000	\$59,297,000
Interstate 4	Add Auxiliary Lanes	Pay Back	\$0	\$400,000	\$400,000
Interstate 4	Interim Interchange Impvt	ENV, ROW	\$0	\$4,139,000	\$4,139,000
Interstate 4	Add 2 Lanes\Rehabilitate	PE	\$0	\$6,500,000	\$6,500,000
Interstate 4	Add 2 Lanes\Rehabilitate	PE	\$0	\$8,000,000	\$8,000,000
Interstate 4	Add 2 Lanes\Rehabilitate	PE	\$0	\$9,450,000	\$9,450,000
Interstate 4	Add 2 Lanes\Rehabilitate	PE	\$0	\$4,050,000	\$4,050,000
Interstate 4	Major Interchange Impvt	ROW	\$0	\$930,000	\$930,000
Interstate 4	Add Auxiliary Lanes	Pay Back	\$0	\$3,800,000	\$3,800,000
Interstate 4	Add Auxiliary Lanes	INC	\$0	\$500,000	\$500,000
Total			\$11,871,000	\$85,195,000	\$97,066,000

Source: Orange County Public Works Division, Traffic Engineering Department, October 24, 2003.

APPENDIX B: ALTERNATIVE COST PER LANE-MILE

Table 28
ALTERNATIVE AVERAGE COST PER LANE-MILE

Roadway Improvement	Year	Miles	Lanes	Lane-Miles	ROW Cost	Design Cost	Constr. Cost	Total Cost
Clarcona-Ocoee Road	1991	3.40	4	13.60	\$6,489,540	\$1,101,201	\$10,132,000	\$17,722,741
Old Winter Garden Road	1991	1.00	4	4.00	\$5,193,257	\$344,353	\$2,995,819	\$8,533,429
Rio Grande	1991	1.10	4	4.40	\$1,988,721	\$423,249	\$2,720,000	\$5,131,970
Apopka-Vineland Road (1)	1992	3.20	4	12.80	\$3,441,749	\$1,300,282	\$6,829,124	\$11,571,155
Conroy-Windermere Road (2)	1992	3.50	4/6	17.40	\$26,923,164	\$1,687,777	\$10,919,759	\$39,530,700
John Young Parkway (2)	1993	4.10	4	16.40	\$18,262,241	\$1,456,677	\$20,875,420	\$40,594,338
Pershing Avenue	1994	1.50	4	6.00	\$2,358,973	\$744,800	\$4,168,865	\$7,272,638
Dean Road (2)	1995	2.10	4	8.40	\$4,095,107	\$1,098,024	\$7,494,151	\$12,687,282
Hiawassee Road (2)(3)	1996	1.60	4	6.40	\$3,711,013	\$664,520	\$3,162,399	\$7,537,932
Piedmont-Wekiwa Road	1996	4.30	4	17.20	\$9,756,512	\$1,365,250	\$9,056,990	\$20,178,752
Pine Hills Road	1996	2.50	4	10.00	\$4,726,700	\$1,109,405	\$5,370,057	\$11,206,162
Ivey Lane	1997	1.90	4	7.60	\$7,914,103	\$789,917	\$5,771,830	\$14,475,850
Old Winter Garden Road (4)	1997	1.50	4	6.00	\$22,673,633	\$1,147,076	\$6,980,296	\$30,801,005
Old Winter Garden Road (5)	1998	2.60	4	10.40	\$19,890,971	\$1,222,347	\$10,304,332	\$31,417,650
Apopka-Vineland Road (6)	1998	3.80	4	15.20	\$4,679,875	\$1,186,641	\$10,034,472	\$15,900,988
Turkey Lake Road	1999	2.40	4	9.60	\$11,879,914	\$682,031	\$6,598,907	\$19,160,852
Winter Garden Vineland Rd (7)	1998-2001	5.55	4	22.20	\$13,801,650	\$1,514,998	\$16,098,021	\$31,414,669
Apopka Vineland Road (8)(10)	2000-2005	3.51	4	14.04	\$8,689,907	\$2,786,093	\$25,858,961	\$37,334,961
Curry Ford Road (9)(10)	2000-2003	5.29	4	21.16	\$7,629,311	\$2,564,361	\$17,375,296	\$27,568,968
Old Winter Garden Road (11)	2003	1.65	4	6.60	\$3,411,316	\$990,638	\$5,910,874	\$10,312,828
Hiawassee Road (10)(12)	2003	2.88	4	11.52	\$6,125,146	\$2,038,417	\$10,027,210	\$18,190,773
Total		59.38		240.92	\$193,642,803	\$26,218,057	\$198,684,783	\$418,545,643
Average Cost per Lane-Mile					\$803,764	\$108,825	\$824,692	\$1,737,281

Notes: Costs expressed in 2003 dollars using average annual increase of 3% for design and construction costs and 9% for ROW costs; (1) Sand Lake to Conroy-Windermere; (2) excludes bridge costs; (3) Conroy-Windermere to City Limit; (4) Kirkman to Ivey; (5) Ivey to US 441; (6) Lake To Sand Lake (7) Chase to Buena Vista; (8) Conroy Windemere to Old Winter Garden; (9) Beltway (SR 417) to Alafaya; (10) includes bridge costs; (11) Apopka Vineland to Hiawassee; (12) Clarcona Ocoee to US 441.

Source: Orange County Public Works Division, Traffic Engineering Department, September 3, 2003 and October 30, 2003.