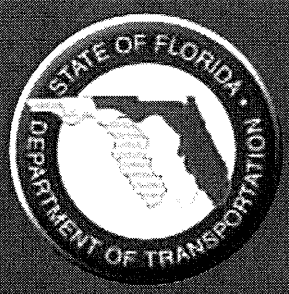
TRANSPORTATION

Appendix 21-E7

FDOT Transportation Costs



OFFICE OF
POLICY PLANNING

Policy Analysis and
Program Evaluation

2004 TRANSPORTATION COSTS

March 2005

INTRODUCTION

Decisions about transportation investments and policies require accurate information on characteristics of transportation system alternatives. This report is a planning handbook that may be used for determining the preliminary cost characteristics of transportation facilities in Florida. The information provided herein is based on statewide estimates. This report includes information about highway construction and maintenance costs, public transportation costs and characteristics, and inflation factors for adjusting cost data. Nothing in this report should be used to supersede or refute competently developed site-specific estimates.

Average costs may vary significantly from one district to another and from one county to another within a district. Average highway construction and right-of-way cost information at the district level is available for some districts. Please contact the district office(s) where the project will be located to determine which estimates should be used. District contacts are provided on page 2 of this report.

Highway-Related Costs

The major source of information for highway construction costs is the Florida Department of Transportation (FDOT) Long Range Estimates (LRE) System. This system is maintained by the FDOT State Estimates Office as a statewide repository of the average bid-price of "pay items" included in FDOT construction contracts. The system includes typical cross section models for new construction, resurfacing, and widening projects that are used to generate cost estimates based on current bid-price trends. The LRE mainframe system, designed in 1984, was re-written as a web-based system in 2004 with additional features. The new features include improved accuracy and calculated costs by component for earthwork, signing, lighting, right and left turns and cross-overs. The highway construction cost calculations exclude costs associated with intersections, interchanges, structures over 20 feet, right-of-way, landscaping, traffic signals, preliminary engineering, and construction engineering inspection. Separate estimates for many of these items are provided in the report.

Highway construction cost models used in this edition of *Transportation Costs* have been revised based on feedback received from Department staff and the new Long Range Estimating System. Changes include replacement of lump sum costs with component details, improved earthwork components, and increased refuge lane widths for urban roads to 10 feet. As a result, the cost data in this report will not be comparable to prior year figures.

The methodology used to develop maintenance costs for each typical highway section is based upon the inventory of roadway and roadside features and calculations of the

workload required to achieve a Maintenance Rating Program (MRP) score of 80. The unit cost for each maintenance activity is developed each year based on unit costs and production reported to FDOT's Maintenance Management System.

The terms "rural" and "urban" refer to the road's shoulder. Rural road costs include costs associated with open drainage systems, such as ditches, while urban road costs include costs relating to closed drainage systems, sidewalks, and curbs.

Other Costs and Characteristics

The primary sources of information for non-highway-related costs are the FDOT Public Transit Office, Aviation Office, Rail Office, Roadway Design Office, Vehicle Procurement Program, and the State Maintenance and State Estimates Offices.

Inflation Factors

Consumer and construction cost price indices are presented on the last page of the report. These indices may be used to adjust the dollar values for the base year desired or for inflation. These factors were provided by the FDOT Office of Financial Development.

Tips for developing costs for projects:

- Use new construction costs to calculate the cost for reconstruction of existing lanes.
- Auxiliary lanes are short road segments that are generally used to improve traffic flow (turn, pass, climb and reduce congestion).
- Refuge lanes are primarily used for emergencies, such as disabled vehicles.
- Bike lanes are included in the cost calculations for new roads as part of the paved shoulders and auxiliary lane costs.

District Contacts:

District	ROW/ CONST	Contact Person	Telephone	Email Address
1	CONST	Ronny Hall	(863) 519-2558	ronny.hall@dot.state.fl.us
1	ROW	Bill Sullivan	(863) 519-2428	william.sullivan1@dot.state.fl.us
2	CONST	William C. Cobb	(386) 961-7553	william.cobb1@dot.state.fl.us
2	ROW	Betty Breckenridge	(386) 961-7405	betty.breckenridge@dot.state.fl.us
3	CONST	Cheryl McCall	(850) 638-0250	cheryl.mccall@dot.state.fl.us
3	ROW	John Duncan	(850) 638-0250	john.duncan@dot.state.fl.us
4	CONST	Gene Lipscomb	(954) 777-4691	gene.lipscomb@dot.state.fl.us
4	ROW	Tom Stepp	(954) 777-4230	thomas.stepp@dot.state.fl.us
5	CONST	Ed Kestory	(386) 943-5415	ed.kestory@dot.state.fl.us
5	ROW	Rick Johnson	(386) 943-5034	richard.johnson@dot.state.fl.us
6	CONST	Ruben Rivero	(305) 470-5259	ruben.rivero@dot.state.fl.us
6	ROW	Steven D. Johnson	(305) 470-5176	steven.johnson@dot.state.fl.us
7	CONST/ROW	Lee Royal	(813) 975-6427	lee.royal@dot.state.fl.us

The electronic version of the *Transportation Costs* report is available on the Florida Department of Transportation's website:

http://www.dot.state.fl.us/planning/publications/

We welcome suggestions for improving *the Transportation Costs* report as an up-to-date and accurate data source. Please send any comments or questions you may have to:

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Highway Cost Per Centerline Mile
2004

State Rural Roads

2 Lanes

New Construction With 5' Paved Shoulders	$2,636,100
Milling & Resurfacing With 5' Paved Shoulders	$515,500
Routine Maintenance (Annual)	$22,400

4 Lanes

New Construction (Interstate) With 10' Paved Shoulders	$5,346,000
New Construction (Undivided) With 5' Paved Shoulders w/12' Aux. Ln.	$3,968,600
New Construction (Divided) With 5' Paved Shoulders	$4,093,800
Milling & Resurfacing (Arterial) With 5' Paved Shoulders w/12' Aux. Ln.	$875,600
Milling & Resurfacing (Interstate) With 10' Paved Shoulders	$848,400
Add 2 Lanes (To Existing 2 Lane) With 5' Paved Shoulders	$2,544,000
Routine Maintenance (Annual)	$42,000

Source: Long Range Estimates System, State Maintenance Office - Florida Department of Transportation.

Notes: Before using the cost information provided herein, please contact the FDOT District Offices to see if district estimates are available. A list of the district contacts is provided in the Introduction of this report.

Figures are for 2004 construction costs for one centerline mile of roadway including structures up to 20 feet in length; they may not be comparable to prior year figures in all cases.

These figures **exclude costs** for intersections/interchanges/structures over 20 feet, right-of-way, landscaping, traffic signals, preliminary engineering, and construction engineering inspection.

The cost-per-centerline mile figures are based on general, statewide averages. They are not to be used for Work Program estimating because they are not job specific.

Highway Cost Per Centerline Mile
2004

State Rural Road

6 Lanes

New Construction (Interstate) With 10' Paved Shoulders	$6,771,600
New Construction (Undivided) With 5' Paved Shoulders w/12' Aux. Ln.	$4,517,700
New Construction (Divided) With 5' Paved Shoulders	$4,608,800
Milling & Resurfacing (Arterial) With 5' Paved Shoulders w/12' Aux. Ln.	$964,200
Milling & Resurfacing (Interstate) With 10' Paved Shoulders	$1,193,500
Add 2 Lns (To Existing 4 Ln.) With 5' Paved Shoulders	$2,874,300
Add 2 Lns (To Existing 4 Ln. Interstate - Inside) With 10' Paved Shoulders	$3,998,900
Routine Maintenance (Annual)	$62,600

8 Lanes

New Construction (Interstate) With 10' Paved Shoulders	$7,677,700
New Construction (Undivided) With 10' Paved Shoulders w/12' Aux. Ln.	$5,277,000
New Construction (Divided) With 10' Paved Shoulders	$5,830,800
Milling & Resurfacing (Arterial) With 10' Paved Shoulders w/12' Aux. Ln.	$1,307,600
Milling & Resurfacing (Interstate) With 10' Paved Shoulders	$1,324,100
Add 2 Lns (To Existing 6 Ln.) With 5' Paved Shoulders	$3,159,100
Add 2 Lns (To Existing 6 Ln. Interstate - Inside) With 10' Paved Shoulders	$4,415,000
Routine Maintenance (Annual)	N/A

Source: Long Range Estimates System, State Maintenance Office - Florida Department of Transportation.

Notes: Before using the cost information provided herein, please contact the FDOT District Offices to see if district estimates are available. A list of the district contacts is provided in the Introduction of this report.

Figures are for 2004 construction costs for one centerline mile of roadway including structures up to 20 feet in length; they may not be comparable to prior year figures in all cases.

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The cost-per-centerline mile figures are based on general, statewide averages. They are not to be used for Work Program estimating because they are not job specific.

Highway Cost Per Centerline Mile
2004

State Urban Roads

2 Lanes

New Construction With 5' Sidewalk, Curb, Gutter and 10' Refuge Ln.	$3,449,500
Milling & Resurfacing Curb to Curb	$476,600
Routine Maintenance (Annual)	$27,000

4 Lanes

New Construction (Interstate) With 10' Paved Shoulder	$5,960,700
New Const. (Undivided) With 5' Sidewalk, Curb, Gutter & 12' Aux. Ln.	$4,187,600
New Const. (Divided) With 5' Sidewalk, Curb, Gutter & 10' Refuge Ln.	$5,337,500
Milling & Resurfacing (Arterial) Curb To Curb w/12' Aux. Ln.	$622,300
Milling & Resurfacing (Interstate) With 10' Paved Shoulder	$861,900
Add 2 Lns (Existing 2 Ln.) W/5' Sidewalk, Curb, Gutter & 12' Aux. Ln.	$3,087,400
Routine Maintenance (Annual)	$60,300

Source: Long Range Estimates System, State Maintenance Office - Florida Department of Transportation.

Notes: Before using the cost information provided herein, please contact the FDOT District Offices to see if district estimates are available. A list of the district contacts is provided in the Introduction of this report.

Figures are for 2004 construction costs for one centerline mile of roadway including structures up to 20 feet in length; they may not be comparable to prior year figures in all cases.

These figures **exclude costs** for intersections/interchanges/structures over 20 feet, right-of-way, landscaping, traffic signals, preliminary engineering, and construction engineering inspection.

The cost-per-centerline mile figures are based on general, statewide averages. They are not to be used for Work Program estimating because they are not job specific.

Highway Cost Per Centerline Mile
2004

State Urban Roads

6 Lanes

New Construction (Interstate) With 10' Paved Shoulders	$7,249,300
New Const. (Undivided) With 5' Sidewalk, Curb, Gutter & 12' Aux. Ln.	$5,062,000
New Const. (Divided) With 5' Sidewalk, Curb, Gutter & 10' Refuge Ln.	$6,162,900
Milling & Resurfacing (Arterial) Curb to Curb w/12' Aux. Ln.	$855,800
Milling & Resurfacing (Interstate) With 10' Paved Shoulder	$1,301,200
Add 2 Lns. (To Existing 4 Ln.) W/5' Sidewalk, Curb, Gutter & 12' Aux. Ln.	$3,490,300
Add 2 Lns. (To Existing 4 Ln. Interstate - Inside) With 10' Paved Shoulders	$4,003,200
Routine Maintenance (Annual)	$118,500

8 Lanes

New Construction (Interstate) With 10' Paved Shoulders	$8,636,300
New Const. (Undivided) With 5' Sidewalk, Curb, Gutter & 12' Aux. Ln.	$5,839,700
New Const. (Divided) With 5' Sidewalk, Curb, Gutter & 10' Refuge Ln.	$6,650,500
Milling & Resurfacing (Arterial) Curb to Curb w/ 10' Refuge Ln.	$1,651,900
Milling & Resurfacing (Interstate) With 10' Paved Shoulder	$1,315,100
Add 2 Lns. (To Existing 6 Ln.) W/5' Sidewalk, Curb, Gutter, & 12' Aux. Ln.	$3,727,900
Add 2 Lns. (To Existing 6 Ln. Interstate - Inside) With 10' Paved Shoulders	$4,880,400
Routine Maintenance (Annual)	$133,300

Source: Long Range Estimates System, State Maintenance Office - Florida Department of Transportation.

Notes: Before using the cost information provided herein, please contact the FDOT District Offices to see if district estimates are available. A list of the district contacts is provided in the Introduction of this report.

Figures are for 2004 construction costs for one centerline mile of roadway including structures up to 20 feet in length; they may not be comparable to prior year figures in all cases.

These figures **exclude costs** for intersections/interchanges/structures over 20 feet, right-of-way, landscaping, traffic signals, preliminary engineering, and construction engineering inspection.

The cost-per-centerline mile figures are based on general, statewide averages. They are not to be used for Work Program estimating because they are not job specific.

Bridge Costs
2004

New Construction
(Cost per Square Foot)

Bridge Type	Low	High
Short Span Bridges		
Reinforced Concrete Flat Slab Simple Span	$70	$90
Pre-cast Concrete Slab Simple Span	$115	$168
Reinforced Concrete Flat Slab Continuous Span	NA	NA
Medium Span Bridges		
Concrete Deck/ Steel Girder - Simple Span	$85	$110
Concrete Deck/ Steel Girder - Continuous Span	$95	$160
Concrete Deck/ Pre-stressed Girder - Simple Span	$70	$110
Concrete Deck/ Pre-stressed Girder - Continuous Span	$85	$125
Long Span Bridges		
Concrete Deck/ Steel Box Girder - Span Range from 150' to 280' (for curvature, add a 15% premium)	$115	$165
Segmental Concrete Box Girders – Cantilever Construction, Span Range from 150' to 280'	$95	$140
Movable Bridge - Bascule Spans and Piers	$800	$1,400
Demolition Cost		
Typical	$15	$25
Bascule	$65	$65

Source: State Estimates Office - Florida Department of Transportation

Notes: Figures are for 2004 construction costs per square foot of deck area, including an allowance for handrails; they may not be comparable to prior year figures in all cases.

Costs of preliminary engineering, right-of-way, bridge approaches, mobilization, and construction engineering inspection are **not** included.

The cost-per-square foot figures are based on general, statewide averages. They are not to be used for Work Program estimating because they are not job specific.

Bridge Costs
2004

Bridge Maintenance and Widening
(Cost per Square Foot)

Project Type	Low	High
Maintenance (Annual-Fixed Bridge)	$0.01	$0.04
Maintenance (Annual-Moveable Bridge)	$2.55	$3.06
Widening (Construction Only)	$85.00	$110.00

Source: State Maintenance Office, State Estimates Office - Florida Department of Transportation.

Other Highway Related Costs

Cost of Traffic Signals
2003

Activity	Rural	Urban	Average
Installation (Mast Arm)	$137,500	$175,000	$156,250
Installation (Strain Pole)	$67,500	$82,500	$75,000
Maintenance (Excluding Power)	--	--	$3,750*

*Per Intersection/Year

Source: Traffic Engineering Office - Florida Department of Transportation

Ratio of Right-of-Way to Construction Costs
Statewide Averages
2004

Type of Right-of-Way Activity	Ratio
Total Right-of-Way/Construction	19%
Resurfacing Only	<1%
Bridge Only	3%
Interstate Construction Only	8%
Other Intrastate	24%
Arterial Capacity and Highway Safety	38%
Other Construction	7%

Note: Right-of-way costs vary considerably, depending on the location. District information is available for some areas. Please contact the District Office where the project will be located before developing project estimates. A list of the district contacts is provided in the Introduction of this report.

Statewide averages for right-of-way as a percentage of construction costs are for the five year period between fiscal years 2000 and 2004. Right-of-way costs vary based on factors such as production mix and location, so historic averages may not be representative for future or individual construction projects.

Ratio of Engineering to Construction Costs
2004

The relationship between the Florida Department of Transportation's engineering to construction costs (including right-of-way) varies. Engineering costs include preliminary engineering, construction engineering inspection, right-of-way support, and related overhead costs. For the past five fiscal years, the ratio of engineering to construction costs has been approximately 46% on average.

Source: Office of Work Program - Florida Department of Transportation

Airport Costs
2003

Runway Costs

General Aviation	Cost
(2,000 to 4,000 foot runway; typical length: 3,700 ft.)	
New Construction	$880/lin. ft. (75' width)
Resurfacing	$252/lin. ft. (75' width)
Ramps/Taxiways	$11.30/sq. ft.
Terminal Structure	$175.00/sq. ft.
Fuel Facilities (100/200/500,000 gal.)	$ (58,240)/ (118,880)/ (232,960)

General Aviation/Private Jet	Cost
(5,000 to 7,999 foot runway; typical length: 5,000)	
New Construction	$1,887/lin. ft. (100' width)
Resurfacing	$373/lin. ft. (100' width)
Ramps/Taxiways	$15.68/sq. ft.
Terminal Structure	$150/sq. ft.
Fuel Facilities (100/200/500,000 gal.)	$(58,240)/ (118,880)/ (232,960)

Commercial Aviation	Cost
(8,000 to 13,000 foot runway; typical length: 13,000)	
New Construction	$2,516/lin. ft. (150' width)
Resurfacing	$629/lin. ft. (150' width)
Ramps/Taxiways	$24.64/sq. ft.
Terminal Structure	$225/sq. ft.
Fuel Facilities (100/200/500,000 gal.)	$(58,240)/ (118,880)/ (232,960)

Airport Inventory

Service Level	Current Number
Primary Commercial	19
Reliever	24
General Aviation (Publicly owned)	56
General Aviation (Privately owned)	23
Turf (Publicly owned)	5
Seaplane	2
Heliport	2

Source: Aviation Office - Florida Department of Transportation.

Transit Operating Costs
2002[1]

Mode	Cost per Vehicle Hour		Cost per Vehicle Mile	
	Florida	United States	Florida	United States
Urban Motor Bus				
Up to 50 Buses	$ 42.74	$ 59.69	$ 2.80	$ 4.05
50 to 200 Buses	$ 60.51	$ 72.26	$ 4.31	$ 5.00
Over 200 Buses	$ 68.95	$ 91.13	$ 5.19	$ 7.26
Demand Response	$ 37.70	$ 52.31	$ 2.50	$ 3.87
Rail Modes				
Commuter Rail	$379.32	$435.51	$11.22	$14.08
Heavy Rail	$191.66	$143.15	$ 8.34	$ 6.77
Automated Guideway	$182.73	$203.99	$15.56	$17.48
Light Rail	n/a	$195.33	n/a	$28.12

[1]Price indices may be used to inflate these numbers, as needed. The last page of this report contains various price indices that may be used to adjust the cost figures.

Sources: Federal Transit Administration, 2002 National Transit Database Files
Extracted by the Florida Transit Information System
Public Transit Office - Florida Department of Transportation

Bus Transit System Costs
2002

Percentage Cost By Object Class[1]

Object Class	Florida	United States
Wages and Salaries[2]	35%	39%
Fringes[2]	19%	27%
Purchased Transportation[2]	21%	12%
Materials and Supplies	11%	10%
Utilities	2%	<1%
Services	8%	7%
Casualty and Liability	3%	3%
Other	<2%	2%

Percentage Costs By Function[1]

Function	Florida	United States
Vehicle Operations	60%	51%
Vehicle Maintenance	19%	20%
Other Maintenance	6%	10%
Administration	15%	19%

[1] Percentages do not always sum to 100% due to rounding.

[2] A substantial increase in purchased transportation costs in 2002 and the off-setting declines in Wages and Salaries and Fringes are reflected in the Percentage Cost by Object Class.

Sources: Federal Transit Administration, 2002 National Transit Database Files
Extracted by the Florida Transit Information System
Public Transit Office - Florida Department of Transportation

Mass Transit Capital Costs
Rolling Stock
2003

Vehicle Type	Seated Passengers	Unit Cost
Van, vanpooling	15	$27,000
Modified Van	7	$35,000
22 Foot Cutaway Bus	14	$50,000
25 Foot Cutaway Bus	18	$52,000
30 Foot Transit Bus	30-32	$236,000
35 Foot Medium Transit Bus	42-45	$278,000
40 Foot Transit Bus	45-50	$293,000
60 Foot Articulated Bus	65-70	$445,000
Light Rail Articulated Cab	110	$2,553,000
Heavy Rail Car	110	$1,235,000[1]
Commuter Rail Locomotive	N/A	$1,919,000
Commuter Rail Coach	110	$2,088,000

[1] Add $248,000 for cab control equipment, if needed.

Sources: Public Transit Office, Vehicle Procurement Program - Florida Department of Transportation.

Unit Costs for Bicycle and Pedestrian Facilities
2004

Bicycle Facilities	Unit Cost
Bike Path per Mile (12' Width) Rail-to-Trail Conversion	$515,500
Bike Lane per Mile (5' Width-2 Sides) Pavement Extension, Rural	$634,900
Bike Lane per Mile (4' Width-2 Sides) when widening road, Urban	$205,508
Bike Lockers (For 2 Bicycles)	$3,800

Pedestrian Facilities	Unit Cost
Sidewalks (per Mile with 4 Inch Depth)	
5' Width-1 Side	$181,000
6' Width-1 Side	$217,000
Brickpavers (per Square Yard)	
Roadway	$70
Sidewalk	$44
"Walk/Don't Walk" Signal System[1]	
Signalhead, LED, 1 Direction (Each)	$520
Signalhead, LED, 2 Directions (Each)	$975
Signalhead, Incandescent (Each)	$381
Activator (Each)	$130
Two Corners, Signalhead, LED - 2 Directions	$1,950
Four Corners, Signalhead, LED - 2 Directions	$3,900
Raised Island/Refuge Island (Porkchop)	
Type "D" Curb (Per Linear Foot)	$19
4 Inch Sidewalk Fill (Per Square Yard)	$19
Handicap Curb Ramp (Concurrent with Construction)	$ -0-

[1] LED signalheads, a technological improvement, and discontinuance of activators, a change in use characteristics, are reflected in the typical cost of pedestrian signal systems.

Source: Long Range Estimating System and TRNS*Port System, maintained by the Estimates Office - Florida Department of Transportation.

Note: Costs may fluctuate from year-to-year due to the small sample size and wide variance in estimated costs for certain items. (For example, the average cost of brick pavers decreased in 2004 due to the increase in projects at moderate prices.)

Florida Department of Transportation
Long Term Construction Cost Inflation Forecast
As of March 2005

FISCAL YEAR	FDOT PRICE TRENDS INDEX[1]		IMPLICIT PRICE DEFLATOR FOR STATE & LOCAL STRUCTURES[2]		CONSUMER PRICE INDEX	
1996	72.3	3.7%	85.44	3.7%	154.51	2.7%
1997	74.5	3.0%	87.98	3.0%	158.90	2.8%
1998	77.0	3.3%	90.93	3.3%	161.75	1.8%
1999	79.4	3.2%	93.83	3.2%	164.55	1.7%
2000	82.8	4.2%	97.76	4.2%	169.28	2.9%
2001	86.2	4.2%	101.88	4.2%	175.08	3.4%
2002	88.8	3.0%	104.95	3.0%	178.16	1.8%
2003	91.2	2.7%	107.73	2.7%	182.12	2.2%
2004	93.2	2.2%	110.08	2.2%	186.08	2.2%
2005	100.0	7.3%	118.14	7.3%	191.14	2.7%
2006	103.5	3.5%	122.61	3.8%	193.98	1.5%
2007	106.9	3.3%	124.60	1.6%	197.54	1.8%
2008	110.4	3.3%	126.52	1.5%	201.63	2.1%
2009	114.1	3.3%	128.66	1.7%	206.03	2.2%
2010	117.9	3.3%	131.02	1.8%	210.79	2.3%
2011	121.7	3.3%	133.67	2.0%	216.07	2.5%
2012	125.8	3.3%	136.65	2.2%	221.83	2.7%
2013	129.9	3.3%	139.69	2.2%	227.83	2.7%
2014	134.2	3.3%	142.57	2.1%	233.90	2.7%
2015	138.6	3.3%			240.15	2.7%

[1] Base year changed to state fiscal year 2004-2005, base year = 100. Historical years reflect annual inflation rates for the Implicit Price Deflator.

[2] Base year changed to calendar year 2000, base year = 100.

Source: Office of Financial Development - Florida Department of Transportation (used in the Florida Transportation Revenue Estimating Conference, March 2005).

Note: This is the current FDOT long-term forecast and is subject to change at anytime if the economy so indicates.

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