
Operating & Maintenance Cost Results Report

For the
Central Florida Commuter Rail Transit Project

In preparation for



AND

CENTRAL FLORIDA RAIL CORRIDOR

Table of Contents

1	Introduction	1
1.1	Purpose of the Report.....	1
1.2	Lynx O&M Cost Model	2
1.3	Votran O&M Cost Model	3
1.4	Commuter Rail O&M Cost Model	3
2	Project Description	5
2.1	No-Build Alternative	5
2.2	TSM/Baseline Alternative	5
2.3	Commuter Rail Build Alternative	5
2.4	Commuter Rail Opening Year Segments.....	6
2.4.1	Initial Operating Segment - 2013.....	6
2.4.2	Locally Preferred Alternative - 2015.....	6
2.4.3	Full Build Alternative - 2017.....	6
2.4.4	Full Build Alternative - 2025.....	7
3	O&M Cost Estimates.....	9
3.1	LYNX O&M Cost Estimates.....	9
3.2	Votran O&M Cost Estimates.....	9
3.3	Commuter Rail O&M Cost Estimates.....	9
3.4	O&M Cost Summary	11

List of Tables and Figures

Figure 1 - Full Build CFRC System.....	8
Table 1: Operating Requirements for Commuter Rail Scenarios	7
Table 2: LYNX Bus Annual O&M Cost Estimates.....	9
Table 3: VOTRAN West Volusia County Annual O&M Cost Estimates	9
Table 4: Commuter Rail Annual O&M Cost Estimates for New Starts Alternatives	10
Table 5: Commuter Rail Annual O&M Cost Estimates for Opening Year Scenarios	10
Table 6: CFCRT Annual O&M Cost Estimates.....	11

List of Appendices

- A-1. LYNX Annual O&M Costs – No-Build Alternative
- A-2. LYNX Annual O&M Costs – TSM/Baseline Alternative
- A-3. LYNX Annual O&M Costs – Build Alternative
- B-1. Commuter Rail Annual O&M Costs -- 2013 IOS Alternative
- B-2. Commuter Rail Annual O&M Costs -- 2015 LPA Alternative
- B-3. Commuter Rail Annual O&M Costs -- 2017 Full Build Alternative
- B-4. Commuter Rail Annual O&M Costs -- 2025 Full Build Alternative
- B-5. Commuter Rail Annual O&M Costs -- 2030 Build Alternative
- C. Commuter Rail Staffing Summary

1 INTRODUCTION

The Florida Department of Transportation (FDOT) is responsible for the design, construction, operation and maintenance of commuter rail service along a 61-mile corridor in Central Florida. The proposed service will be operated using a fleet of push-pull diesel locomotives, coaches and cab cars.

The Central Florida Commuter Rail Transit (CFCRT) Project uses an existing and active FRA Class IV passenger and freight CSXT A-Line railway right of way (ROW) for rail operations and property adjacent to the ROW for station site parking and bus circulation. The Full Build CRT Project extends from the DeLand Amtrak Station in the north (Volusia County) to Poinciana Industrial Park Station in the south (Osceola County). Seventeen (17) stations will be provided. The primary infrastructure improvements include a new railway operations signal system and 40 miles of new 2nd track bringing the total double track to approximately 59 miles in the 61-mile corridor, which will have the FRA designation of Central Florida Rail Corridor (CFRC) when acquired by the State.

SunRail, the new commuter rail service, will be implemented in three phases.

- The first phase, the initial operating segment (IOS), is between DeBary Station in Volusia County and Sand Lake Road Station in Orange County. The IOS is approximately 32 miles long with 12 stations.
- The second phase adds the south corridor, and is referred to as the Locally Preferred Alternative (LPA). The LPA will extend the IOS 17 miles from Sand Lake Road Station to Poinciana Industrial Park Station. A total of sixteen (16) stations and 49 route-miles are in the LPA.
- A 12 mile extension from DeBary Station to DeLand Amtrak Station will complete the Full Build.

The IOS will be operational in 2013 and the LPA is planned to be operational in 2015. The Full Build is assumed to be completed in 2017.

1.1 Purpose of the Report

This report presents the annual operating and maintenance (O&M) cost estimates for the CFCRT project. This report supersedes the O&M Cost Results Report prepared during the Preliminary Engineering phase (August 2007). These O&M cost estimates are one of several factors that have been used to evaluate the effectiveness of the project alternatives and determine the financial feasibility of the alternatives. Transit bus and rail transit cost models were used to estimate annual O&M costs for the project alternatives: No-Build, Transportation System Management / Baseline (TSM/Baseline) and Build (commuter rail transit). Three models were used to estimate project costs: (1) LYNX bus operations, (2) VOTRAN bus operations, and (3) commuter rail operations.

Each model is used to estimate costs based on projected system operating characteristics.

These O&M cost models are appropriate for the CFCRT project for the following reasons: (1) the models have been fully tested and validated; and (2) O&M cost results are consistent with those developed for the CFCRT Alternatives Analysis and other transit major investment studies in the Orlando area. The O&M cost methodologies for the CFCRT project were presented in a previous report (Operations and Maintenance Cost Methodology Report, September 10, 2010).

1.2 Lynx O&M Cost Model

LYNX developed its first bus O&M cost model in 1996 and later updated the model in 2002 and again in 2005. The LYNX bus O&M cost model is “resource build-up” in form. This means that costs are disaggregated and cost drivers (e.g., hours or miles) are assigned to each cost unit. Line item costs are “built up” based on the quantity of service supplied and other bus system characteristics (e.g., bus maintenance facilities, passenger transit centers, superstops, etc.). Line item costs are all costs incurred by LYNX and are detailed by cost center (e.g., labor, fringes, materials, etc.).

The LYNX O&M cost model uses 14 system characteristics to define the LYNX transit system. These characteristics were developed as part of the operating plans for all CFCRT project alternatives. All line item costs are linked, directly or indirectly, to one or more input variables. The cost model requires the following inputs for each study alternative:

1. *Total Annual Bus Boardings*
2. *Peak Buses*
3. *Active Fleet Buses*
4. *Operating Divisions*
5. *Maintenance Facilities*
6. *Annual Revenue Bus-Miles*
7. *Annual Revenue Bus-Hours*
8. *Transit Centers*
9. *Superstops*
10. *Shelters*
11. *Advertising Shelters*
12. *Annual Service Vehicle-Miles*
13. *Vanpool Fleet*
14. *Total Annual Paratransit Boardings*

The LYNX model estimates costs in 2005 dollars; results were inflated to 2008 dollars (3.0% per annum).

1.3 Votran O&M Cost Model

Cost estimates were developed for bus transit service provided by VOTRAN in west Volusia County using fully-allocated average costs per garage, peak bus, revenue bus-mile, and revenue bus-hour. Year 2005 cost per revenue bus hour was derived from financial and operations data reported by VOTRAN in its National Transit Database report for fiscal year 2005. Cost estimates were inflated from FY 2005 to FY 2008 dollars (3.0% per annum).

1.4 Commuter Rail O&M Cost Model

Since urban rail transit does not currently operate in the Central Florida region, an O&M cost model was developed based on actual financial and operating data for a comparable rail transit system. In order to determine operational cost data representative of CFCRT, data were collected for U.S. peer commuter rail (CR) systems. Potential peer CR systems were identified based largely on system size. The proposed CFCRT system would be a fairly small, single route system which would be operated by a contract operator. Potential peer CR systems were first screened to eliminate very large CR systems in New York, Boston, Philadelphia and Chicago. The eleven peer systems are:

- MetroLink – Los Angeles
- MARC – Maryland Transit Authority
- VRE – Virginia Rail Express
- Tri-Rail – Tri-County Commuter Rail Authority (Miami)
- Trinity Express – Dallas and Fort Worth
- Coaster – North San Diego County Transit
- Caltrain – San Francisco Bay Area
- ConnDOT – Connecticut Department of Transportation
- ACE – Altamont Commuter Express (California)
- FrontRunner – Salt Lake City
- Sounder -- Seattle

The rail transit model developed during the Alternatives Analysis project phase and later updated in the Preliminary Engineering project phase was based on operations and financial data from the Virginia Rail Express (VRE). During the Final Design phase, the model was modified to reflect push-pull operations and more detailed operations plans and staffing plans.

The CFCRT commuter rail cost model assumes an Oversight Agency is in place to oversee a Contract Operator and various contract services. The Contract Operator is assumed to have direct responsibility for operation of the service and maintenance of rail equipment at the Contract Operator's yard facility.

The CFCRT cost model is resource build-up in structure. Line item costs were determined by the quantity of service supplied and other system characteristics (e.g., stations, train-hours, car-miles, etc.). The following twelve (12) system characteristics were used to estimate rail transit O&M costs:

1. Annual Passenger Trips
2. Peak Passenger Cars
3. Peak Trainsets
4. Annual Revenue Train-Hours
5. Annual Revenue Car-Hours
6. Annual Revenue Train-Miles
7. Annual Revenue Car-Miles
8. Directional Route-Miles
9. Stations
10. Maintenance Yards
11. Weekly Revenue Train Trips
12. Cost of Diesel Fuel

CR cost estimates were developed in 2008 dollars.

2 PROJECT DESCRIPTION

FTA's *New Starts Planning and Project Development Guidelines* describe the definition of alternatives to be considered in its New Starts process. The initial activities of the corridor analysis are focused on narrowing the range of alternatives to a more manageable number to carry forward in the study. FTA specifies that each project must have a No-Build Alternative, TSM/Baseline Alternative, and Build Alternatives.

2.1 No-Build Alternative

The No-Build Alternative is a requirement of the National Environmental Policy Act (NEPA) regulations and serves as the baseline for establishing the environmental impacts of the alternatives, the financial condition of implementing and operating agencies, and the cost-effectiveness of the TSM/Baseline Alternatives.

The No-Build Alternative includes the region's current and planned roadway and transit projects. The No-Build Alternative reflects significant future transit service and highway network expansion included in LYNX's *Transit Development Plan (TDP) for Fiscal Years 2008-2017* and selected other projects that are included in METROPLAN ORLANDO's *2025 Long-Range Transportation Plan*.

2.2 TSM/Baseline Alternative

The TSM/Baseline Alternative is defined as "the best that can be done" to address the identified transportation deficiencies in the corridor without constructing a Build Alternative. While lower in cost than the Build Alternatives, the TSM/Baseline Alternative(s) may still carry some significant costs, particularly when the transportation problems in the corridor are complex and the associated build options are capital intensive. The key factor in designing the TSM/Baseline is that it must serve the same travel markets and provide as close a level of service as the Build Alternatives under study, absent a corresponding level of capital investment.

The TSM/Baseline Alternative includes all transit services provided in the No-Build Alternative plus the addition of several express and limited stop bus routes operating in the CFCRT north and south corridors. These express and limited stop bus routes were designed to satisfy the travel markets in the CFCRT study area. With these facility and service enhancements, the TSM/Baseline express and limited stop services will have similar functionality as the Build Alternatives.

2.3 Commuter Rail Build Alternative

The Build Alternatives feature all of the transit services and projects included in the No-Build Alternative with the addition of commuter rail services along the CSXT "A" line, from Fort Florida (in west Volusia County), through Seminole and Orange counties, to Poinciana Boulevard (in Osceola County). Commuter rail transit service would be

operated with push-pull locomotives and passenger coach and cab cars that can be coupled together in multiple units.

The Initial Operating Segment (IOS) would extend approximately 31.6 miles from the Fort Florida station to the Sand Lake station. Twelve (12) stations would be located at Fort Florida, Sanford/SR 46, Lake Mary, Longwood, Altamonte Springs, Maitland, Winter Park, Florida Hospital, LYNX Central Station, Church Street (downtown Orlando), ORMC/Orlando Amtrak, and Sand Lake Road. In the design year (2030), trains would run every 15 minutes during the peak period, and every 30 minutes during the mid-day period, and every 60 to 120 minutes during evenings and weekends.

2.4 Commuter Rail Opening Year Segments

In addition to the New Starts alternatives, annual O&M costs were estimated for the following opening year or intermediate year commuter rail scenarios.

2.4.1 Initial Operating Segment - 2013

The Initial Operating Segment (IOS) will commence service in 2013 and extend from the DeBary Station to the Sand Lake Road Station, a distance of approximately 32 miles. The twelve (12) IOS stations will be located at DeBary, Sanford, Lake Mary, Longwood, Altamonte Springs, Maitland, Winter Park Amtrak, Florida Hospital, LYNX Central Station, Church Street, Orlando Health/Amtrak, and Sand Lake Road. Park-and-ride facilities will be provided at all stations except Florida Hospital, LYNX Central Station, Orlando Health/Amtrak, Winter Park and Church Street.

Trains will run every 30 minutes in the peak period, varying from every 120 to 150 minutes during the midday and evening hours (32 daily trips). For the 2013 IOS service plan, no service will be operated on Saturdays or Sundays. Operating requirements for the 2013 IOS Alternative are summarized in Table 1.

2.4.2 Locally Preferred Alternative - 2015

The Locally Preferred Alternative (LPA) is similar to the IOS except the southern terminus of the line will extend to the Poinciana Industrial Park Station. The route length will be approximately 48.7 miles and include four additional stations: Meadow Woods, Osceola Parkway, Kissimmee Amtrak, and Poinciana Industrial Park. The LPA will begin service in 2015.

Trains will run every 30 minutes in the peak period, varying from every 120 to 150 minutes during the midday and evening hours (32 daily trips). For the 2015 LPA service plan, no service will be operated on Saturdays or Sundays. Operating requirements for the 2015 LPA Alternative are summarized in Table 1.

2.4.3 Full Build Alternative - 2017

The Full Build Alternative, commencing in 2017, adds to the IOS and LPA a 12-mile, one-

station extension from DeBary Station to DeLand Amtrak Station in the north. At full build-out, the CFRC will be a 17-station, 61-mile alignment from DeLand in the north to Poinciana Boulevard in the south.

Trains will run every 30 minutes in the peak period, varying from every 120 to 150 minutes during the midday and evening hours (32 daily trips). For the 2017 Full Build service plan, no service will be operated on Saturdays or Sundays. Operating requirements for the 2017 Full Build Alternative are summarized in Table 1.

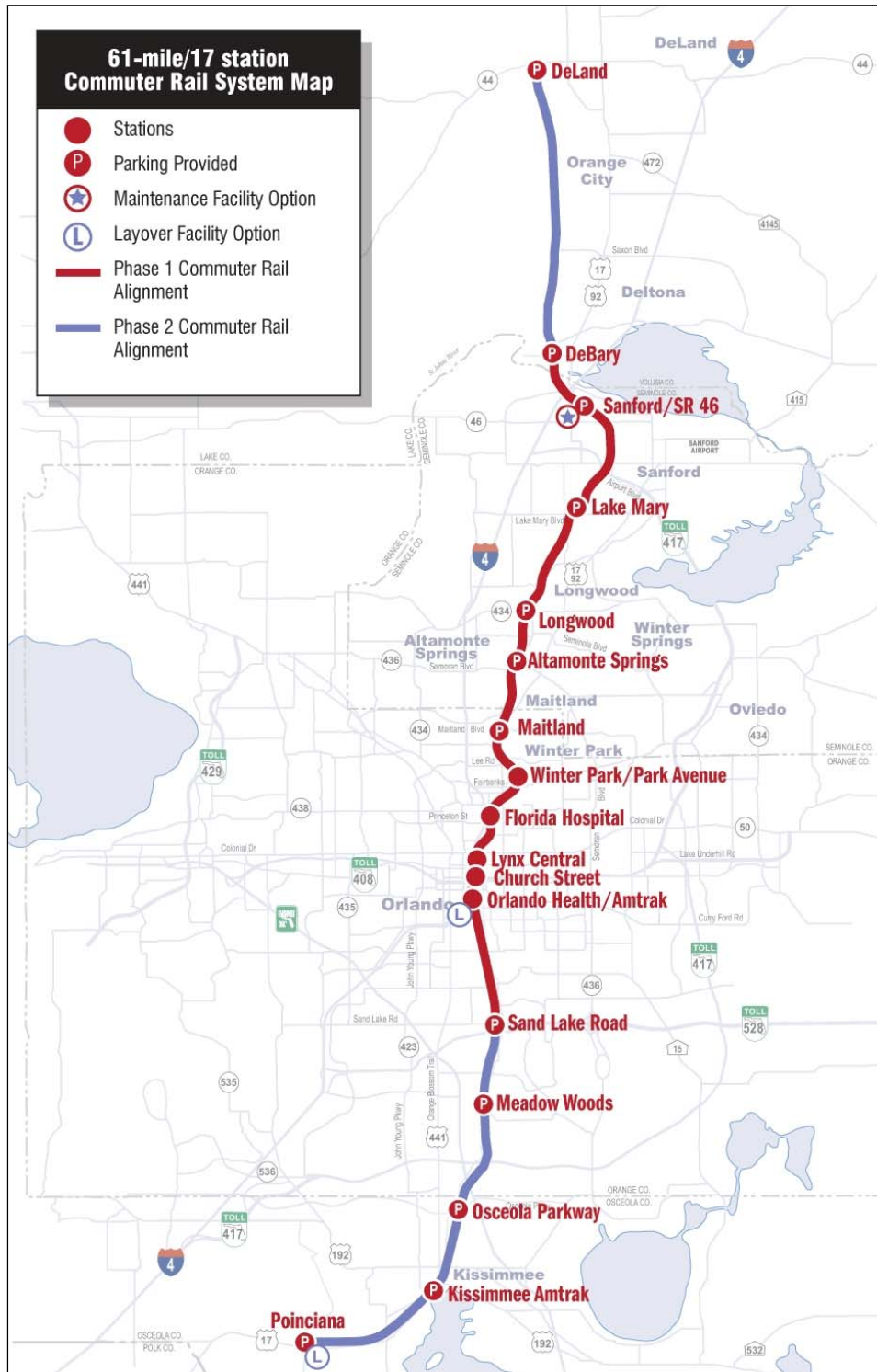
2.4.4 Full Build Alternative - 2025

In 2025, the Full Build Alternative would have service frequency increased for weekday peak, midday and evening hours. Trains will run every 15 minutes in the peak period and every 60 minutes during the midday and evening hours (56 daily trips). No service will be operated on Saturdays or Sundays. Operating requirements for the 2025 Full Build Alternative are summarized in Table 1.

Table 1. Operating Requirements for Commuter Rail Scenarios

Operating Characteristics	2013 IOS	2015 LPA	2017 Full Build	2025 Full Build	2030 IOS New Starts
Annual Passenger Trips	1,077,000	1,381,000	1,574,000	3,597,000	2,154,000
Peak Passenger Cars	10	14	16	28	20
Peak Trainsets	5	7	8	14	10
Revenue Train-Hours	10,400	14,560	16,640	29,120	27,000
Revenue Pass. Car-Hours	20,800	29,120	33,280	58,240	54,000
Revenue Train-Miles	262,496	404,768	503,027	880,298	681,480
Revenue Pass. Car-Miles	524,992	809,536	1,006,054	1,760,595	1,362,960
Directional Route Miles	63.1	97.3	120.9	120.9	63.1
Stations	12	16	17	17	12
Maintenance Yards	1	1	1	1	1
Daily Revenue Train Trips	32	32	32	56	72
Average Price of Diesel Fuel	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50

Figure 1 - Full Build CFRC System



3 O&M COST ESTIMATES

The estimated annual O&M costs of bus and rail transit operations for each of the CFCRT project alternatives are summarized in this section. The annual O&M cost estimates are based on the operating plans and ridership projections. These future cost estimates, however, are presented in 2008 dollars.

3.1 LYNX O&M Cost Estimates

Table 2, below, shows the system characteristics and estimated annual O&M costs for LYNX’s bus operations for each of the New Starts alternatives. The LYNX bus costs are presented for the entire LYNX service area. Costs were inflated to 2008 dollars with a 3.0% annual inflation rate. Detailed LYNX bus O&M costs are included in Appendix A.

Table 2. LYNX Bus Annual O&M Cost Estimates

Input Measure	No Build	TSM/ Baseline	Build (IOS)
Annual Bus Boardings (in millions)	51.73	52.35	51.31
Peak Buses	456	507	473
Active Fleet Buses	547	608	567
Total Superstops	10	20	10
Annual Rev. Bus-Miles (in millions)	23.75	25.85	24.71
Annual Rev. Bus-Hours (in millions)	2.46	2.62	2.53
LYNX Total O&M Cost (in millions)	\$157.6	\$166.8	\$163.3

3.2 Votran O&M Cost Estimates

Table 3, below, shows the system characteristics and estimated annual O&M costs for VOTRAN’s west Volusia bus operations for each of the New Starts alternatives. Costs were inflated to 2008 dollars with a 3.0% annual inflation rate.

Table 3. VOTRAN West Volusia County Annual O&M Cost Estimates

Input Measure	No Build	TSM/ Baseline	Build (IOS)
Peak Buses	9	12	12
Annual Rev. Bus-Miles	526,800	609,200	609,200
Annual Rev. Bus-Hours	34,600	40,500	40,500
Votran Total O&M Cost (in millions)	\$2.53	\$2.89	\$2.89

3.3 Commuter Rail O&M Cost Estimates

Table 4 shows the system characteristics and estimated annual O&M costs for commuter

rail operations for the New Starts Build Alternative. Commuter rail costs estimated for two scenarios – with CFCRT maintaining just the 32-mile IOS and with CFCRT maintaining the entire 61-mile line. Costs were inflated to 2008 dollars with a 3.0% annual inflation rate. Detailed O&M costs are included in Appendix B.

Table 4. Commuter Rail Annual O&M Cost Estimates for New Starts Alternatives

Cost Type	No Build	TSM/ Baseline	Build (IOS)
Operating Agency	n/a	n/a	\$5,454,093
Contract Operator	n/a	n/a	\$18,557,811
Total Cost - MOW 32 Miles	n/a	n/a	\$24,011,904
Incremental Cost - MOS 61 Miles	n/a	n/a	\$1,677,032
Total Cost - MOW 61 Miles	n/a	n/a	\$25,688,936
<u>Notes:</u>			
1. MOW costs projected for both 32-mile IOS and 61-mile line.			
2. CR O&M costs do NOT include Payment to Railroad costs.			

Table 5 shows the system characteristics and estimated annual O&M costs for commuter rail operations for the opening year and intermediate year scenarios. Commuter rail costs estimated for two scenarios – with CFCRT maintaining just the opening year segment and with CFCRT maintaining the entire 61-mile line. Costs were inflated to 2008 dollars with a 3.0% annual inflation rate. Detailed O&M costs are included in Appendix B. A summary of staffing, by position, is included in Appendix C.

Table 5. Commuter Rail Annual O&M Cost Estimates for Opening Year Scenarios

Cost Type	2013 IOS	2015 LPA	2017 Full Build	2025 Full Build
Operating Agency	\$3,684,469	\$5,167,549	\$5,645,740	\$7,028,094
Contract Operator	\$10,626,507	\$13,713,827	\$15,323,932	\$21,731,070
Total Cost - MOW for IOS or LPA	\$14,310,976	\$18,881,376	\$20,969,672	\$28,759,163
Incremental Cost - MOS 61 Miles	\$1,677,031	\$608,894	\$0	\$0
Total Cost - MOW 61 Miles	\$15,988,008	\$19,490,270	\$20,969,672	\$28,759,163
<u>Notes:</u>				
1. MOW costs projected for IOS or LPA and 61-mile line.				
2. CR O&M costs do NOT include Payment to Railroad costs.				

3.4 O&M Cost Summary

Table 6 summarizes the estimated annual O&M costs for each of the CFCRT project alternatives. Costs were inflated to 2008 dollars using a 3.0% annual inflation factor. The total annual O&M cost ranges from \$160 million (No-Build) to \$192 million (Full Build). The incremental O&M cost for the TSM/Baseline Alternative (relative to the No-Build Alternative) is \$9.6 million. The incremental O&M cost for the IOS Build Alternative is \$22.2 million.


Table 6. CFCRT Annual O&M Cost Estimates

Input Measure	No Build	TSM/ Baseline	Build (IOS)
LYNX O&M Cost (in millions)	\$157.6	\$166.8	\$163.3
VOTRAN O&M Cost (in millions)	\$2.5	\$2.9	\$2.9
Commuter Rail O&M Cost (in millions)	--	--	\$25.7
Total Annual O&M Cost (in millions)	\$160.1	\$169.7	\$191.9
Incremental Annual O&M Cost (in millions)	--	\$9.6	\$22.2

- (1) Commuter rail cost includes MOW for 61-mile line.
- (2) Incremental cost of the TSM/Baseline Alternative is relative to the No-Build Alternative.
- (3) Incremental cost of the IOS Alternative is relative to the TSM/Baseline Alternative.

APPENDIX A
LYNX O&M COST ESTIMATES

Appendix A-1 LYNX Annual O&M Costs – No-Build Alternative


 CENTRAL FLORIDA REGIONAL TRANSPORTATION AUTHORITY
 O&M COST MODEL
 System Characteristics & Cost Summary

System Characteristic	Driving Variable	Input Value	Units
MOTOR BUS:			
Annual Boardings (Unlinked Trips)	BUSPASS	51.7	million
Peak Buses	PKBUS	456	
Active Fleet Buses	TOTBUS	547	
Operating Divisions	GARAGE	2	
Annual Revenue Vehicle-Miles	BUSMILE	23.75	million
Annual Revenue Vehicle-Hours	BUSHOUR	2.46	million
Agency Facilities	FACILITIES	3	
Transit Centers	CENTERS	1	
Superstops	SUPERSTOPS	10	
Shelters	SHELTERS	233	
Advertising Shelters	ADVSHelters	188	
Service Vehicle Miles	SERVMILES	1,200,000	
Vans	VANS	57	
Paratransit Trips	PARATRIPS	583,903	

Mode	Labor	Non-Labor	TOTAL	FTEs
TOTAL:				
All Modes (2005\$)	\$100,031,389	\$44,156,527	\$144,187,916	2,048.0
All Modes (2007\$)	\$110,906,589	\$48,957,131	\$159,863,719	2,048.0
INCREMENTAL:				
All Modes			\$65,362,662	1,099.0
Total Cost per Revenue				
Mode	Bus Hour	Bus Mile	Passenger	Trip
Motor Bus	\$52.37	\$5.42	\$2.49	N/A
Paratransit	N/A	N/A	N/A	\$26.58

NOTES:
 All numbers are based on **actual** 2005 figures and have been inflated to 2007 figures. Cost Model runs an estimate of what cost "should have" been using the assumptions under the O&M cost model.
 Incremental differences: (Total = actual expenses - estimated expenses) and FTEs = actual employees - estimated employees needed

Appendix A-2 LYNX Annual O&M Costs – TSM/Baseline Alternative

 CENTRAL FLORIDA REGIONAL TRANSPORTATION AUTHORITY
 O&M COST MODEL
 System Characteristics & Cost Summary

System Characteristic	Driving Variable	Input Value	Units
MOTOR BUS:			
Annual Boardings (Unlinked Trips)	BUSPASS	52.3	million
Peak Buses	PKBUS	507	
Active Fleet Buses	TOTBUS	608	
Operating Divisions	GARAGE	2	
Annual Revenue Vehicle-Miles	BUSMILE	25.85	million
Annual Revenue Vehicle-Hours	BUSHOUR	2.62	million
Agency Facilities	FACILITIES	3	
Transit Centers	CENTERS	1	
Superstops	SUPERSTOPS	20	
Shelters	SHELTERS	233	
Advertising Shelters	ADVSHelters	188	
Service Vehicle Miles	SERVMILES	1,200,000	
Vans	VANS	57	
Paratransit Trips	PARATRIPS	583,903	

Mode	Labor	Non-Labor	TOTAL	FTEs
TOTAL:				
All Modes (2005\$)	\$106,421,147	\$46,181,765	\$152,602,912	2,180.0
All Modes (2007\$)	\$117,991,028	\$51,202,548	\$169,193,576	2,180.0
INCREMENTAL:				
All Modes			\$73,777,658	1,231.0
Total Cost per Revenue				
Mode	Bus Hour	Bus Mile	Passenger	Trip
Motor Bus	\$52.35	\$5.30	\$2.62	N/A
Paratransit	N/A	N/A	N/A	\$26.75

NOTES:
 All numbers are based on **actual** 2005 figures and have been inflated to 2007 figures. Cost Model runs an estimate of what cost "should have" been using the assumptions under the O&M cost model.
 Incremental differences: (Total = actual expenses - estimated expenses) and FTEs = actual employees - estimated employees needed

Appendix A-3
LYNX Annual O&M Costs – IOS Build Alternative



CENTRAL FLORIDA REGIONAL TRANSPORTATION AUTHORITY
 O&M COST MODEL

System Characteristics & Cost Summary

System Characteristic	Driving Variable	Input Value	Units
MOTOR BUS:			
Annual Boardings (Unlinked Trips)	BUSPASS	51.5	million
Peak Buses	PKBUS	485	
Active Fleet Buses	TOTBUS	581	
Operating Divisions	GARAGE	2	
Annual Revenue Vehicle-Miles	BUSMILE	25.16	million
Annual Revenue Vehicle-Hours	BUSHOUR	2.57	million
Agency Facilities	FACILITIES	3	
Transit Centers	CENTERS	1	
Superstops	SUPERSTOPS	10	
Shelters	SHELTERS	233	
Advertising Shelters	ADVSHELTERS	188	
Service Vehicle Miles	SERVMILES	1,200,000	
Vans	VANS	57	
Paratransit Trips	PARATRIPS	583,903	

Mode	Labor	Non-Labor	TOTAL	FTEs
TOTAL:				
All Modes (2005\$)	\$104,014,896	\$45,394,541	\$149,409,437	2,129.9
All Modes (2007\$)	\$115,323,175	\$50,329,739	\$165,652,914	2,129.9
INCREMENTAL:				
All Modes			\$70,584,184	1,180.9
Total Cost per Revenue				
Mode	Bus Hour	Bus Mile	Passenger	Trip
Motor Bus	\$52.16	\$5.32	\$2.60	N/A
Paratransit	N/A	N/A	N/A	\$26.69

NOTES:
 All numbers are based on **actual** 2005 figures and have been inflated to 2007 figures. Cost Model runs an estimate of what cost "should have" been using the assumptions under the O&M cost model.
 Incremental differences: (Total = actual expenses - estimated expenses) and FTEs = actual employees - estimated employees needed

APPENDIX B
COMMUTER RAIL O&M COST ESTIMATES

**Appendix B-1
 Commuter Rail Annual O&M Costs – 2013 IOS Alternative**

CFCRT Final Design		
Commuter Rail O&M Cost Results Report		
Appendix B. Detailed Commuter Rail O&M Cost Estimates		
Alternative:	2013 IOS	
System Characteristics		Input Value
Annual Passenger Trips	1,077,000	
Peak Passenger Cars	10	
Peak Trainsets	5	
Revenue Train-Hours	10,400	
Revenue Pass. Car-Hours	20,800	
Revenue Train-Miles	262,496	
Revenue Pass. Car-Miles	524,992	
Directional Route Miles	120.9	
Stations	12	
Maintenance Yards	1.0	
Daily Revenue Train Trips	32	
Average Price of Diesel Fuel	\$2.50	
Cost Type		O&M Cost 2008 \$
Operating Agency		
Executive Director's Office		\$477,499
Administration & Finance		\$878,660
Liability Insurance		\$1,841,583
Customer Service		\$529,015
Contract Operations		\$710,503
Total		\$4,437,260
Contract Operator		
General Manager's Office		\$305,066
Safety & Training		\$238,180
Operations		\$4,518,982
Equipment Maintenance		\$2,047,589
Engineering / Maintenance of Way		\$2,824,873
Administration & Finance		\$566,297
Management Fee		\$1,050,099
Total		\$11,551,085
TOTAL COST		\$15,988,345
Average Cost		
Cost per Train-Hour:		\$1,537.34
Cost per Car-Mile:		\$30.45
Cost per Passenger:		\$14.85
Notes:		
1. Costs reported in 2008 dollars.		
2. Operating Agency and Contract Operator Staffing based on VHB (revised).		
3. MOW cost includes ALL MOW for 61-mile line including CFCRT, CSX & Amtrak.		
4. O&M costs include estimated liability insurance costs (per VRE).		
5. CR O&M costs do NOT include Payment to Railroad costs.		
6. CR costs reflect Push-Pull operations.		
Prepared by: HDR Engineering, Inc.		
		1/11/2011

**Appendix B-2
 Commuter Rail Annual O&M Costs – 2015 LPA Alternative**

CFCRT Final Design		
Commuter Rail O&M Cost Results Report		
Appendix B. Detailed Commuter Rail O&M Cost Estimates		
Alternative:	2015 LPA	
System Characteristics		Input Value
Annual Passenger Trips		1,381,000
Peak Passenger Cars		14
Peak Trainsets		7
Revenue Train-Hours		14,560
Revenue Pass. Car-Hours		29,120
Revenue Train-Miles		404,768
Revenue Pass. Car-Miles		809,536
Directional Route Miles		120.9
Stations		16
Maintenance Yards		1.0
Daily Revenue Train Trips		32
Average Price of Diesel Fuel		\$2.50
Cost Type		O&M Cost 2008 \$
Operating Agency		
Executive Director's Office		\$528,839
Administration & Finance		\$1,285,681
Liability Insurance		\$1,963,956
Customer Service		\$726,378
Contract Operations		\$968,728
Total		\$5,473,581
Contract Operator		
General Manager's Office		\$372,283
Safety & Training		\$239,347
Operations		\$5,875,371
Equipment Maintenance		\$2,711,048
Engineering / Maintenance of Way		\$2,855,927
Administration & Finance		\$688,776
Management Fee		\$1,274,275
Total		\$14,017,026
TOTAL COST		\$19,490,607
Average Cost		
Cost per Train-Hour:		\$1,338.64
Cost per Car-Mile:		\$24.08
Cost per Passenger:		\$14.11
Notes:		
1. Costs reported in 2008 dollars.		
2. Operating Agency and Contract Operator Staffing based on VHB (revised).		
3. MOW cost includes ALL MOW for 61-mile line including CFCRT, CSX & Amtrak.		
4. O&M costs include estimated liability insurance costs (per VRE).		
5. CR O&M costs do NOT include Payment to Railroad costs.		
6. CR costs reflect Push-Pull operations.		
Prepared by: HDR Engineering, Inc.		1/11/2011

**Appendix B-3
 Commuter Rail Annual O&M Costs – 2017 Full Build Alternative**

CFCRT Final Design		
Commuter Rail O&M Cost Results Report		
Appendix B. Detailed Commuter Rail O&M Cost Estimates		
Alternative:	2017 Full Build	
System Characteristics		Input Value
Annual Passenger Trips		1,574,000
Peak Passenger Cars		16
Peak Trainsets		8
Revenue Train-Hours		16,640
Revenue Pass. Car-Hours		33,280
Revenue Train-Miles		503,027
Revenue Pass. Car-Miles		1,006,054
Directional Route Miles		120.9
Stations		17
Maintenance Yards		1.0
Daily Revenue Train Trips		32
Average Price of Diesel Fuel		\$2.50
Cost Type		O&M Cost 2008 \$
Operating Agency		
Executive Director's Office		\$555,988
Administration & Finance		\$1,294,099
Liability Insurance		\$2,025,142
Customer Service		\$795,751
Contract Operations		\$974,760
Total		\$5,645,740
Contract Operator		
General Manager's Office		\$373,266
Safety & Training		\$239,930
Operations		\$6,713,702
Equipment Maintenance		\$3,039,824
Engineering / Maintenance of Way		\$2,858,110
Administration & Finance		\$706,015
Management Fee		\$1,393,085
Total		\$15,323,932
TOTAL COST		\$20,969,672
Average Cost		
Cost per Train-Hour:		\$1,260.20
Cost per Car-Mile:		\$20.84
Cost per Passenger:		\$13.32
Notes:		
1. Costs reported in 2008 dollars.		
2. Operating Agency and Contract Operator Staffing based on VHB (revised).		
3. MOW cost includes ALL MOW for 61-mile line including CFCRT, CSX & Amtrak.		
4. O&M costs include estimated liability insurance costs (per VRE).		
5. CR O&M costs do NOT include Payment to Railroad costs.		
6. CR costs reflect Push-Pull operations.		
Prepared by: HDR Engineering, Inc.		1/11/2011

**Appendix B-4
 Commuter Rail Annual O&M Costs – 2025 Full Build Alternative**

CFCRT Final Design			
Commuter Rail O&M Cost Results Report			
Appendix B. Detailed Commuter Rail O&M Cost Estimates			
Alternative:	2025 Full Build		
System Characteristics		Input Value	
Annual Passenger Trips		3,597,000	
Peak Passenger Cars		28	
Peak Trainsets		14	
Revenue Train-Hours		29,120	
Revenue Pass. Car-Hours		58,240	
Revenue Train-Miles		880,298	
Revenue Pass. Car-Miles		1,760,595	
Directional Route Miles		120.9	
Stations		17	
Maintenance Yards		1.0	
Daily Revenue Train Trips		56	
Average Price of Diesel Fuel		\$2.50	
Cost Type		O&M Cost	2008 \$
Operating Agency			
Executive Director's Office			\$690,194
Administration & Finance			\$1,704,611
Liability Insurance			\$2,392,259
Customer Service			\$1,248,074
<u>Contract Operations</u>			<u>\$992,955</u>
Total			\$7,028,094
Contract Operator			
General Manager's Office			\$379,165
Safety & Training			\$339,306
Operations			\$10,548,603
Equipment Maintenance			\$4,813,784
Engineering / Maintenance of Way			\$2,871,208
Administration & Finance			\$803,451
Management Fee			\$1,975,552
Total			\$21,731,070
TOTAL COST			\$28,759,163
Average Cost			
Cost per Train-Hour:			\$987.61
Cost per Car-Mile:			\$16.33
Cost per Passenger:			\$8.00
Notes:			
1. Costs reported in 2008 dollars.			
2. Operating Agency and Contract Operator Staffing based on VHB (revised).			
3. MOW cost includes <u>ALL</u> MOW for 61-mile line including CFCRT, CSX & Amtrak.			
4. O&M costs include estimated liability insurance costs (per VRE).			
5. CR O&M costs do NOT include Payment to Railroad costs.			
6. CR costs reflect Push-Pull operations.			
Prepared by: HDR Engineering, Inc.		1/11/2011	

**Appendix B-5
 Commuter Rail Annual O&M Costs – 2030 Build Alternative**

CFCRT Final Design		
Commuter Rail O&M Cost Results Report		
Appendix B. Detailed Commuter Rail O&M Cost Estimates		
Alternative:	2030 Build	
System Characteristics		Input Value
Annual Passenger Trips		2,154,000
Peak Passenger Cars		20
Peak Trainsets		10
Revenue Train-Hours		27,000
Revenue Pass. Car-Hours		54,000
Revenue Train-Miles		681,480
Revenue Pass. Car-Miles		1,362,960
Directional Route Miles		120.9
Stations		12
Maintenance Yards		1.0
Daily Revenue Train Trips		72
Average Price of Diesel Fuel		\$2.50
Cost Type		O&M Cost 2008 \$
Operating Agency		
Executive Director's Office		\$641,176
Administration & Finance		\$1,490,937
Liability Insurance		\$2,147,260
Customer Service		\$1,003,430
Contract Operations		\$923,825
Total		\$6,206,628
Contract Operator		
General Manager's Office		\$375,232
Safety & Training		\$336,972
Operations		\$9,567,408
Equipment Maintenance		\$3,794,681
Engineering / Maintenance of Way		\$2,862,402
Administration & Finance		\$774,494
Management Fee		\$1,771,119
Total		\$19,482,307
TOTAL COST		\$25,688,936
Average Cost		
Cost per Train-Hour:		\$951.44
Cost per Car-Mile:		\$18.85
Cost per Passenger:		\$11.93
Notes:		
1. Costs reported in 2008 dollars.		
2. Operating Agency and Contract Operator Staffing based on VHB (revised).		
3. MOW cost includes <u>ALL</u> MOW for 61-mile line including CFCRT, CSX & Amtrak.		
4. O&M costs include estimated liability insurance costs (per VRE).		
5. CR O&M costs do NOT include Payment to Railroad costs.		
6. CR costs reflect Push-Pull operations.		
Prepared by: HDR Engineering, Inc.		1/11/2011

APPENDIX C
COMMUTER RAIL STAFFING ESTIMATES

**Appendix C
 Commuter Rail Staffing Estimates**

Central Florida Commuter Rail Transit Commuter Rail O&M Cost Results Report Appendix C. Staffing Summary				
Cost Item	2013 IOS FTE's	2015 FB FTE's	2017 FB FTE's	2025 FB FTE's
OPERATING AGENCY				
Executive Director's Office				
Executive Director	1.0	1.0	1.0	1.0
Administrative Assistant	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>
	2.0	2.0	2.0	2.0
Administration & Finance				
Director of Administration & Finance	1.0	1.0	1.0	1.0
Administrative Assistant	0.5	1.0	1.0	1.0
Manager of Revenue & Ticketing	0.5	1.0	1.0	1.0
Manager of Accounting	1.0	1.0	1.0	1.0
Budget Analyst	0.5	1.0	1.0	2.0
Accountant	0.5	1.0	1.0	2.0
Revenue Analyst	0.5	1.0	1.0	2.0
Manager of Procurement	0.5	1.0	1.0	1.0
Contracts Compliance Officer	0.5	1.0	1.0	2.0
Manager of Information Technology	0.5	1.0	1.0	1.0
Manager of Human Resources	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>
	7.0	11.0	11.0	15.0
Customer Service				
Director of Customer Service	1.0	1.0	1.0	1.0
Manager of Public Information	0.5	1.0	1.0	1.0
Customer Service Representatives	3.0	4.0	5.0	9.0
Manager of Marketing	<u>0.5</u>	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>
	5.0	7.0	8.0	12.0
Contract Operations				
Director of Contract Operations	1.0	1.0	1.0	1.0
Administrative Assistant	0.5	1.0	1.0	1.0
Manager of Infrastructure	1.0	1.0	1.0	1.0
Manager of Equipment	1.0	1.0	1.0	1.0
Manager of Safety & Security	0.5	1.0	1.0	1.0
Manager of AFC Maintenance	0.5	1.0	1.0	1.0
AFC Maintainer	1.0	1.5	1.5	1.5
Manager of Railroad Operations	<u>0.5</u>	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>
	6.0	8.5	8.5	8.5

Cost Item	2013 IOS FTE's	2015 FB FTE's	2017 FB FTE's	2025 FB FTE's
CONTRACT OPERATOR				
General Manager's Office				
General Manager	1.0	1.0	1.0	1.0
Quality Control Manager	0.5	1.0	1.0	1.0
Administrative Assistant	1.0	1.0	1.0	1.0
	2.5	3.0	3.0	3.0
Safety & Training				
Director of Safety & Training	1.0	1.0	1.0	1.0
Instructor	1.0	1.0	1.0	2.0
	2.0	2.0	2.0	3.0
Operations				
Director of Operations	1.0	1.0	1.0	1.0
Administrative Assistant	0.5	1.0	1.0	1.0
Locomotive Engineers	13.0	18.0	21.0	36.0
Trainmaster	3.0	3.0	3.0	3.0
Conductors	13.0	18.0	21.0	36.0
Bridge Tenders	5.0	5.0	5.0	5.0
Manager of Train Operations	1.0	1.0	1.0	1.0
Train Dispatchers	5.0	5.0	5.0	5.0
	41.5	52.0	58.0	88.0
Equipment Maintenance				
Director of Equipment Maintenance	1.0	1.0	1.0	1.0
Manager of Equipment Maintenance	2.0	2.0	2.0	2.0
Administrative Assistant	0.5	1.0	1.0	1.0
Cleaning Supervisor	1.0	1.0	1.0	1.0
Car Cleaners	3.0	4.0	4.0	7.0
Maintenance Supervisor	1.0	1.0	1.0	1.0
Maintainers	7.0	11.0	13.0	24.0
	15.5	21.0	23.0	37.0
Engineering / Maintenance of Way				
Chief Engineer	1.0	1.0	1.0	1.0
Administrative Assistant	0.5	1.0	1.0	1.0
Manager of Track	1.0	1.0	1.0	1.0
Section Foreman	2.0	2.0	2.0	2.0
Track Maintainers	4.5	4.5	4.5	4.5
Machine Operator	1.0	1.0	1.0	1.0
Track Welder	2.5	2.5	2.5	2.5
Manager of Signals/Communications	1.0	1.0	1.0	1.0
Signal Inspector	1.0	1.0	1.0	1.0
Signal Maintainers	7.0	7.0	7.0	7.0
Communications Maintainer	1.0	1.0	1.0	1.0
Manager of Structures	1.0	1.0	1.0	1.0
	23.5	24.0	24.0	24.0
Administration & Finance				
Director of Administration & Finance	1.0	1.0	1.0	1.0
Information Technologies	0.5	1.0	1.0	1.0
Human Resources	0.5	1.0	1.0	1.0
Manager of Accounting & Finance	1.0	1.0	1.0	1.0
Payroll & Billing	1.0	1.0	1.0	1.0
Procurement	1.0	1.0	1.0	1.0
	5.0	6.0	6.0	6.0
Operating Agency Subtotal	20.0	28.5	29.5	37.5
Contract Operator Subtotal	90.0	108.0	116.0	161.0
Total FTEs	110.0	136.5	145.5	198.5

NOTES:

- Staffing includes Maintenance of Way for entire 61-mile line.
- Staffing rounded to nearest 1/2 FTE. 1/2 FTE represents shared positions or increased overtime.