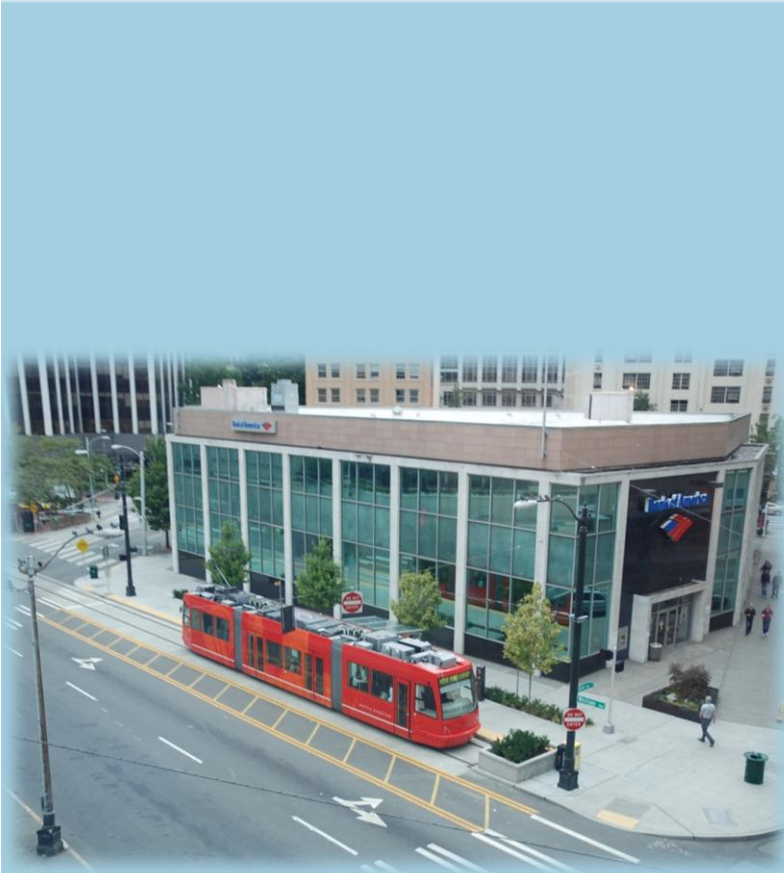


CENTRAL BROWARD EAST-WEST TRANSIT STUDY OPERATIONS AND MAINTENANCE COSTING METHODOLOGY TECHNICAL MEMORANDUM



June 2013



JACOBS



CENTRAL BROWARD



TRANSIT STUDY

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1.0 Introduction

1.1 Background and Study Overview

The Florida Department of Transportation (FDOT), Broward County Transit (BCT), the Broward Metropolitan Planning Organization (MPO), and the South Florida Regional Transportation Authority (SFRTA), in cooperation with the Federal Transit Administration (FTA), are evaluating potential transit options in central Broward County, including premium bus service and modern streetcar. Potential east-west mobility solutions involving premium bus service or modern streetcar will be assessed for potential environmental impacts in compliance with the National Environmental Policy Act (NEPA) and the process and study requirements for the federal New Starts funding program for new transit initiatives.

1.2 Description of the Study Area

The study area, in central Broward County, extends from Oakland Park Boulevard to the north, the Sawgrass Expressway/I-75 to the west, Stirling Road and Griffin Road to the south and the Intracoastal Waterway/Port Everglades to the east. The alternatives to be analyzed would provide premium bus service or rail service from the Sawgrass Mills Mall/BB&T Center (formerly the Bank Atlantic Center) in the City of Sunrise to the Fort Lauderdale-Hollywood International Airport, providing connections along the way to major activity centers including the Sawgrass International Business Park, Plantation Midtown, the South Florida Education Center, and downtown Fort Lauderdale, as well as two connections to Tri-Rail at the Fort Lauderdale (Broward Boulevard) and the Fort Lauderdale-Hollywood International Airport (Griffin Road) stations. The Study is also considering connections to proposed passenger service on the Florida East Coast Railroad and the downtown Fort Lauderdale Wave circulator. The length of the corridor is over 20 miles and varies by alternative.

Exhibit 1: Study Location Map



1.3 Build Alternatives

The Build Alternatives have proposed alignments beginning at the Sawgrass Mills Mall/ BB&T Center, to the west, then travel south to I-595 through the Sawgrass International Corporate Park. Once through the Sawgrass International Corporate Park, the alignments run east, following the I-595 corridor to University Drive. For all Build Alternatives, this portion is proposed to be premium bus service.

In the eastern portion of the study area the Build Alternatives will have the same alignment, between the Fort Lauderdale Tri-Rail Station, downtown Fort Lauderdale, the Fort Lauderdale-Hollywood International Airport, and the Fort Lauderdale-Hollywood International Airport Tri-Rail Station. For this eastern portion of the corridor, modern streetcar will be considered. The Build Alternatives have different alignment options between University Drive and I-95 detailed below.

There are three Build Alternatives that diverge at University Drive and converge at the Tri-Rail Stations, as described below.

- The SR 7/Broward Boulevard Premium Bus Alternative leaves the I-595 corridor, south on University Drive to Nova Drive where it turns east and travels to Davie Road. At Davie Road, the alignment turns north and re-enters the I-595 corridor and continues east to SR 7. At SR 7, the alignment travels north to Broward Boulevard then continues east to the Fort Lauderdale Tri-Rail Station on Broward Boulevard, where it meets the eastern portion of the alignment. For this alignment, both premium bus and modern streetcar will be considered. This Alternative is illustrated in Exhibit 2.
- The two Griffin Road Alternatives continue south from the I-595 corridor to Griffin Road, using either University Drive or a combination of University Drive, Nova Drive, and Davie Road. These Alternatives continue east on Griffin Road to the Fort Lauderdale-Hollywood International Airport Tri-Rail Station, where it meets the eastern portion of the alignment. For these alignments, both premium bus service and modern streetcar will be considered (Griffin Road Premium Bus Alternative and Griffin Road Modern Streetcar Alternative, respectively). These Alternatives are illustrated in Exhibit 3.

Exhibit 2: SR 7/Broward Boulevard Premium Bus Alternative



Exhibit 3: Griffin Road Alternatives



1.4 Methodology Report

This report presents the process used to develop operating and maintenance (O&M) cost estimates being prepared for the Central Broward East-West Transit Study. Two primary resource build-up cost models were developed: a bus cost model and a light rail transit (LRT) cost model. The bus cost model will be used to estimate premium bus services and bus rapid transit (BRT) alternatives. A streetcar cost model also was adapted from the LRT cost model for evaluating modern streetcar alternatives. Each model estimates O&M costs based on projected system operating statistics.

Steps required for estimating O&M costs are as follows:

1. Development of an O&M cost model for each mode,
2. Calibration of the models for current year of operations,
3. Validation of the model for prior year operations, and
4. Calculation of annual O&M costs.

Separate models have been developed for each transit mode. The bus O&M cost model was developed from operational and financial data supplied by BCT for the 2010 Fiscal Year. Since LRT currently is not in operation in Broward County, the LRT model is based on financial and operating data for LRT systems in Baltimore, Denver, Los Angeles, Portland, Sacramento, St. Louis, Salt Lake City, and San Jose. The LRT cost model has been adapted for the Broward County area by using Miami-Dade Transit (MDT) salary, wage, and fringe benefits rates, as well as Florida Power & Light electric utility rates to provide a local estimate of the rail vehicle traction power cost requirements.

2.0 Bus O&M Cost Model

This section presents the bus O&M cost model which estimates annual operating and maintenance costs for BCT's existing bus and demand response transit services, as well as alternatives being evaluated in this Draft EIS. A general overview of the model, input variables and formulas used in the calculation of labor and non-labor costs is provided in sections 2.1 through 2.4.

2.1 General Model Description

The bus O&M cost model is a disaggregate, resource build-up model, consistent with the methodology specified by the FTA. Line item costs are determined according to the quantity of service supplied and other system characteristics. The cost model is based on BCT's operational and financial data for the 2010 Fiscal Year. Articulated buses will be used on the planned alignment. BCT currently operates articulated buses on its Breeze routes. The model was developed using this O&M cost data. BCT's O&M costs (labor and non-labor costs) are broken out by National Transit Database (NTD) standards: mode, function, and object class. The two modes are motor bus and demand response. Function refers to the activity performed or cost center of the agency: vehicle operations, vehicle maintenance, non-vehicle maintenance, and general administration. Object class refers to groupings of expenses on the basis of goods or services purchased. Expenses for each object class (e.g. salary/wages, materials, utilities) are modeled on a separate line, thus ensuring that the equations are mutually exclusive and cover all operating costs. The 2010 BCT O&M cost data did not include ITS costs; therefore, the cost model does not include ITS O&M costs.

A cost model was developed for each alternative using Microsoft Excel and includes the following tables:

- Table 1 - Input Statistics
- Table 2 - Line Item Detail
- Table 3 - Summary: O&M Costs by Function and Cost Type

Table 1, the Input Statistics worksheet, summarizes the operating requirements and system characteristics of each model input variable for the baseline year and validation years, as well as alternative scenarios evaluated in the Draft EIS. Table 2, the line item detail worksheet, calculates the O&M expenses for each modeled line item. Table 3 summarizes the annual cost estimate for the combined BCT motor bus and demand response services cross-tabulated by function and cost type (object class). Additional descriptions of input statistics and line item detail are provided in sections 2.2 and 2.3. The 2012 model calibration tables for the three build alternatives are presented in Appendix A.

2.2 Input Variables

A total of six input variables were used to describe operating requirements and system characteristics for BCT's motor bus and demand response transit modes. All line item costs are linked either directly or indirectly to one or more of the input variables. Each of these variables was estimated for the Build Alternatives based on proposed operating plans. The cost model's six input variables are as follows:

- **Annual Revenue Bus-Hours (BUSHR)** - The total annual motor bus vehicle-hours in revenue service, excluding deadhead time. For Fiscal Year (FY) 2010, the BUSHR are estimated to be 1,024,606 hours.
- **Annual Revenue Bus-Miles (BUSMI)** - The total annual motor bus vehicle-miles in revenue service, excluding deadhead mileage. For FY 2010, the BUSMI are estimated to be 14,049,190 miles.
- **Peak Buses (PKBUS)** - The number of motor buses operated in maximum service. BCT's FY 2010 peak bus estimate is 236 vehicles.
- **Bus Garages (GARAGE)** - The number of bus maintenance garages operated in the system. BCT operates two bus maintenance garages, the Copans Road and Ravenswood Road facilities.
- **BCT-Owned Park & Ride/Transit Centers (PNR)** - As of FY 2010, the number of existing park & ride and/or transit centers that are owned and maintained by BCT was one.
- **Annual Revenue Paratransit Hours (DRHR)** - The total annual demand response vehicle-hours in revenue service. For FY 2010, the DRHR are estimated to be 456,078 hours.

In addition, an Inflation Factor is used to deflate model generated costs during validation testing to compare model generated costs with actual BCT FY 2007, 2008 and 2009 costs. The Inflation Factor is used to inflate BCT FY 2010 costs to April 2012 dollars. The Inflation Factor is based on information obtained from the Southeast Urban Consumer Price Index - All Urban Consumers from the U.S. Bureau of Labor Statistics.

2.3 Line Item Detail

The line item detail worksheet lists the following parameters for each line item object class.

- Function Code
- Object Class (Section 15) Code
- Cost Type
- Baseline Cost (BCT FY 2010 Costs)
- Productivity Factor
- Driving Variable (from Input Variables)

- Line Item Cost

The line item object class expenses are generally a function of the baseline cost, and the base and future values of the driving variables. This function assumes that current rates of consumption will continue in future years.

Cost equations used by the model are generally of the form:

$$\text{Projected Annual Cost} = \text{Base FY 2010 Cost} \div \text{Base Driving Variable} \times \text{Future Driving Variable}$$

Where:

- **Base FY 2010 Cost** = Budgeted expense in the base (FY 2010), or calibration year modeled.
- **Base Driving Variable** = Quantity of the input variable in the base (FY 2010), or calibration year.
- **Future Driving Variable** = Projected quantity of the input variable for the future year.

2.4 Model Validation

The ability of the bus O&M cost model to reasonably estimate annual operating and maintenance costs for future study alternatives was tested by applying the model to three prior fiscal years of operation: FY 2007, 2008, and 2009. The validation test demonstrates the sensitivity of the model, particularly for prior years in which BCT's level of bus service was different from current operations. Input variables and actual O&M costs for FY 2007, 2008, and 2009 were obtained from BCT's NTD reports. The estimated (model) costs were deflated to the specified fiscal year using the Southeast Urban Consumer Price Index – All Urban Consumers from the U.S. Bureau of Labor Statistics.

Exhibit 4 presents validation results for the bus O&M cost model. Applying the FY 2009 operating statistics, the model estimated labor costs to within 0.1%, non-labor expenses to within 1.4%, and total costs to within 3.1%. The model overestimated materials and supplies by 17.9% and underestimated purchased transportation by 23.1%. During 2009, the price of diesel began to drop to \$2.467 per gallon (according to the U.S. Energy Information Administration) and BCT completed its program to replace older fleet vehicles with newer fleet vehicles which reduced maintenance costs. These two occurrences may have contributed to the actual cost of materials and supplies being lower than the costs calculated by the model.

Applying the FY 2008 operating statistics, the model estimated labor costs to within 3.8%, non-labor expenses to within 4.3%, and total costs to within 6.8%. The model underestimated materials and supplies and purchased transportation by 17.9% and 22.7%, respectively. During 2008, the price of diesel was at a peak price of \$3.803 per gallon (according to U.S. Energy Information Administration) which may account for BCT's costs being higher than the costs calculated by the model.

The model underestimated purchased transportation costs for FY 2008 and FY 2009. Starting in FY 2008, BCT built in fuel cost escalators into the new vendor contracts resulting in higher costs for purchased transportation which may account for BCT's costs being higher than the costs calculated by the model.

The model validation reasonably calculated costs for line items, such as labor costs and non-labor expenses, which were stable and not affected by changing environments such as fuel costs, fleet replacement, and vendor contract changes. Therefore, it is concluded that the model will reasonably calculate future costs within a stable BCT environment.

Exhibit 4: Validation of Bus O&M Cost Model

Year	Expense Category	Model Estimate	Actual Costs	Percent Difference
2010	Salaries/Wages/Benefits	\$71,126,085	\$71,126,085	0.0%
	Materials & Supplies	\$18,143,992	\$18,143,992	0.0%
	Other Non-Labor Expenses	\$8,881,449	\$8,881,449	0.0%
	Purchased Transportation	\$18,588,220	\$18,588,220	0.0%
	Total	\$116,739,746	\$116,739,746	0.0%
2009	Salaries/Wages/Benefits	\$69,647,870	\$69,571,200	0.1%
	Materials & Supplies	\$17,783,868	\$15,083,043	17.9%
	Other Non-Labor Expenses	\$8,800,159	\$8,675,885	1.4%
	Purchased Transportation	\$22,138,551	\$28,783,932	-23.1%
	Total	\$118,370,448	\$122,114,060	-3.1%
2008	Salaries/Wages/Benefits	\$69,972,252	\$67,403,699	3.8%
	Materials & Supplies	\$17,839,433	\$21,717,036	-17.9%
	Other Non-Labor Expenses	\$8,794,662	\$9,193,379	-4.3%
	Purchased Transportation	\$24,046,727	\$31,091,072	-22.7%
	Total	\$120,653,074	\$129,405,186	-6.8%
2007	Salaries/Wages/Benefits	\$80,107,102	\$67,034,811	19.5%
	Materials & Supplies	\$20,385,531	\$17,271,301	18.0%
	Other Non-Labor Expenses	\$9,313,780	\$8,816,542	5.6%
	Purchased Transportation	\$21,471,804	\$23,002,298	-6.7%
	Total	\$131,278,218	\$116,124,952	13.0%

3.0 Light Rail Transit O&M Cost Model

3.1 General Model Description

The LRT model has a structure with line item costs tabulated for specific cost centers (e.g. vehicle operations, vehicle maintenance, facilities maintenance, and LRT general administration). Within each cost center, line items are defined as labor, materials, services, utilities, fuel, insurance, taxes, and miscellaneous costs. The LRT model uses a series of interactive tables generated in a Microsoft Excel spreadsheet.

Specific line items are provided for unique labor positions such as power maintainer and train operator, and also for non-labor expenses such as propulsion power and station maintenance materials and supplies. Each labor and non-labor expense is modeled separately to ensure that equations are mutually exclusive and cover all operating costs. O&M costs are calculated from the quantity of service supplied (e.g., number of peak cars) or some other system characteristic (e.g., number of directional route-miles). Labor productivity rates and non-labor unit costs are based on actual cost experiences of the following eight light rail systems:

- Baltimore (Maryland Transit Administration)
- Denver (Denver Regional Transit District)
- Los Angeles (Los Angeles County Metropolitan Transportation Authority)
- Portland (Tri-County Metropolitan Transit District of Oregon)
- Sacramento (Sacramento Regional Transit District)
- St. Louis (Bi-State Development Agency)
- Salt Lake City (Utah Transit Authority)
- San Jose (Santa Clara Valley Transportation Authority)

LRT operation costs are being utilized in this report, since the number of modern streetcars currently in operation in the U.S. is too limited to provide a sufficient basis for comparison. These U.S. LRT systems are recommended as peers for the Central Broward East-West Transit Study because they operate in urban environments, link activity and/or employment centers, and serve as regional connectors. Operational speeds expected for the Griffin Road Modern Streetcar Alternative, and the similarities with the power delivery system and vehicle characteristics make LRT the best comparable system, versus the historic streetcar.

To specifically account for potential LRT costs in Broward County, the cost model reflects MDT salary, wage, and fringe benefits rates. MDT operates the Miami-Dade County's rapid transit system, known as Metrorail. Of the two rail transit operators in the region MDT is more similar to modern streetcar operations and maintenance functions than SFRTA. The Vehicle Operations utility cost for LRT traction power is modeled using Florida Power & Light electricity rates (effective in 2012).

The LRT model uses a series of interactive tables in a Microsoft Excel Spreadsheet:

- Table 1 – Input Statistics
- Table 2 – Labor Cost Listing
- Table 3a – Non-Labor Cost Listing
- Table 3b – Non-Labor Unit Costs
- Table 4 – Line Item Detail
- Table 5 – Summary of Alternative

The printouts from the three build alternatives model runs are included in Appendix B.

3.2 Input Variables

Input variables determine nearly all costs in the model. Some items will be linked to secondary variables such as employment or total cost. The model requires six input variables, as described below:

- **Peak Cars (PKCAR)** - The maximum number of LRT vehicles in scheduled service during peak periods.
- **Annual Revenue Car-Miles (CARMI)** - The total vehicle miles operated in revenue service during one year, excluding deadhead mileage.
- **Annual Revenue Train-Hours (TRNHR)** - The total train-hours operated in revenue service during one year, excluding report and deadhead time.
- **Passenger Stations (STATION)** - The number of stations in the system.
- **Directional Route-Miles (RTMILE)** - The number of directional route-miles of revenue track, excluding yard and tail track. For example, one route-mile of double track equals two directional route-miles.
- **Maintenance Facilities (YARD)** - The number of LRT maintenance and storage yards.

Park and Ride lots were not included as input variables in the LRT model, because none are proposed on the streetcar portion of the alignments. No Park and Ride lots are included in the operating plan assumptions for the streetcar alternatives.

The Inflation Factor is used to inflate FY 2010 costs obtained from the eight light rail agencies to April 2012 dollars. The Inflation Factor is based on information obtained from the Southeast Urban Consumer Price Index - All Urban Consumers from the U.S. Bureau of Labor Statistics.

Table 1 in Appendix B shows the input statistics for each peer LRT system.

Some operating parameters, such as vehicle operating speeds and acceleration, may impact the operating costs. Modern streetcar would operate similar to LRT in the western segment of the alignment, while it will operate in mixed traffic more like a circulator in the downtown area.

3.3 Labor List

The cost model assumes that a new rail division will be established prior to revenue service. However, because there is adequate existing management structure in place to support the incremental increase represented by this new service, the model removed certain administrative, maintenance, and upper level management functions and positions to ensure no duplication of staffing. The model assumes four cost centers for the modern streetcar operator:

- Rail Vehicle Operations
- Rail Vehicle Maintenance
- Rail Facilities Maintenance
- Rail Administration and Support

Job positions have been defined by analyzing staffing levels for selected rail systems. Table 2 of Appendix B is the model's Labor List with positions identifies the four LRT divisions. Average base salaries and wages are based on the most recent MDT salary and wage rates. Paid leave (e.g. vacation) is included in the average annual earnings. The model uses an estimated fringe benefit rate of 26%, which is calculated excluding sick, holiday, and vacation pay.

3.4 Non-Labor Costs

Table 3a of Appendix B illustrates the model's NTD cost categories (e.g. vehicle operations, vehicle maintenance), cost types (e.g. services, materials and supplies, utilities), and reported peer system FY 2010 costs.

Table 3b of Appendix B illustrates the models calculations and average unit costs for the peer system expenses.

The model goes beyond NTD reporting, further allocating non-labor costs for selected categories, where more detail is desirable.

- Facilities Maintenance materials and supplies may be subdivided three ways: costs related to track, way, and signals; costs related to stations; and costs related to yard, shop and central control.
- Facilities Maintenance contract services may be broken out into costs related to track, way and signals; costs related to stations; and costs related to yard, shop, and central control.
- Cost for insurance and utilities, other than traction power, have been split: 50% to yard and shops and 50% to passenger stations.

3.5 Line Item Detail

The Line Item Detail (Table 4 of Appendix B) illustrates how the model combines labor with non-labor expenses and calculates costs and staffing requirements based on the system inputs. Cost items are listed by function (rail vehicle operations, rail vehicle maintenance, rail facilities maintenance, and rail administration and support).

- Staffing requirements, in Full-Time Equivalents (FTEs), are calculated from labor productivity equations for each job classification.
- Labor cost equals the calculated staffing requirement multiplied by the average employee salary for the particular job classification (e.g. train operators).
- Total labor productivity is calculated for each department (e.g. vehicle operations employees per revenue train-hour) to check the validity of model results.
- Similarly, non-labor unit costs are calculated for each department (e.g. vehicle maintenance non-labor cost per car-mile).

The Line Item Detail table also calculates total staffing requirements and operating cost.

3.6 Summary of Alternative

Table 5 of Appendix B illustrates how the model summarizes the results of a single model run showing the set of input variables that constitutes the test system, a tabulation of cost estimates by department and cost type, and calculations of various system cost productivity indexes. Costs are reported in April 2012 dollars.

3.7 Model Validation

The model's ability to accurately forecast O&M costs was tested by using the average 2010 operating statistics for the eight peer LRT systems as the alternative in the cost model. Since the validation model run will be compared to the average 2010 operating statistics obtained from the peer LRT systems, no inflation was added to the validation model run output. The model's calculated cost per train-hour and cost per car-mile was compared to actual unit costs for the peer systems. In addition, the model's calculation of labor productivity factors and non-labor unit costs were compared to actual labor productivity factors and non-labor unit costs for the peer systems. Validation results can be found in Section 3.7.1, Total Cost Comparison.

3.7.1 Total Cost Comparison

The first validity test was a comparison of model results on a train-hour and car-mile basis. Model results fall within the range of costs for the peer systems. Exhibit 5 presents the validation results for the LRT O&M cost model. Specific findings are as follows:

- The average total cost per train-hour for the eight peer LRT systems is \$488 per train-hour (2010 dollars). With averaged operating statistics from the peer systems, the model produces a total cost estimate of \$319 per train-hour (2010 dollars). Model results are lower than the peer average because of differences in cost of living and higher labor productivity in facilities maintenance.
- The average total cost per car-mile for the eight per LRT systems is \$12.53 (2010 dollars). With averaged operating statistics from the peer systems, the model produces a total cost estimate of \$8.33 per car-mile (2010 dollars). Again, model results are most likely lower than the peer average because of wage differences and higher labor productivity in facilities maintenance.

3.7.2 Labor Productivity Comparison

The model's staffing estimates were validated by comparing peer labor productivities for vehicle operations, vehicle maintenance, facilities maintenance, and general administration. Comparisons of labor productivity factors yield some indication of a system's cost-effectiveness. A high productivity factor implies a cost-effective system. Labor productivity factors calculated by the model fall within the range of labor productivity factors for the peer LRT systems. The black bar in exhibits 6 through 9 illustrate the value of the labor productivity factor calculated by the model. The values for each peer system and the calculated value are shown in the tables below the exhibits.

- Vehicle Operations (Exhibit 6)
- Vehicle Maintenance (Exhibit 7)
- Facilities Maintenance (Exhibit 8)
- General Administration (Exhibit 9)

3.7.3 Non-Labor Unit Cost Comparison

The model's non-labor cost estimates were validated by comparing non-labor unit costs for vehicle operations, vehicle maintenance, facilities maintenance, and general administration. Comparisons of non-labor unit costs yield some indication of a system's cost-effectiveness. A highly cost effective system is one with a low unit cost. All non-labor unit costs calculated by the model fall within the range of non-labor unit costs for the peer LRT systems. The black bar exhibits 10 through 13 illustrates the value of the non-labor unit cost calculated by the model. The values for each peer system and the calculated value are shown in the tables below the exhibits.

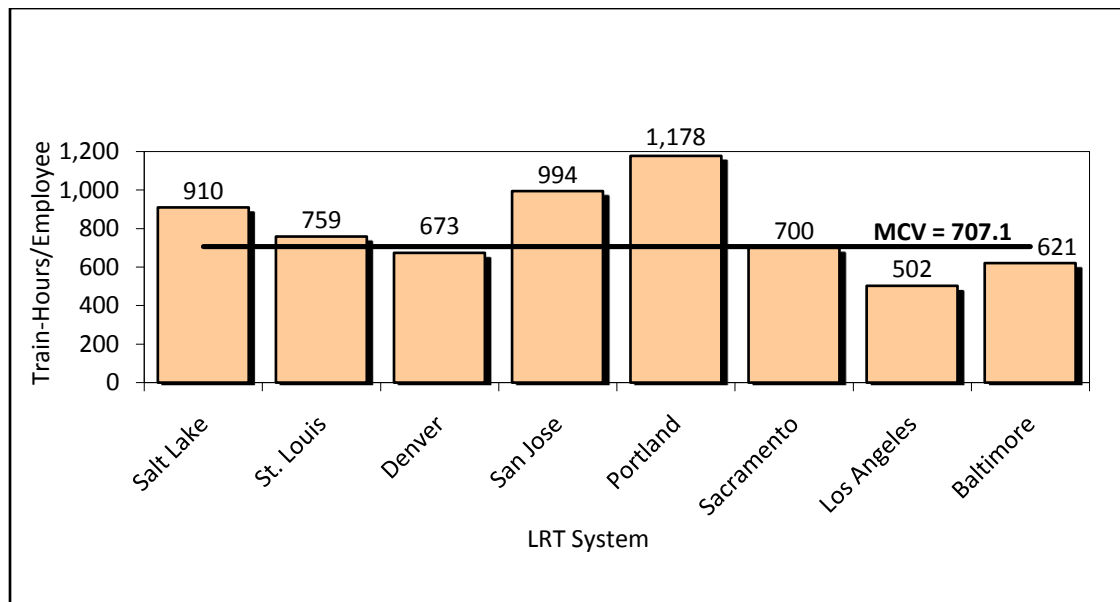
- Vehicle Operations (Exhibit 10)
- Vehicle Maintenance (Exhibit 11)

- Facilities Maintenance (Exhibit 12)
- General Administration (Exhibit 13)

Exhibit 5: Validation of LRT O&M Cost Model

Annual Cost Factors (2010)	
Total Cost per Revenue Train-Hour	\$319.19
Total Cost per Revenue Car-Mile	\$8.33
Vehicle Operations: Cost per Train-Hour	\$143
Vehicle Maintenance: Cost per Car-Mile	\$2.02
Facility Maintenance: Cost per Station	\$119,958
Administrative: Cost per Peak Car	\$132,699

Exhibit 6: Vehicle Operation Labor Productivity



*MCV = Model Calculated Value

Exhibit 7: Vehicle Maintenance Labor Productivity

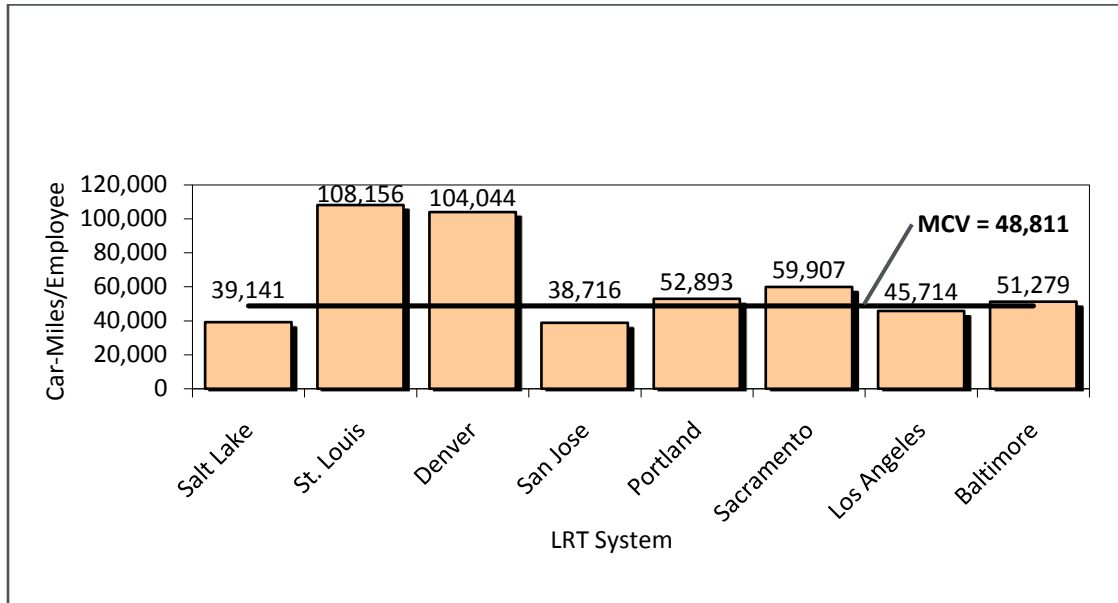


Exhibit 8: Facilities Maintenance Labor Productivity

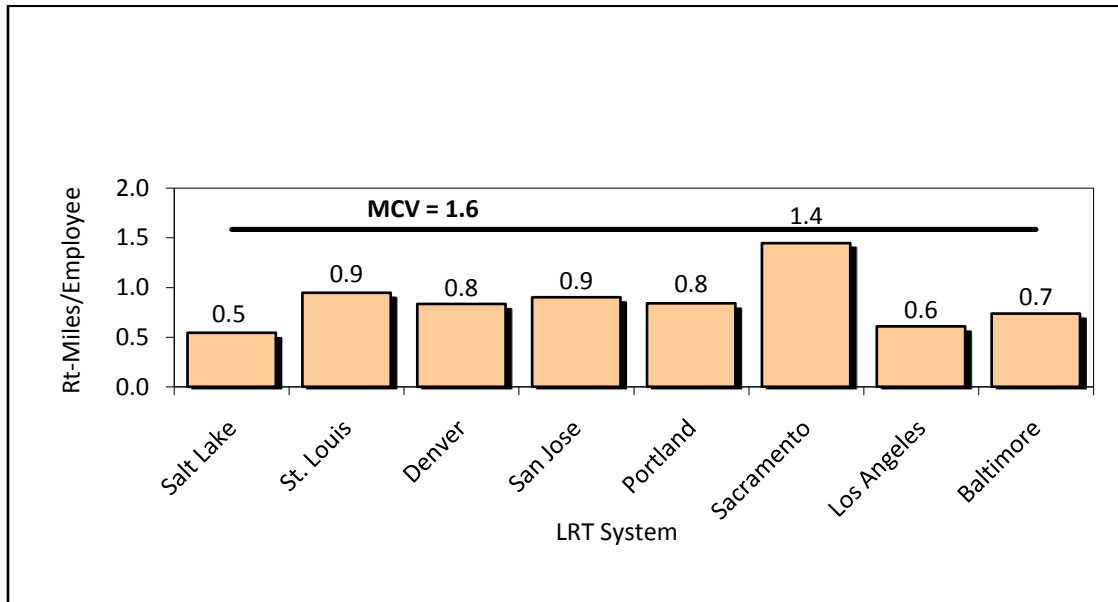


Exhibit 9: General Administration Labor Productivity

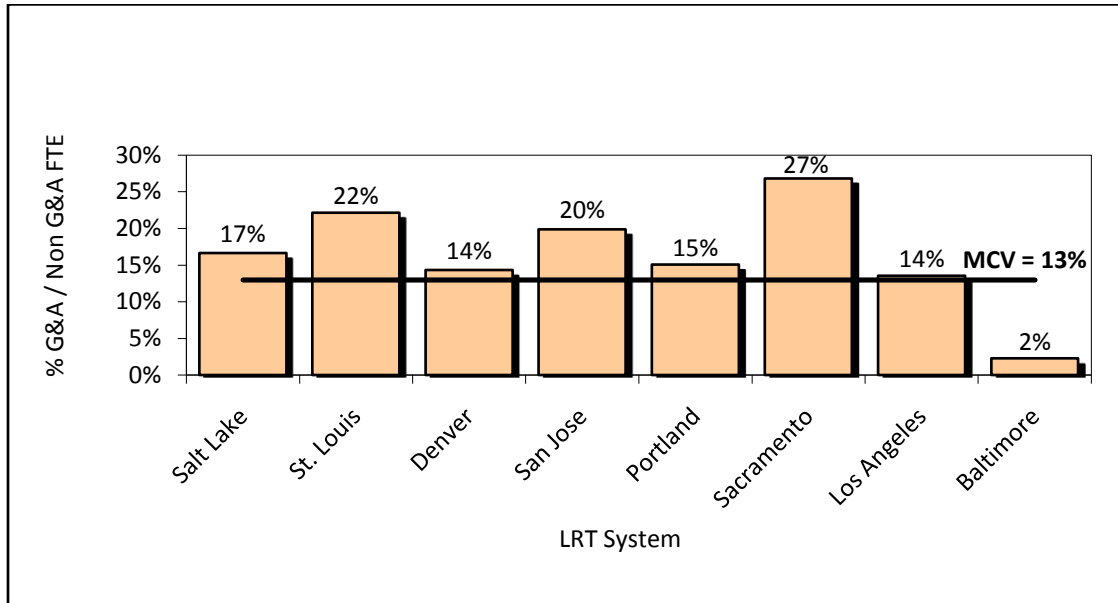


Exhibit 10: Vehicle Operation Non-Labor Productivity

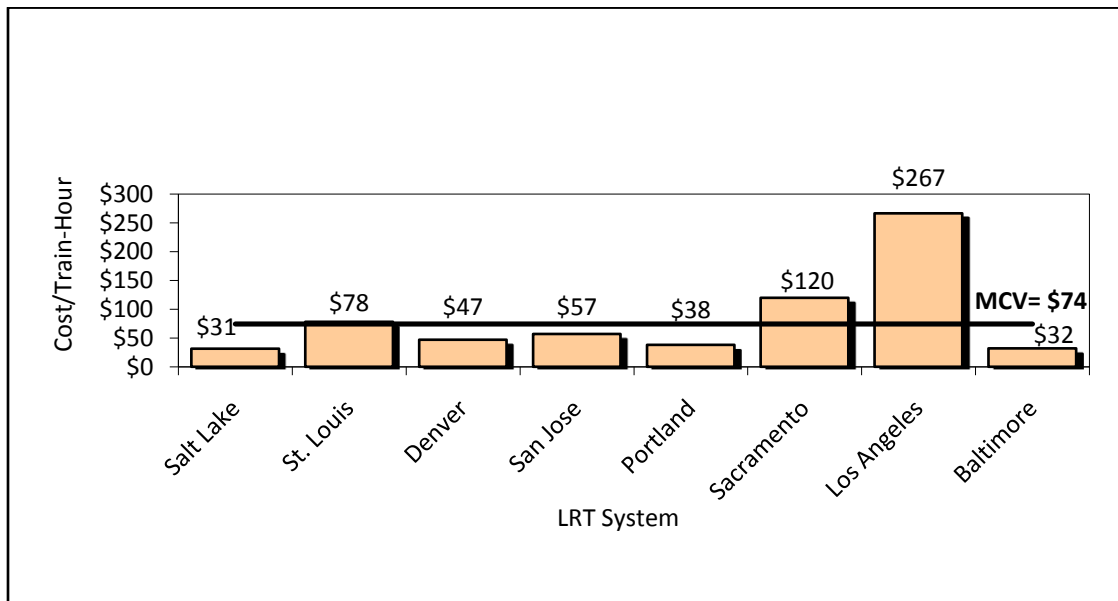


Exhibit 11: Vehicle Maintenance Non-Labor Productivity

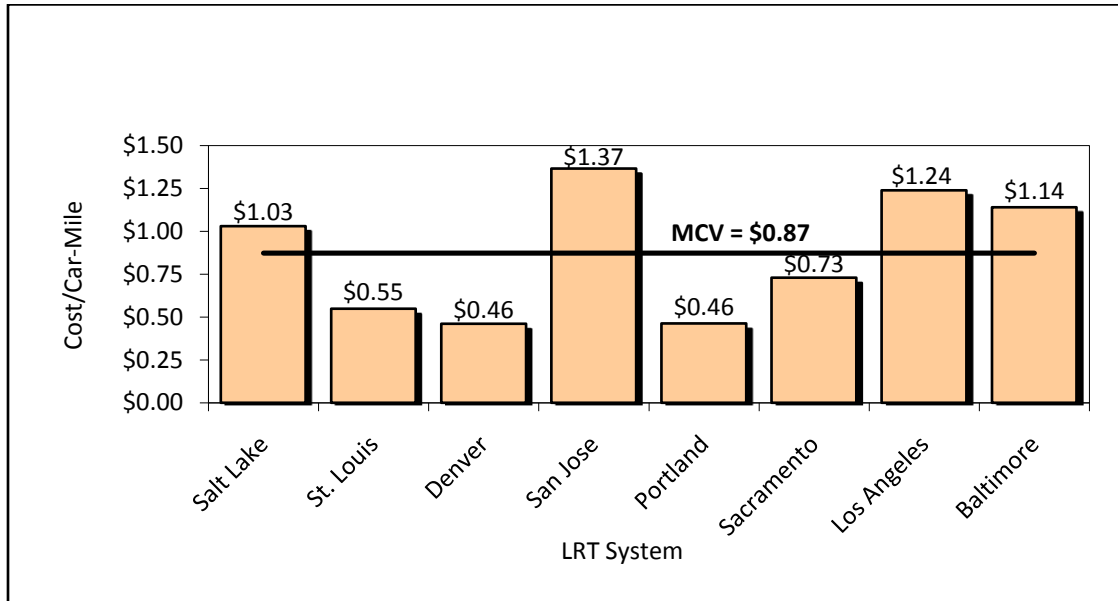


Exhibit 12: Facilities Maintenance Non-Labor Productivity

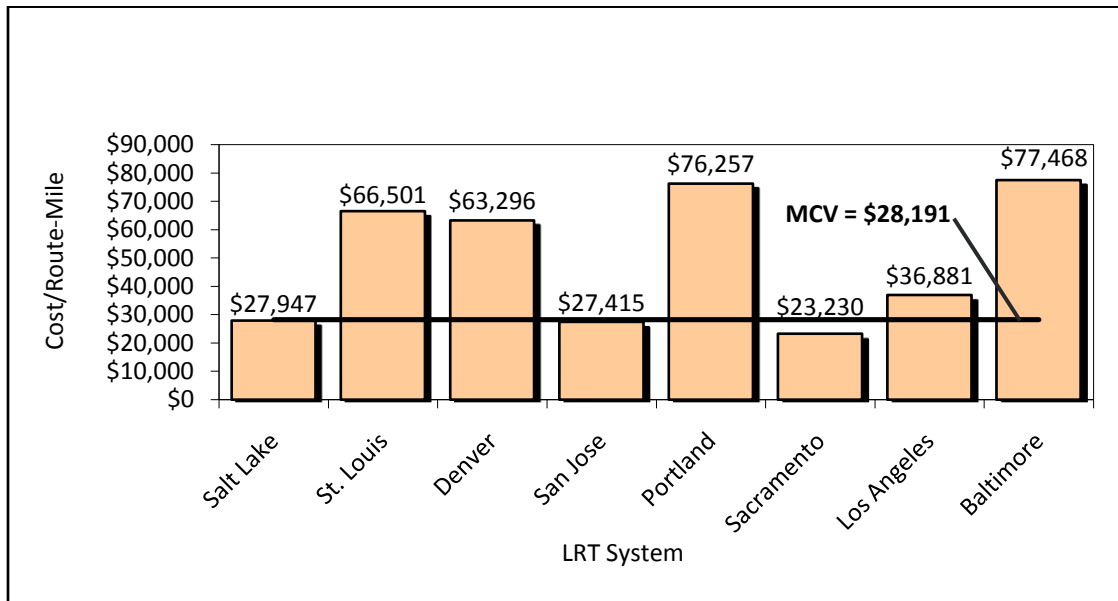
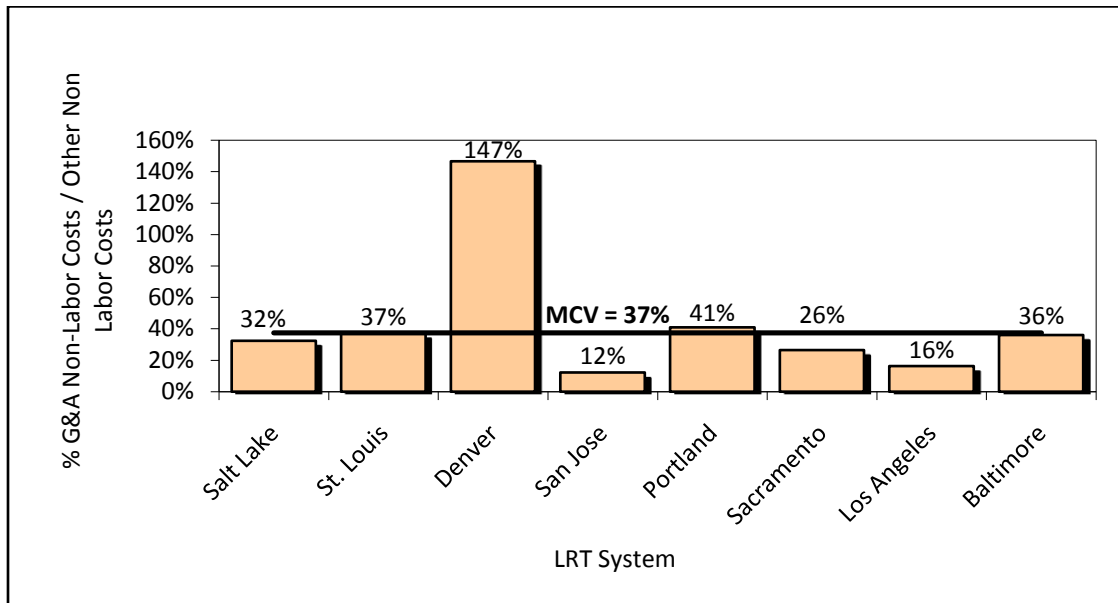


Exhibit 13: General Administration Non-Labor Productivity



4.0 Modern Streetcar O&M Cost Model Adaptation

The modern streetcar O&M cost model was adapted from the primary LRT cost model based on the general assumption that modern streetcar vehicles have higher maintenance productivities for labor and non-labor costs, as well as lower electrical energy consumption rates for traction power. Typical modern streetcar vehicles have shorter overall length, are less wide, and weigh less than most LRT vehicles. This justifies adjustments to the maintenance productivity factors. For example, the energy consumption rate was reduced from 8.0 kwh per car-mile to 6.0 kwh per car-mile. Thus, the vehicle maintenance productivity factors were modified for power maintainers, mechanics and car cleaners, as well as contract services, materials and supplies, and fuel and lubricants. Additional model adaptations include removal of certain administrative, maintenance, and upper management functions and positions to reflect their existence within the current BCT structure; reduction of certain rail facilities maintenance cost items by half of the peer LRT costs; and reduction of the number of supervisors, technicians, maintainers, and other support staff.

5.0 Summary of Alternatives

The results of the O&M cost model runs for the three Build Alternatives are summarized in Exhibits 14 through 16. Costs are reported in 2012 dollars.

Exhibit 14: SR 7/Broward Boulevard Premium Bus Alternative

Input Variables	Input Value
Bus Model Overview	
Annual Revenue Bus-Hours	26,286
Annual Revenue Bus-Miles	825,600
Peak Buses	9
Bus Garages	0
BCT Park & Ride Lots	0
Annual Revenue Demand Response Hours	0
Sub-Total Bus Model O&M Cost	\$2,291,801
Streetcar Model Overview	
Peak Cars	7
Revenue Car-Miles	291,840
Revenue Train-Hours	19,688
Passenger Stations	10
Directional Route Miles	6.4
Maintenance Facilities	1
Sub-Total Streetcar Model O&M Cost	\$3,271,858
Total O&M Cost	\$5,563,659

Exhibit 15: Griffin Road Modern Streetcar Alternative

Input Variables	Input Value
Bus Model Overview	
Annual Revenue Bus-Hours	8,270
Annual Revenue Bus-Miles	241,920
Peak Buses	3
Bus Garages	0
BCT Park & Ride Lots	0
Annual Revenue Demand Response Hours	0
Sub-Total Bus Model O&M Cost	\$704,264
Streetcar Model Overview	
Peak Cars	11
Revenue Car-Miles	738,720
Revenue Train-Hours	32,646
Passenger Stations	22
Directional Route Miles	16.2
Maintenance Facilities	1
Sub-Total Streetcar Model O&M Cost	\$6,529,385
Total O&M Cost	\$7,233,649

Exhibit 16: Griffin Road Premium Bus Alternative

Input Variables	Input Value
Bus Model Overview	
Annual Revenue Bus-Hours	21,730
Annual Revenue Bus-Miles	670,560
Peak Buses	8
Bus Garages	0
BCT Park & Ride Lots	0
Annual Revenue Demand Response Hours	0
Sub-Total Bus Model O&M Cost	\$1,899,500
Streetcar Model Overview	
Peak Cars	7
Revenue Car-Miles	287,280
Revenue Train-Hours	19,437
Passenger Stations	12
Directional Route Miles	6.3
Maintenance Facilities	1
Sub-Total Streetcar Model O&M Cost	\$3,297,965
Total O&M Cost	\$5,197,465

Appendix A: Bus O&M Cost Models

Table 1
CENTRAL BROWARD EAST-WEST TRANSIT STUDY
CBEWT Bus O&M Cost Model
LPA w/Nova & Davie
INPUT STATISTICS

Input Variable	Variable Name	Input Statistics LPA Alternative	Do not Delete	Calibration Statistics		
			2010 Baseline	2009	2008	2007
Annual Revenue Bus-Hours	BUSHR	8,270	1,024,606	1,014,405	1,051,090	1,254,275
Annual Revenue Bus-Miles	BUSMI	241,920	14,049,190	13,878,467	14,245,816	16,879,810
Peak Buses	PKBUS	3	236	240	245	241
Bus Garages	GARAGE	0	2	2	2	2
BCT-Owned Park & Ride	PNR	0	1	1	1	1
Annual Revenue Paratransit Hours	DRHR	0	456,078	550,601	611,262	546,698
Inflation Factor	INFLATE	1.06	1.00	0.99	0.97	0.96
Alternative Name		2012 Calibration	2010 Calibration	2009 Validation	2008 Validation	2007 Validation

Inflation rate based on Bureau of Labor Statistics Data - South CPI (April 2012 - December 2010)

Table 2							
CENTRAL BROWARD EAST-WEST TRANSIT STUDY							
CBEWT Bus O&M Cost Model							
LPA w/Nova & Davie							
LINE ITEM DETAIL WORKSHEET							
2012 Calibration							
Cost Center/Line Item	Function	Section 15 Code	Cost Type	Baseline Cost (\$2010)	Productivity Factor	Driving Variable	Line Item Cost (\$2012)
Bus Transportation							
Operator Wages	10	501.01	LABOR	\$32,739,261	\$31.95	per BUSHR	\$278,910
Other Wages & Salaries	10	501.02	LABOR	\$2,716,366	\$2.65	per BUSHR	\$0
Fringe Benefits	10	502.00	FRINGE	\$14,956,566	42.18%	Bus Transp. salaries & wages	\$0
Contract Services	10	503.00	SERV	\$719,114	\$0.70	per BUSHR	\$6,126
Fuel & Lubricants	10	504.01	MATL	\$11,348,239	\$0.81	per BUSMI	\$206,251
Tires & Tubes	10	504.02	MATL	\$1,161,755	n/a	per PKBUS (50%), BUSMI (50%)	\$18,351
Other Materials & Supplies	10	504.99	MATL	\$17,256	\$0.001228	per BUSMI	\$314
Fuel Tax & Vehicle Registr.	10	507.00	TAX	\$0	n/a	per PKBUS (50%), BUSMI (50%)	\$0
Bus Maintenance							
Salaries & Wages	41	501.02	LABOR	\$9,947,922	\$0.71	per BUSMI	\$0
Fringe Benefits	41	502.00	FRINGE	\$3,378,197	33.96%	of Bus Maint. salaries & wages	\$0
Contract Services	41	503.00	SERV	\$194,992	n/a	per PKBUS (50%), BUSMI (50%)	\$3,080
Fuel & Lubricants (NRV)	41	504.01	MATL	\$226,088	\$958.00	per PKBUS	\$3,033
Other Materials & Supplies	41	504.99	MATL	\$5,249,905	n/a	per PKBUS (50%), BUSMI (50%)	\$82,927
Casualty & Liability	41	506.00	INSUR	\$0	\$0.00	per PKBUS	\$0
Facilities Maintenance							
Salaries & Wages	42	501.02	LABOR	\$408,613	\$0.0291	per BUSMI	\$0
Fringe Benefits	42	502.00	FRINGE	\$176,778	43.26%	of Facilities Maint. salaries & wages	\$0
Contract Services	42	503.00	SERV	\$228,934	n/a	per GARAGE (40%) & PNR (60%)	\$0
Other Materials & Supplies	42	504.99	MATL	\$54,496	n/a	per GARAGE (40%) & PNR (60%)	\$0
Casualty & Liability	42	506.00	INSUR	\$0	\$0.00	per PKBUS	\$0
General & Administrative							
Salaries & Wages	160	501.02	LABOR	\$5,029,007	\$21,309	per PKBUS,	\$0
Fringe Benefits	160	502.00	FRINGE	\$1,773,375	35.26%	of Genl & Admin salaries & wages	\$0
Services	160	503.00	SERV	\$4,750,707	n/a	per PKBUS (50%), BUSMI (50%)	\$75,041
Other Materials & Supplies	160	504.99	MATL	\$86,253	\$365.48	per PKBUS	\$1,157
Utilities	160	505.00	UTIL	\$749,931	\$374,966	per GARAGE	\$0
Casualty & Liability	160	506.00	INSUR	\$2,085,658	\$8,837.53	per PKBUS	\$27,983
Taxes	160	507.00	TAX	\$0	n/a	Fixed	\$0
Miscellaneous Expenses	160	509.00	MISC	\$152,113	0.18%	per Non G&A Costs	\$1,091
Expense Transfers	160	510.00	XFERS	\$0	0.00%	per Non G&A Costs	\$0
Leases & Rentals	160	512.00	LEASE	\$0	0.00%	per Non G&A Costs	\$0
Demand Response	n/a	508.00	PURCH	\$18,588,220	\$40.76	per DRHR	\$0
TOTAL COSTS				\$116,739,746			\$704,264

Table 3
CENTRAL BROWARD EAST-WEST TRANSIT STUDY
CBEWT Bus O&M Cost Model
LPA w/Nova & Davie
O&M COSTS BY FUNCTION AND TYPE
[2012 Calibration](#)

INPUT STATISTICS

Variable	Statistic
Annual Revenue Bus-Hours	8,270
Annual Revenue Bus-Miles	241,920
Peak Buses	3
Bus Garages	0
BCT Park & Ride Lots	0
Annual Revenue Demand Resp. Hours	0

O&M COSTS

Expense Object Class	Object Code	Bus Transportation	Bus Maintenance	Facilities Maintenance	General & Administrative	Paratransit Services	Grand Total
	Sum of Cost (\$2012)	Function					
Expense Object Class	Code	10	41	42	160	n/a	Grand Total
Labor - Operator Salaries/Wages	501.01	\$278,910					\$278,910
Labor - Other Salaries/Wages	501.02	\$0	\$0	\$0	\$0		\$0
Fringe Benefits	502	\$0	\$0	\$0	\$0		\$0
Services	503	\$6,126	\$3,080	\$0	\$75,041		\$84,248
Materials & Supplies - Fuel/Lubricants	504.01	\$206,251	\$3,033				\$209,284
Materials & Supplies - Tires/Tubes	504.02	\$18,351					\$18,351
Materials & Supplies - Other	504.99	\$314	\$82,927	\$0	\$1,157		\$84,398
Utilities	505				\$0		\$0
Casualty/Liability Cost	506		\$0	\$0	\$27,983		\$27,983
Taxes	507	\$0			\$0		\$0
Purchased Transportation	508					\$0	\$0
Miscellaneous Expenses	509				\$1,091		\$1,091
Expense Transfers	510				\$0		\$0
Interest Expenses	512				\$0		\$0
Grand Total		\$509,951	\$89,040	\$0	\$105,273	\$0	\$704,264

Table 1
CENTRAL BROWARD EAST-WEST TRANSIT STUDY
CBEWT Bus O&M Cost Model
SR 7/Broward Alt
INPUT STATISTICS

Input Variable	Variable Name	Input Statistics LPA Alternative	Do not Delete	Calibration Statistics		
			2010 Baseline	2009	2008	2007
Annual Revenue Bus-Hours	BUSHR	26,286	1,024,606	1,014,405	1,051,090	1,254,275
Annual Revenue Bus-Miles	BUSMI	825,600	14,049,190	13,878,467	14,245,816	16,879,810
Peak Buses	PKBUS	9	236	240	245	241
Bus Garages	GARAGE	0	2	2	2	2
BCT-Owned Park & Ride	PNR	0	1	1	1	1
Annual Revenue Paratransit Hours	DRHR	0	456,078	550,601	611,262	546,698
Inflation Factor	INFLATE	1.06	1.00	0.99	0.97	0.96
Alternative Name		2012 Calibration	2010 Calibration	2009 Validation	2008 Validation	2007 Validation

Inflation rate based on Bureau of Labor Statistics Data - South CPI (April 2012 - December 2010)

Table 2							
CENTRAL BROWARD EAST-WEST TRANSIT STUDY							
CBEWT Bus O&M Cost Model							
SR 7/Broward Alt							
LINE ITEM DETAIL WORKSHEET							
2012 Calibration							
Cost Center/Line Item	Function	Section 15 Code	Cost Type	Baseline Cost (\$2010)	Productivity Factor	Driving Variable	Line Item Cost (\$2012)
Bus Transportation							
Operator Wages	10	501.01	LABOR	\$32,739,261	\$31.95	per BUSHR	\$886,509
Other Wages & Salaries	10	501.02	LABOR	\$2,716,366	\$2.65	per BUSHR	\$0
Fringe Benefits	10	502.00	FRINGE	\$14,956,566	42.18%	Bus Transp. salaries & wages	\$0
Contract Services	10	503.00	SERV	\$719,114	\$0.70	per BUSHR	\$19,472
Fuel & Lubricants	10	504.01	MATL	\$11,348,239	\$0.81	per BUSMI	\$703,871
Tires & Tubes	10	504.02	MATL	\$1,161,755	n/a	per PKBUS (50%), BUSMI (50%)	\$59,410
Other Materials & Supplies	10	504.99	MATL	\$17,256	\$0.001228	per BUSMI	\$1,070
Fuel Tax & Vehicle Registr.	10	507.00	TAX	\$0	n/a	per PKBUS (50%), BUSMI (50%)	\$0
Bus Maintenance							
Salaries & Wages	41	501.02	LABOR	\$9,947,922	\$0.71	per BUSMI	\$0
Fringe Benefits	41	502.00	FRINGE	\$3,378,197	33.96%	of Bus Maint. salaries & wages	\$0
Contract Services	41	503.00	SERV	\$194,992	n/a	per PKBUS (50%), BUSMI (50%)	\$9,971
Fuel & Lubricants (NRV)	41	504.01	MATL	\$226,088	\$958.00	per PKBUS	\$9,100
Other Materials & Supplies	41	504.99	MATL	\$5,249,905	n/a	per PKBUS (50%), BUSMI (50%)	\$268,469
Casualty & Liability	41	506.00	INSUR	\$0	\$0.00	per PKBUS	\$0
Facilities Maintenance							
Salaries & Wages	42	501.02	LABOR	\$408,613	\$0.0291	per BUSMI	\$0
Fringe Benefits	42	502.00	FRINGE	\$176,778	43.26%	of Facilities Maint. salaries & wages	\$0
Contract Services	42	503.00	SERV	\$228,934	n/a	per GARAGE (40%) & PNR (60%)	\$0
Other Materials & Supplies	42	504.99	MATL	\$54,496	n/a	per GARAGE (40%) & PNR (60%)	\$0
Casualty & Liability	42	506.00	INSUR	\$0	\$0.00	per PKBUS	\$0
General & Administrative							
Salaries & Wages	160	501.02	LABOR	\$5,029,007	\$21,309	per PKBUS,	\$0
Fringe Benefits	160	502.00	FRINGE	\$1,773,375	35.26%	of Genl & Admin salaries & wages	\$0
Services	160	503.00	SERV	\$4,750,707	n/a	per PKBUS (50%), BUSMI (50%)	\$242,941
Other Materials & Supplies	160	504.99	MATL	\$86,253	\$365.48	per PKBUS	\$3,472
Utilities	160	505.00	UTIL	\$749,931	\$374,966	per GARAGE	\$0
Casualty & Liability	160	506.00	INSUR	\$2,085,658	\$8,837.53	per PKBUS	\$83,950
Taxes	160	507.00	TAX	\$0	n/a	Fixed	\$0
Miscellaneous Expenses	160	509.00	MISC	\$152,113	0.18%	per Non G&A Costs	\$3,566
Expense Transfers	160	510.00	XFERS	\$0	0.00%	per Non G&A Costs	\$0
Leases & Rentals	160	512.00	LEASE	\$0	0.00%	per Non G&A Costs	\$0
Demand Response	n/a	508.00	PURCH	\$18,588,220	\$40.76	per DRHR	\$0
TOTAL COSTS				\$116,739,746			\$2,291,801

Table 3							
CENTRAL BROWARD EAST-WEST TRANSIT STUDY							
CBEWT Bus O&M Cost Model							
SR 7/Broward Alt							
O&M COSTS BY FUNCTION AND TYPE							
2012 Calibration							
INPUT STATISTICS							
Variable	Statistic						
Annual Revenue Bus-Hours	26,286						
Annual Revenue Bus-Miles	825,600						
Peak Buses	9						
Bus Garages	0						
BCT Park & Ride Lots	0						
Annual Revenue Demand Resp. Hours	0						
O&M COSTS							
Expense Object Class	Object Code	Bus Transportation	Bus Maintenance	Facilities Maintenance	General & Administrative	Paratransit Services	Grand Total
	Sum of Cost (\$2012)						
		10	41	42	160	n/a	Grand Total
Labor - Operator Salaries/Wages	501.01	\$886,509					\$886,509
Labor - Other Salaries/Wages	501.02	\$0	\$0	\$0	\$0		\$0
Fringe Benefits	502	\$0	\$0	\$0	\$0		\$0
Services	503	\$19,472	\$9,971	\$0	\$242,941		\$272,385
Materials & Supplies - Fuel/Lubricants	504.01	\$703,871	\$9,100				\$712,972
Materials & Supplies - Tires/Tubes	504.02	\$59,410					\$59,410
Materials & Supplies - Other	504.99	\$1,070	\$268,469	\$0	\$3,472		\$273,011
Utilities	505				\$0		\$0
Casualty/Liability Cost	506		\$0	\$0	\$83,950		\$83,950
Taxes	507	\$0			\$0		\$0
Purchased Transportation	508					\$0	\$0
Miscellaneous Expenses	509				\$3,566		\$3,566
Expense Transfers	510				\$0		\$0
Interest Expenses	512				\$0		\$0
Grand Total		\$1,670,332	\$287,541	\$0	\$333,928	\$0	\$2,291,801

Table 1
CENTRAL BROWARD EAST-WEST TRANSIT STUDY
CBEWT Bus O&M Cost Model
Griffin Alt with Bus
INPUT STATISTICS

Input Variable	Variable Name	Input Statistics LPA Alternative	Do not Delete	Calibration Statistics		
			2010 Baseline	2009	2008	2007
Annual Revenue Bus-Hours	BUSHR	21,730	1,024,606	1,014,405	1,051,090	1,254,275
Annual Revenue Bus-Miles	BUSMI	670,560	14,049,190	13,878,467	14,245,816	16,879,810
Peak Buses	PKBUS	8	236	240	245	241
Bus Garages	GARAGE	0	2	2	2	2
BCT-Owned Park & Ride	PNR	0	1	1	1	1
Annual Revenue Paratransit Hours	DRHR	0	456,078	550,601	611,262	546,698
Inflation Factor	INFLATE	1.06	1.00	0.99	0.97	0.96
Alternative Name		2012 Calibration	2010 Calibration	2009 Validation	2008 Validation	2007 Validation

Inflation rate based on Bureau of Labor Statistics Data - South CPI (April 2012 - December 2010)

Table 2							
CENTRAL BROWARD EAST-WEST TRANSIT STUDY							
CBEWT Bus O&M Cost Model							
Griffin Alt with Bus							
LINE ITEM DETAIL WORKSHEET							
2012 Calibration							
Cost Center/Line Item	Function	Section 15 Code	Cost Type	Baseline Cost (\$2010)	Productivity Factor	Driving Variable	Line Item Cost (\$2012)
Bus Transportation							
Operator Wages	10	501.01	LABOR	\$32,739,261	\$31.95	per BUSHR	\$732,855
Other Wages & Salaries	10	501.02	LABOR	\$2,716,366	\$2.65	per BUSHR	\$0
Fringe Benefits	10	502.00	FRINGE	\$14,956,566	42.18%	Bus Transp. salaries & wages	\$0
Contract Services	10	503.00	SERV	\$719,114	\$0.70	per BUSHR	\$16,097
Fuel & Lubricants	10	504.01	MATL	\$11,348,239	\$0.81	per BUSMI	\$571,691
Tires & Tubes	10	504.02	MATL	\$1,161,755	n/a	per PKBUS (50%), BUSMI (50%)	\$50,046
Other Materials & Supplies	10	504.99	MATL	\$17,256	\$0.001228	per BUSMI	\$869
Fuel Tax & Vehicle Registr.	10	507.00	TAX	\$0	n/a	per PKBUS (50%), BUSMI (50%)	\$0
Bus Maintenance							
Salaries & Wages	41	501.02	LABOR	\$9,947,922	\$0.71	per BUSMI	\$0
Fringe Benefits	41	502.00	FRINGE	\$3,378,197	33.96%	of Bus Maint. salaries & wages	\$0
Contract Services	41	503.00	SERV	\$194,992	n/a	per PKBUS (50%), BUSMI (50%)	\$8,400
Fuel & Lubricants (NRV)	41	504.01	MATL	\$226,088	\$958.00	per PKBUS	\$8,089
Other Materials & Supplies	41	504.99	MATL	\$5,249,905	n/a	per PKBUS (50%), BUSMI (50%)	\$226,155
Casualty & Liability	41	506.00	INSUR	\$0	\$0.00	per PKBUS	\$0
Facilities Maintenance							
Salaries & Wages	42	501.02	LABOR	\$408,613	\$0.0291	per BUSMI	\$0
Fringe Benefits	42	502.00	FRINGE	\$176,778	43.26%	of Facilities Maint. salaries & wages	\$0
Contract Services	42	503.00	SERV	\$228,934	n/a	per GARAGE (40%) & PNR (60%)	\$0
Other Materials & Supplies	42	504.99	MATL	\$54,496	n/a	per GARAGE (40%) & PNR (60%)	\$0
Casualty & Liability	42	506.00	INSUR	\$0	\$0.00	per PKBUS	\$0
General & Administrative							
Salaries & Wages	160	501.02	LABOR	\$5,029,007	\$21,309	per PKBUS,	\$0
Fringe Benefits	160	502.00	FRINGE	\$1,773,375	35.26%	of Genl & Admin salaries & wages	\$0
Services	160	503.00	SERV	\$4,750,707	n/a	per PKBUS (50%), BUSMI (50%)	\$204,650
Other Materials & Supplies	160	504.99	MATL	\$86,253	\$365.48	per PKBUS	\$3,086
Utilities	160	505.00	UTIL	\$749,931	\$374,966	per GARAGE	\$0
Casualty & Liability	160	506.00	INSUR	\$2,085,658	\$8,837.53	per PKBUS	\$74,622
Taxes	160	507.00	TAX	\$0	n/a	Fixed	\$0
Miscellaneous Expenses	160	509.00	MISC	\$152,113	0.18%	per Non G&A Costs	\$2,940
Expense Transfers	160	510.00	XFERS	\$0	0.00%	per Non G&A Costs	\$0
Leases & Rentals	160	512.00	LEASE	\$0	0.00%	per Non G&A Costs	\$0
Demand Response	n/a	508.00	PURCH	\$18,588,220	\$40.76	per DRHR	\$0
TOTAL COSTS				\$116,739,746			\$1,899,500

Appendix B: LRT O&M Cost Models

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

LPA w/Nova & Davie

Table 1. Input Statistics

		TEST CASE	CALIBRATION SYSTEMS								BASE
<i>Variable</i>	<i>Code</i>	<i>Alignment Calibration</i>	<i>FY 10 Salt Lake City</i>	<i>FY 10 St. Louis</i>	<i>FY 10 Denver</i>	<i>FY 10 San Jose</i>	<i>FY 10 Portland</i>	<i>FY 10 Sacramento</i>	<i>FY 10 Los Angeles</i>	<i>FY 10 Baltimore</i>	<i>12/10 Calibration</i>
Peak Cars	PKCAR	11	43	50	104	47	110	56	118	38	71
Revenue Car-Miles	CARMI	738,720	3,248,740	5,818,779	7,969,738	3,019,865	8,145,575	4,073,674	9,645,684	3,179,325	5,637,673
Revenue Train-Hours	TRNHR	32,646	84,644	116,669	183,865	133,236	305,050	81,226	187,402	84,579	147,084
Passenger Stations	STATION	22	28	37	36	65	38	48	53	33	42
Directional Route Miles	RTMILE	16	39.4	91.1	70.0	81.0	112.4	73.8	121.1	57.6	81
Maintenance Facilities	YARD	1.0	1	2	2	1	4	2	3	2	2.1
Inflation Factor	INFLATE	1.06									1.00
Alternative Name	NAME	04/12 Calibration									12/10 Calibration
Total Oper Cost Efficiencies			\$28,006,024	\$53,945,130	\$71,424,851	\$56,685,665	\$106,374,746	\$47,846,225	\$167,914,954	\$39,400,273	\$71,449,734
	Cost/Peak Car		\$651,303	\$1,078,903	\$686,777	\$1,206,078	\$967,043	\$854,397	\$1,423,008	\$1,036,849	\$988,045
	Cost/Car-Mile		\$8.62	\$9.27	\$8.96	\$18.77	\$13.06	\$11.75	\$17.41	\$12.39	\$12.53
	Cost/Train-Hour		\$331	\$462	\$388	\$425	\$349	\$589	\$896	\$466	\$488
	Cost/Station		\$1,000,215	\$1,457,976	\$1,984,024	\$872,087	\$2,799,335	\$996,796	\$3,168,207	\$1,193,948	\$1,684,074
	Cost/Track-Mile		\$711,354	\$592,413	\$1,020,355	\$700,169	\$946,731	\$648,499	\$1,386,352	\$684,033	\$836,238
Labor Productivity											
	Vehicle Operations	Train Hrs. / Emp.	910	759	673	994	1,178	700	502	621	792
	Vehicle Maintenance	Car Miles. / Emp.	39,141	108,156	104,044	38,716	52,893	59,907	45,714	51,279	62,481
	Facilities Maintenance	Dir. Rt. Miles/Emp.	0.54	0.95	0.83	0.90	0.84	1.45	0.61	0.74	0.86
	Rail Admin. & Support	% Non G&A FTE's	17%	22%	14%	20%	15%	27%	14%	2%	16%
Non-Labor Productivity											
	Vehicle Operations	Non Labor Cost/Train Hrs.	\$31	\$78	\$47	\$57	\$38	\$120	\$267	\$32	\$84
	Vehicle Maintenance	Non Labor Cost/Car Mile	\$1.03	\$0.55	\$0.46	\$1.37	\$0.46	\$0.73	\$1.24	\$1.14	\$0.87
	Facilities Maintenance	Non Labor Cost/Dir. Rt. Miles	\$27,947.12	\$66,500.66	\$63,295.70	\$27,414.65	\$76,257.11	\$23,229.82	\$36,881.38	\$77,467.53	\$49,874.25
	Rail Admin. & Support	% Non G&A Non-labor Costs	32%	37%	147%	12%	41%	26%	16%	36%	43%

Source: RY 2010 National Transit Database Reports.

CENTRAL BROWARD EAST-WEST TRANSIT STUDY					
CBEWT Streetcar O&M Cost Model					
LPA w/Nova & Davie					
Table 2. Labor Cost Listing - Metro Dade Transit, FL					
			2012	Fringe	
Position	Lookup	Salary/Wage		Rate	Total
Rail Transportation					
General Superintendent MDT (8473)	10.01	\$87,266		26.00%	\$109,955
Chief Supervisor Rail Traffic Control (8161)	10.02	\$77,863		26.00%	\$98,107
Rail Traffic Controller (8160)	10.03	\$53,770		26.00%	\$67,750
Instructor (Ops & Maintenance)	10.04	\$46,107		26.00%	\$58,094
Secretary (0031)	10.05	\$29,808		26.00%	\$37,559
Rail Supervisor (8163)	10.06	\$46,231		26.00%	\$58,251
Train Operator (8073)	10.07	\$34,611		26.00%	\$43,610
Fare Inspector	10.08	\$31,387		26.00%	\$39,548
Rail Vehicle Maintenance					
General Superintendent MDT (8473)	20.01	\$87,266		26.00%	\$109,955
Administrative Secretary (0094)	20.02	\$31,218		26.00%	\$39,335
Chief Supervisor Rail Vehicle Repair (8169)	20.03	\$68,601		26.00%	\$86,438
Rail Stock Clerk (8074)	20.04	\$34,299		26.00%	\$43,217
MDT Operation Maintenance Instructor (Rail Maintenance) (8106)	20.05	\$46,107		26.00%	\$58,094
Foreman, LRV Shops	20.06	\$46,107		26.00%	\$58,094
Rail Vehicle Mechanic (8071)	20.07	\$45,427		26.00%	\$57,238
Rail Maintenance Worker (8063)	20.08	\$31,387		26.00%	\$39,548
Rail Vehicle Cleaner (8069)	20.09	\$31,387		26.00%	\$39,548
Rail Facilities Maintenance					
Chief MDT Facilities Maintenance (8331)	30.01	\$81,158		26.00%	\$102,260
Secretary (0031)	30.02	\$29,808		26.00%	\$37,559
General Superintendent Track & Guideway (8473)	30.03	\$87,266		26.00%	\$109,955
Manager, Power & Signals	30.04	\$46,107		26.00%	\$58,094
MDT Property Manager (8265)	30.05	\$39,014		26.00%	\$49,158
Rail Structure & Track Supervisor (8180)	30.06	\$52,615		26.00%	\$66,295
Supervisor, Power	30.07	\$46,107		26.00%	\$58,094
Facilities Maintenance Supervisor	30.08	\$39,014		26.00%	\$49,158
Account Clerk (0310)	30.09	\$27,806		26.00%	\$35,036
Track Repairer (8064)	30.10	\$32,698		26.00%	\$41,199
Power Maintainer	30.11	\$45,427		26.00%	\$57,238
Transit Facilities Maintainer	30.12	\$45,427		26.00%	\$57,238
Electrician	30.13	\$39,014		26.00%	\$49,158
Power Inspector	30.14	\$45,427		26.00%	\$57,238
Rail Vehicle Electronic Technician (8068)	30.15	\$46,679		26.00%	\$58,816
Mechanic Helper	30.16	\$29,808		26.00%	\$37,559
LRT General Administration					
General Manager	40.01	\$153,285		26.00%	\$193,140
Chief Safety & Security	40.02	\$77,863		26.00%	\$98,107
MDT, Grant Resources (0346)	40.03	\$87,378		26.00%	\$110,096
Operations Analyst	40.04	\$34,299		26.00%	\$43,217
Transit Administrative Coordinator (8310)	40.05	\$58,058		26.00%	\$73,154
MDT Field Test Engineer (Civil) (8358)	40.06	\$91,646		26.00%	\$115,474
MDT Field Test Engineer (Electrical) (8358)	40.07	\$91,646		26.00%	\$115,474
Engineering Technician	40.08	\$34,299		26.00%	\$43,217
NOTES:					
1.	Comparable existing MDT positions are matched to new LRT positions.				
2.	Wage data from MDT FY 2012 salary and wage data.				
3.	Fringe benefit rate provided by MDT.				
4.	No inflation assumed:		1.00		

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

LPA w/Nova & Davie

Table 3a. Non-Labor Cost Listing

<i>Cost Item</i>	<i>Salt Lake</i>	<i>St. Louis</i>	<i>Denver</i>	<i>San Jose</i>	<i>Portland</i>	<i>Sacramento</i>	<i>Los Angeles</i>	<i>Baltimore</i>	<i>Average</i>
Vehicle Operations									
Contract Services	\$22,426	\$6,475,126	\$3,275,705	\$3,436,682	\$7,380,872	\$5,533,499	\$36,775,838	\$52,504	\$7,869,082
Materials & Supplies	\$0	\$161,326	\$86,686	\$28,619	\$134,439	\$237,263	\$60,517	\$196,267	\$113,140
Miscellaneous	\$19,836	\$2,364	\$30,983	\$56,351	\$0	\$24,004	\$0	\$6,192	\$17,466
Propulsion Power	\$2,600,654	\$2,466,842	\$5,274,759	\$4,087,109	\$4,085,751	\$3,951,671	\$13,152,029	\$2,460,431	\$4,759,906
Subtotal	\$2,642,916	\$9,105,658	\$8,668,133	\$7,608,761	\$11,601,062	\$9,746,437	\$49,988,384	\$2,715,394	\$12,759,593
<i>Oper. Cost/Train-Hour</i>	<i>\$31.22</i>	<i>\$78.05</i>	<i>\$47.14</i>	<i>\$57.11</i>	<i>\$38.03</i>	<i>\$119.99</i>	<i>\$266.74</i>	<i>\$32.10</i>	<i>\$86.75</i>
Vehicle Maintenance									
Contract Services	\$178,269	\$643,515	\$84,722	\$419,499	\$71,403	\$193,922	\$7,006	\$255,162	\$231,687
Materials & Supplies	\$2,947,331	\$2,309,824	\$3,437,915	\$3,381,088	\$3,528,062	\$2,710,861	\$11,770,737	\$2,820,029	\$4,113,231
Miscellaneous	\$3,370	\$3,842	\$55,426	\$39,120	\$0	\$22,077	\$0	\$511,058	\$79,362
Fuel & Lube	\$218,658	\$234,056	\$89,065	\$282,749	\$164,887	\$45,352	\$175,490	\$38,275	\$156,067
Subtotal	\$3,347,628	\$3,191,237	\$3,667,128	\$4,122,456	\$3,764,352	\$2,972,212	\$11,953,233	\$3,624,524	\$4,580,346
<i>Veh. Maint. Cost/Car-Mile</i>	<i>\$1.03</i>	<i>\$0.55</i>	<i>\$0.46</i>	<i>\$1.37</i>	<i>\$0.46</i>	<i>\$0.73</i>	<i>\$1.24</i>	<i>\$1.14</i>	<i>\$0.81</i>
Facilities Maintenance									
Materials & Supplies	\$506,903	\$1,330,599	\$747,177	\$682,222	\$7,175,601	\$992,682	\$1,672,571	\$641,730	
Track/Way/Signals	\$167,278	\$1,317,293	\$239,097	\$204,667	\$4,664,141	\$327,585	\$669,028	\$385,038	\$996,766
Stations	\$167,278	\$13,306	\$448,306	\$307,000	\$1,435,120	\$327,585	\$501,771	\$192,519	\$424,111
Yard/Shop/Central Control	\$167,278	\$0	\$59,774	\$170,556	\$1,076,340	\$327,585	\$501,771	\$64,173	\$295,935
Contract Services	\$604,489	\$4,724,951	\$3,683,522	\$1,708,076	\$1,392,648	\$731,141	2794502	3820400	
Track/Way/Signals	\$199,481	\$4,724,951	\$1,510,244	\$1,024,846	\$905,221	\$365,571	\$1,117,801	\$382,040	\$1,278,769
Stations	\$199,481	\$0	\$147,341	\$256,211	\$278,530	\$365,571	\$838,351	\$3,056,320	\$642,726
Yard/Shop/Central Control	\$199,481	\$0	\$2,025,937	\$256,211	\$208,897	\$0	\$838,351	\$382,040	\$488,865
Miscellaneous	\$35,800	\$54,567	\$432	\$66,061	\$0	\$9,538	\$0	\$10,010	\$22,051
Subtotal	\$1,100,278	\$6,055,550	\$4,430,699	\$2,219,490	\$8,568,249	\$1,713,896	\$4,467,073	\$4,462,130	\$4,149,222
<i>Fac. Maint. Cost/Track-Mile</i>	<i>\$27,947</i>	<i>\$66,501</i>	<i>\$63,296</i>	<i>\$27,415</i>	<i>\$76,257</i>	<i>\$23,230</i>	<i>\$36,881</i>	<i>\$77,468</i>	<i>\$51,364</i>
<i>Fac. Maint. Cost/Station</i>	<i>\$39,296</i>	<i>\$163,664</i>	<i>\$123,075</i>	<i>\$34,146</i>	<i>\$225,480</i>	<i>\$35,706</i>	<i>\$84,284</i>	<i>\$135,216</i>	<i>\$98,206</i>
LRT General Administration									
Contract Services	\$704,338	\$2,179,190	\$22,578,023	\$576,478	\$6,463,875	\$1,838,955	\$5,669,538	\$47,837	\$5,007,279
Materials & Supplies	\$121,725	\$699,992	\$389,339	\$258,712	\$504,878	\$245,547	\$1,529,118	\$615,899	\$545,651
Miscellaneous	\$238,721	\$187,716	\$699,731	\$137,444	\$1,086,152	\$166,263	\$956,564	\$7,606	\$435,025
Casualty & Liability	\$148,496	\$1,095,585	\$52,189	\$289,406	\$23,528	\$488,555	\$556,259	\$1,046,485	\$462,563
Casualty & Liability	\$148,496	\$1,095,585	\$52,189	\$289,406	\$23,528	\$488,555	\$556,259	\$1,046,485	\$462,563
Taxes	\$0	\$39,799	\$28,171	\$0	\$0	\$51,969	\$19,740	\$0	\$17,460
Utilities	\$465,468	\$757,987	\$383,178	\$68,661	\$849,985	\$263,203	\$762,469	\$560,989	\$513,992
Utilities	\$465,468	\$757,987	\$383,178	\$68,661	\$849,985	\$263,203	\$762,469	\$560,989	\$513,992
Subtotal	\$2,292,711	\$6,813,841	\$24,565,996	\$1,688,768	\$9,801,931	\$3,806,249	\$10,812,415	\$3,886,290	\$7,958,525
<i>Admin. Cost/Peak Car</i>	<i>\$53,319</i>	<i>\$136,277</i>	<i>\$236,212</i>	<i>\$35,931</i>	<i>\$89,108</i>	<i>\$67,969</i>	<i>\$91,631</i>	<i>\$102,271</i>	<i>\$112,488</i>
TOTAL	\$9,383,533	\$25,166,286	\$41,331,956	\$15,639,475	\$33,735,594	\$18,238,794	\$77,221,105	\$14,688,338	\$29,447,686

NOTES:

1. Cost for insurance and utilities, other than traction power, have been split between two lines on this worksheet. 50% to yard and shops and 50% to passenger stations.
2. Non-labor costs are from FY 2010 National Transit Database Reports.
3. \$2010 inflated to ___ Budget with CPI-U: 1.0000 (South CPI, Dec. 2010)

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

LPA w/Nova & Davie

Table 3b. Non-Labor Unit Costs

Cost Item	Code	Driving Variable	UNIT COSTS							Average	Use	Unit Cost x Unit	
			Salt Lake	St. Louis	Denver	San Jose	Portland	Sacramento	Los Angeles				Baltimore
Vehicle Operations													
Contract Services	100.1	TRNHR	\$0.26	\$55.50	\$17.82	\$25.79	\$24.20	\$68.12	\$196.24	\$0.62	\$27.47	\$27.47 ^{1.}	\$4,040,936
Materials & Supplies	100.2	VO empl	\$0	\$1,050	\$318	\$214	\$519	\$2,045	\$162	\$1,441	\$529.01	\$529.01 ^{2.}	\$101,695
Miscellaneous	100.3	VO empl	\$213	\$15	\$113	\$421	\$0	\$207	\$0	\$45	\$126.89	\$126.89	\$24,392
Propulsion Power	100.4	CARMI	\$0.80	\$0.42	\$0.66	\$1.35	\$0.50	\$0.97	\$1.36	\$0.77	\$0.86	\$0.86	\$4,826,379
											\$8,993,402		
											Veh. Operations Cost/Train-Hr =	\$61.14	
Vehicle Maintenance													
Contract Services	200.1	CARMI	\$0.05	\$0.11	\$0.01	\$0.14	\$0.01	\$0.05	\$0.00	\$0.08	\$0.06	\$0.06	\$318,784
Materials & Supplies	200.2	CARMI	\$0.91	\$0.40	\$0.43	\$1.12	\$0.43	\$0.67	\$1.22	\$0.89	\$0.76	\$0.76	\$4,271,281
Miscellaneous	200.3	VM empl	\$41	\$71	\$724	\$502	\$0	\$325	\$0	\$8,243	\$237.40	\$237.40 ^{3.}	\$23,336
Fuel & Lube	200.4	PKCAR	\$5,085	\$4,681	\$856	\$6,016	\$1,499	\$810	\$1,487	\$1,007	\$2,680.22	\$2,680.22	\$189,626
											\$4,803,027		
											Veh. Maintenance Cost/Car-Mile =	\$0.85	
Facilities Maintenance													
Materials & Supplies													
Track/Way/Signals	300.1	RTMILE	\$4,249	\$14,466	\$3,416	\$2,528	\$41,511	\$4,440	\$5,524	\$6,685	\$5,901.02	\$5,901.02 ^{4.}	\$476,692
Stations	300.2	STATION	\$4,249	\$360	\$12,453	\$4,723	\$37,766	\$4,440	\$9,467	\$5,834	\$5,932.26	\$5,932.26 ^{4.}	\$250,638
Yard/Shop/Central Ctr.	300.3	YARD	\$4,249	\$0	\$29,887	\$170,556	\$269,085	\$4,440	\$167,257	\$32,087	\$14,132.49	\$14,132.49 ^{1,4,5}	\$30,032
Contract Services													
Track/Way/Signals	300.4	RTMILE	\$5,067	\$51,888	\$21,575	\$12,659	\$8,056	\$4,955	\$9,229	\$6,633	\$7,766.39	\$7,766.39 ^{6,7}	\$627,378
Stations	300.5	STATION	\$5,067	\$0	\$4,093	\$3,942	\$7,330	\$7,616	\$15,818	\$92,616	\$4,674.52	\$4,674.52 ^{1,3}	\$197,499
Yard/Shop/Central Ctr.	300.6	YARD	\$5,067	\$0	\$1,012,969	\$256,211	\$52,224	\$0	\$279,450	\$191,020	\$111,996.11	\$111,996.11 ⁷	\$237,992
Miscellaneous	300.7	FM empl	\$494	\$567	\$5	\$734	\$0	\$187	\$0	\$128	\$264.45	\$264	\$26,601
											\$1,846,831		
											Fac. Maint. Cost/Track-Mile =	\$22,862	
											Fac. Maint. Cost/Station =	\$43,712	
General Administration													
Contract Services	400.1	PKCAR	\$16,380	\$43,584	\$217,096	\$12,265	\$58,763	\$32,838	\$48,047	\$1,259	\$30,448.00	\$30,448 ⁷	\$2,154,196
Materials & Supplies	400.2	Total empl	\$420	\$1,887	\$786	\$715	\$802	\$824	\$1,720	\$2,180	\$1,166.68	\$1,167	\$527,529
Miscellaneous	400.3	Total empl	\$824	\$506	\$1,412	\$380	\$1,725	\$558	\$1,076	\$27	\$813.48	\$813	\$367,825
Casualty & Liability	400.4	CARMI	\$0.05	\$0.19	\$0.01	\$0.10	\$0.00	\$0.12	\$0.06	\$0.33	\$0.11	\$0	\$596,195
Casualty & Liability	400.5	RTMILE	\$3,772	\$12,031	\$746	\$3,575	\$209	\$6,622	\$4,593	\$18,168	\$3,252.64	\$3,253 ^{3,6}	\$262,752
Taxes	400.6	PKCAR	\$0	\$796	\$271	\$0	\$0	\$928	\$167	\$0	\$270.27	\$270	\$19,122
Utilities	400.7	STATION	\$16,624	\$20,486	\$10,644	\$1,056	\$22,368	\$5,483	\$14,386	\$17,000	\$13,505.93	\$13,506	\$570,625
Utilities	400.8	YARD	\$465,468	\$378,994	\$191,589	\$68,661	\$212,496	\$131,602	\$254,156	\$280,495	\$247,932.40	\$247,932	\$526,856
											\$5,025,101		
											Admin. Cost/Peak Car =	\$71,026	
											Calibration Non-Labor Cost	\$20,668,361	

NOTES: The following cities were not included in the calculation of average unit costs where specified, because they were considered outliers:

1. Los Angeles
2. Sacramento
3. Baltimore
4. Portland
5. San Jose
6. St. Louis
7. Denver

Calculation of Propulsion Power Costs		Estimated kwh per month = 369,360				
CHARGE	UNIT COST	MONTHLY COST		ANNUAL COST		
1 Customer Charge	\$179.19	\$1,434		\$17,202		
2 Energy Charge		6.0 kwh per REVCARMI \$0.1019	\$37,627	\$451,519		
3 Demand Charge		13.2 KW per substation \$7.60	\$803	\$9,631		
TOTAL STREETCAR TRACTION POWER				\$478,352		
Cost per kwh =				\$0.11		
Cost per Rev. Car-Mile =				\$0.65		
<p>1. FPL Business Rate Schedule GSLD-2 (General Service Large Demand), effective 1/1/12. 2. One Customer Charge assumed for each substation; assume 1 substation per route-mile. 3. Average energy consumption rate for Salt Lake City, St. Louis, San Jose and Portland (see calculation below). 4. Maximum demand assumed supplied to each substation = 13.2KV (Portland); assume 1 substation per route-mile. 5. Assume negotiated rates with no transmission/distribution charges and no rate riders.</p>						
				Average kwh Consumption Rate		
	Propulsion \$	\$/kwh		kwh	rev. car-mi	kwh/rev. car-mi
	\$2,600,654	\$0.11	<i>Salt Lake</i>	23,196,953	2,982,557	7.78
	\$2,466,842	\$0.07	<i>St. Louis</i>	36,302,117	5,024,244	7.23
	\$4,087,109	\$0.18	<i>San Jose</i>	22,358,361	2,459,638	9.09
	\$4,085,751	\$0.08	<i>Portland</i>	53,556,304	6,023,056	8.89
	\$13,240,356	\$0.10	Subtotal	135,413,735	16,489,495	8.21 <<< Use 8.0
	\$3,951,671	\$0.11	<i>Sacramento</i>	34,946,640	3,429,277	10.19
	\$4,072,291	\$0.06	<i>Dallas</i>	70,181,785	5,153,160	13.62
	\$5,274,759	\$0.11	<i>Denver</i>	46,339,256	3,869,345	11.98
	\$13,152,029	\$0.14	<i>Los Angeles</i>	95,971,346	8,114,242	11.83
	\$2,460,431	\$0.07	<i>Baltimore</i>	33,758,160	2,060,331	16.38
	\$42,151,537	\$0.10	Total	416,610,922	39,115,850	10.65

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

LPA w/Nova & Davie

Table 4. Line Item Detail

04/12 Calibration

Cost Item	Dept.	Code	Type	Annual Earnings	Productivity Factor	Driver	FTEs	Annual Cost (04/'12 dollars)
Rail Vehicle Operations								
General Superintendent MDT (8473)	100	10.01	LABOR	\$109,955	0	Fixed	0.0	\$0
Chief Supervisor Rail Traffic Control (8161)	100	10.02	LABOR	\$98,107	0	# of Controllers	0.0	\$0
Rail Traffic Controller (8160)	100	10.03	LABOR	\$67,750	0	# of Operators	0.0	\$0
Instructor (Ops & Maintenance)	100	10.04	LABOR	\$58,094	0.020	# of Operators	1.0	\$58,094
Secretary (0031)	100	10.05	LABOR	\$37,559	0	YARD	0.0	\$0
Rail Supervisor (8163)	100	10.06	LABOR	\$58,251	0.17	# of Operators	4.0	\$233,004
Train Operator (8073)	100	10.07	LABOR	\$43,610	0.769	TRNHR	25.0	\$1,090,253
Fare Inspector	100	10.08	LABOR	\$39,548	0.015	CARMI	7.0	\$276,835
Overtime, Operators	100		LABOR		5.0%	Operator Wages		\$54,513
Overtime, Other ATU Empl.	100		LABOR		5.0%	Other ATU Wages		\$13,842
System Police Officers	100		SERV		\$0.394	1,000 TRNHR		\$0
Other Contract Services	100	100.1	SERV		\$27.47	TRNHR		\$946,658
Materials & Supplies	100	100.2	MATL		\$529	Dept. Employee		\$20,659
Miscellaneous	100	100.3	MISC		\$126.89	Dept. Employee		\$4,955
<u>Propulsion Power</u>	<u>100</u>	<u>100.4</u>	<u>UTIL</u>		n/a	Calculated Separately		\$478,352
Subtotal							37.0	\$3,177,165
						<i>Train-Hours/Operations Employee</i>		882.3
						<i>Operations Non-Labor Cost/Train-Hour</i>		\$44.43
Rail Vehicle Maintenance								
General Superintendent MDT (8473)	200	20.01	LABOR	\$109,955	0	Fixed	0.0	\$0
Administrative Secretary (0094)	200	20.02	LABOR	\$39,335	0	YARD	0.0	\$0
Chief Supervisor Rail Vehicle Repair (8169)	200	20.03	LABOR	\$86,438	0	YARD	0.0	\$0
Rail Stock Clerk (8074)	200	20.04	LABOR	\$43,217	2.0	Shifts, YARD	2.0	\$86,434
MDT Operation Maintenance Instructor (Rail Maintenance) (8106)	200	20.05	LABOR	\$58,094	1.0	YARD	0.0	\$0
Foreman, LRV Shops	200	20.06	LABOR	\$58,094	2.0	Shifts, YARD	2.0	\$116,189
Rail Vehicle Mechanic (8071)	200	20.07	LABOR	\$57,238	0.133	10,000 CARMI	10.0	\$572,383
Rail Maintenance Worker (8063)	200	20.08	LABOR	\$39,548	0.167	# Elec./Mech.	0.0	\$0
Rail Vehicle Cleaner (8069)	200	20.09	LABOR	\$39,548	0.20	PKCAR	2.0	\$79,096
Overtime, ATU Employees	200		LABOR		5.0%	Dept. ATU Wages		\$36,896
Contract Services	200	200.1	SERV		\$0.06	CARMI		\$33,066
Materials & Supplies	200	200.2	MATL		\$0.76	CARMI		\$443,043
Miscellaneous	200	200.3	MISC		\$237.40	Dept. Employee		\$4,009
<u>Fuel & Lube</u>	<u>200</u>	<u>200.4</u>	<u>FUEL</u>		\$2,680.22	PKCAR		\$31,118
Subtotal							16.0	\$1,402,233
						<i>Car-Miles/Vehicle Maint. Employee</i>		46,170
						<i>Veh. Maint. Non-Labor Cost/Car-Mile</i>		\$0.69

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

LPA w/Nova & Davie

Table 4. Line Item Detail

04/12 Calibration

Cost Item	Dept.	Code	Type	Annual Earnings	Productivity Factor	Driver	FTEs	Annual Cost (04/'12 dollars)	
Rail Facilities Maintenance									
Chief MDT Facilities Maintenance (8331)	300	30.01	LABOR	\$102,260	0	Fixed	0.0	\$0	
Secretary (0031)	300	30.02	LABOR	\$37,559	0	YARD	0.0	\$0	
General Superintendent Track & Guideway (8473)	300	30.03	LABOR	\$109,955	0	Fixed	0.0	\$0	
Manager, Power & Signals	300	30.04	LABOR	\$58,094	0	Fixed	0.0	\$0	
MDT Property Manager (8265)	300	30.05	LABOR	\$49,158	0	Fixed	0.0	\$0	
Rail Structure & Track Supervisor (8180)	300	30.06	LABOR	\$66,295	0.2	# T&W Maint.	1.0	\$66,295	
Supervisor, Power	300	30.07	LABOR	\$58,094	0.2	# P&S Maint.	1.0	\$58,094	
Facilities Maintenance Supervisor	300	30.08	LABOR	\$49,158	0.2	# B&G Maint.	1.0	\$49,158	
Account Clerk (0310)	300	30.09	LABOR	\$35,036	1.0	YARD	1.0	\$35,036	
Track Repairer (8064)	300	30.10	LABOR	\$41,199	0.125	RTMILE	2.0	\$82,398	
Power Maintainer	300	30.11	LABOR	\$57,238	0.100	RTMILE	2.0	\$114,477	
Transit Facilities Maintainer	300	30.12	LABOR	\$57,238	0.10	STATION	2.0	\$114,477	
Electrician	300	30.13	LABOR	\$49,158	0.10	STATION	2.0	\$98,316	
Power Inspector	300	30.14	LABOR	\$57,238	0.05	RTMILE	1.0	\$57,238	
Rail Vehicle Electronic Technician (8068)	300	30.15	LABOR	\$58,816	0.07	RTMILE	0.0	\$0	
Mechanic Helper	300	30.16	LABOR	\$37,559	0.20	# Maintainers	0.0	\$0	
Overtime, ATU Employees	300		LABOR		5.0%	Dept. ATU Wages		\$33,774	
Materials & Supplies									
Track/Way	300	300.1	MATL		\$5,901	RTMILE		\$50,450	
Stations	300	300.2	MATL		\$5,932	STATION		\$68,875	
Yard/Shop	300	300.3	MATL		\$14,132	YARD, PK VEH		\$7,458	
Contract Services									
Track/Way	300	300.4	SERV		\$7,766	RTMILE		\$66,397	
Stations	300	300.5	SERV		\$4,675	STATION		\$54,272	
Yard/Shop	300	300.6	SERV		\$111,996	YARD, PK VEH		\$59,104	
Miscellaneous	300	300.7	MISC		\$264.45	Dept. Employee		\$3,629	
Subtotal							13.0	\$1,019,448	
								Track-Miles/Facil. Maint. Employee	1.25
								Facil. Maint. Non-Labor Cost/Track-Mile	\$19,147
Rail Administration & Support									
General Manager	400	40.01	LABOR	\$193,140	0	Fixed	0.0	\$0	
Chief Safety & Security	400	40.02	LABOR	\$98,107	1	Fixed	1.0	\$98,107	
MDT, Grant Resources (0346)	400	40.03	LABOR	\$110,096	0	Fixed	0.0	\$0	
Operations Analyst	400	40.04	LABOR	\$43,217	0	PKCAR	0.0	\$0	
Administrative Secretary (0094)	400	40.05	LABOR	\$39,335	0	Fixed	0.0	\$0	
MDT Field Test Engineer (Civil) (8358)	400	40.06	LABOR	\$115,474	0.033	RTMILE	0.0	\$0	
MDT Field Test Engineer (Electrical) (8358)	400	40.07	LABOR	\$115,474	0.040	PKCAR	0.0	\$0	
Engineering Technician	400	40.08	LABOR	\$43,217	1.0	# Engineer	0.0	\$0	
Other Support Staff	400		LABOR	\$37,559	0	Total LRT empl.	0.0	\$0	
Overtime, ATU Employees	400		LABOR		5.0%	Dept. ATU Wages		\$0	
Contract Services	400	400.1	SERV		\$30,448	PKCAR		\$176,753	
Materials & Supplies	400	400.2	MATL		\$1,167	Total LRT empl.		\$41,252	
Miscellaneous	400	400.3	MISC		\$813.48	Total LRT empl.		\$28,763	
Casualty & Liability	400	400.4	INSUR		\$0.11	CARMI		\$82,455	
Casualty & Liability	400	400.5	INSUR		\$3,253	RTMILE		\$55,616	
Taxes	400	400.6	TAX		\$270	PKCAR		\$3,138	
Station Utilities	400	400.7	UTIL		\$13,506	STATION		\$313,613	
Yard Utilities	400	400.8	UTIL		\$247,932	YARD		\$130,843	
							1.0	\$930,539	
								G/A FTE/Other G&A FTE (%age)	2%
								G/A Non-Labor Costs/Other Non-Labor Costs	37%
TOTAL EMPLOYEES AND COST							67.0	\$6,529,385	

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

LPA w/Nova & Davie

Table 5. Summary of Alternative

04/12 Calibration

I. INPUT VARIABLES

Operating Statistic	Input Value
Peak Cars	11
Revenue Car-Miles	738,720
Revenue Train-Hours	32,646
Passenger Stations	22
Directional Route Miles	16.2
Maintenance Facilities	1

II. COST SUMMARY BY COST CATEGORY/COST TYPE (04/12\$)

	Dept.	FUEL	INSUR	LABOR	MATL	MISC	SERV	TAX	UTIL	TOTAL
LR Operations	100			\$1,726,540	\$20,659	\$4,955	\$946,658		\$478,352	\$3,177,165
LRV Maintenance	200	\$31,118		\$890,997	\$443,043	\$4,009	\$33,066			\$1,402,233
LR Facilities Maint.	300			\$709,263	\$126,783	\$3,629	\$179,774			\$1,019,448
LR Administration	400		\$138,070	\$98,107	\$41,252	\$28,763	\$176,753	\$3,138	\$444,455	\$930,539
Grand Total	Grand Total	\$31,118	\$138,070	\$3,424,907	\$631,736	\$41,356	\$1,336,252	\$3,138	\$922,807	\$6,529,385

III. ANNUAL COST FACTORS (04/12\$)

Total Cost per Revenue Train-Hour =	\$200.01
Total Cost per Revenue Car-Mile =	\$8.84
Veh. Ops. Cost per Train-Hour =	\$97
Veh. Maint. Cost per Car-Mile =	\$1.90
Facil. Maint. Cost per Station =	\$46,339
Administrative Cost per Peak Car =	\$84,594

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

SR7/Broward Alt

Table 1. Input Statistics

		TEST CASE	CALIBRATION SYSTEMS								BASE
<i>Variable</i>	<i>Code</i>	<i>Alignment Calibration</i>	<i>FY 10 Salt Lake City</i>	<i>FY 10 St. Louis</i>	<i>FY 10 Denver</i>	<i>FY 10 San Jose</i>	<i>FY 10 Portland</i>	<i>FY 10 Sacramento</i>	<i>FY 10 Los Angeles</i>	<i>FY 10 Baltimore</i>	<i>12/10 Calibration</i>
Peak Cars	PKCAR	7	43	50	104	47	110	56	118	38	71
Revenue Car-Miles	CARMI	291,840	3,248,740	5,818,779	7,969,738	3,019,865	8,145,575	4,073,674	9,645,684	3,179,325	5,637,673
Revenue Train-Hours	TRNHR	19,688	84,644	116,669	183,865	133,236	305,050	81,226	187,402	84,579	147,084
Passenger Stations	STATION	10	28	37	36	65	38	48	53	33	42
Directional Route Miles	RTMILE	6	39.4	91.1	70.0	81.0	112.4	73.8	121.1	57.6	81
Maintenance Facilities	YARD	1.0	1	2	2	1	4	2	3	2	2.1
Inflation Factor	INFLATE	1.06									1.00
Alternative Name	NAME	04/12 Calibration									12/10 Calibration
Total Oper Cost Efficiencies			\$28,006,024	\$53,945,130	\$71,424,851	\$56,685,665	\$106,374,746	\$47,846,225	\$167,914,954	\$39,400,273	\$71,449,734
	Cost/Peak Car		\$651,303	\$1,078,903	\$686,777	\$1,206,078	\$967,043	\$854,397	\$1,423,008	\$1,036,849	\$988,045
	Cost/Car-Mile		\$8.62	\$9.27	\$8.96	\$18.77	\$13.06	\$11.75	\$17.41	\$12.39	\$12.53
	Cost/Train-Hour		\$331	\$462	\$388	\$425	\$349	\$589	\$896	\$466	\$488
	Cost/Station		\$1,000,215	\$1,457,976	\$1,984,024	\$872,087	\$2,799,335	\$996,796	\$3,168,207	\$1,193,948	\$1,684,074
	Cost/Track-Mile		\$711,354	\$592,413	\$1,020,355	\$700,169	\$946,731	\$648,499	\$1,386,352	\$684,033	\$836,238
Labor Productivity											
	Vehicle Operations	Train Hrs. / Emp.	910	759	673	994	1,178	700	502	621	792
	Vehicle Maintenance	Car Miles. / Emp.	39,141	108,156	104,044	38,716	52,893	59,907	45,714	51,279	62,481
	Facilities Maintenance	Dir. Rt. Miles/Emp.	0.54	0.95	0.83	0.90	0.84	1.45	0.61	0.74	0.86
	Rail Admin. & Support	% Non G&A FTE's	17%	22%	14%	20%	15%	27%	14%	2%	16%
Non-Labor Productivity											
	Vehicle Operations	Non Labor Cost/Train Hrs.	\$31	\$78	\$47	\$57	\$38	\$120	\$267	\$32	\$84
	Vehicle Maintenance	Non Labor Cost/Car Mile	\$1.03	\$0.55	\$0.46	\$1.37	\$0.46	\$0.73	\$1.24	\$1.14	\$0.87
	Facilities Maintenance	Non Labor Cost/Dir. Rt. Miles	\$27,947.12	\$66,500.66	\$63,295.70	\$27,414.65	\$76,257.11	\$23,229.82	\$36,881.38	\$77,467.53	\$49,874.25
	Rail Admin. & Support	% Non G&A Non-labor Costs	32%	37%	147%	12%	41%	26%	16%	36%	43%

Source: RY 2010 National Transit Database Reports.

CENTRAL BROWARD EAST-WEST TRANSIT STUDY					
CBEWT Streetcar O&M Cost Model					
SR 7/Broward Alt					
Table 2. Labor Cost Listing - Metro Dade Transit, FL					
<i>Position</i>	<i>Lookup</i>	<i>2012 Salary/Wage</i>	<i>Fringe Rate</i>	<i>Total</i>	
Rail Transportation					
General Superintendent MDT (8473)	10.01	\$87,266	26.00%	\$109,955	
Chief Supervisor Rail Traffic Control (8161)	10.02	\$77,863	26.00%	\$98,107	
Rail Traffic Controller (8160)	10.03	\$53,770	26.00%	\$67,750	
Instructor (Ops & Maintenance)	10.04	\$46,107	26.00%	\$58,094	
Secretary (0031)	10.05	\$29,808	26.00%	\$37,559	
Rail Supervisor (8163)	10.06	\$46,231	26.00%	\$58,251	
Train Operator (8073)	10.07	\$34,611	26.00%	\$43,610	
Fare Inspector	10.08	\$31,387	26.00%	\$39,548	
Rail Vehicle Maintenance					
General Superintendent MDT (8473)	20.01	\$87,266	26.00%	\$109,955	
Administrative Secretary (0094)	20.02	\$31,218	26.00%	\$39,335	
Chief Supervisor Rail Vehicle Repair (8169)	20.03	\$68,601	26.00%	\$86,438	
Rail Stock Clerk (8074)	20.04	\$34,299	26.00%	\$43,217	
MDT Operation Maintenance Instructor (Rail Maintenance) (8074)	20.05	\$46,107	26.00%	\$58,094	
Foreman, LRV Shops	20.06	\$46,107	26.00%	\$58,094	
Rail Vehicle Mechanic (8071)	20.07	\$45,427	26.00%	\$57,238	
Rail Maintenance Worker (8063)	20.08	\$31,387	26.00%	\$39,548	
Rail Vehicle Cleaner (8069)	20.09	\$31,387	26.00%	\$39,548	
Rail Facilities Maintenance					
Chief MDT Facilities Maintenance (8331)	30.01	\$81,158	26.00%	\$102,260	
Secretary (0031)	30.02	\$29,808	26.00%	\$37,559	
General Superintendent Track & Guideway (8473)	30.03	\$87,266	26.00%	\$109,955	
Manager, Power & Signals	30.04	\$46,107	26.00%	\$58,094	
MDT Property Manager (8265)	30.05	\$39,014	26.00%	\$49,158	
Rail Structure & Track Supervisor (8180)	30.06	\$52,615	26.00%	\$66,295	
Supervisor, Power	30.07	\$46,107	26.00%	\$58,094	
Facilities Maintenance Supervisor	30.08	\$39,014	26.00%	\$49,158	
Account Clerk (0310)	30.09	\$27,806	26.00%	\$35,036	
Track Repairer (8064)	30.10	\$32,698	26.00%	\$41,199	
Power Maintainer	30.11	\$45,427	26.00%	\$57,238	
Transit Facilities Maintainer	30.12	\$45,427	26.00%	\$57,238	
Electrician	30.13	\$39,014	26.00%	\$49,158	
Power Inspector	30.14	\$45,427	26.00%	\$57,238	
Rail Vehicle Electronic Technician (8068)	30.15	\$46,679	26.00%	\$58,816	
Mechanic Helper	30.16	\$29,808	26.00%	\$37,559	
LRT General Administration					
General Manager	40.01	\$153,285	26.00%	\$193,140	
Chief Safety & Security	40.02	\$77,863	26.00%	\$98,107	
MDT, Grant Resources (0346)	40.03	\$87,378	26.00%	\$110,096	
Operations Analyst	40.04	\$34,299	26.00%	\$43,217	
Transit Administrative Coordinator (8310)	40.05	\$58,058	26.00%	\$73,154	
MDT Field Test Engineer (Civil) (8358)	40.06	\$91,646	26.00%	\$115,474	
MDT Field Test Engineer (Electrical) (8358)	40.07	\$91,646	26.00%	\$115,474	
Engineering Technician	40.08	\$34,299	26.00%	\$43,217	
NOTES:					
1.	Comparable existing MDT positions are matched to new LRT positions.				
2.	Wage data from MDT FY 2012 salary and wage data.				
3.	Fringe benefit rate provided by MDT.				
4.	No inflation assumed:		1.00		

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

SR7/Broward Alt

Table 3a. Non-Labor Cost Listing

<i>Cost Item</i>	<i>Salt Lake</i>	<i>St. Louis</i>	<i>Denver</i>	<i>San Jose</i>	<i>Portland</i>	<i>Sacramento</i>	<i>Los Angeles</i>	<i>Baltimore</i>	<i>Average</i>
Vehicle Operations									
Contract Services	\$22,426	\$6,475,126	\$3,275,705	\$3,436,682	\$7,380,872	\$5,533,499	\$36,775,838	\$52,504	\$7,869,082
Materials & Supplies	\$0	\$161,326	\$86,686	\$28,619	\$134,439	\$237,263	\$60,517	\$196,267	\$113,140
Miscellaneous	\$19,836	\$2,364	\$30,983	\$56,351	\$0	\$24,004	\$0	\$6,192	\$17,466
Propulsion Power	\$2,600,654	\$2,466,842	\$5,274,759	\$4,087,109	\$4,085,751	\$3,951,671	\$13,152,029	\$2,460,431	\$4,759,906
Subtotal	\$2,642,916	\$9,105,658	\$8,668,133	\$7,608,761	\$11,601,062	\$9,746,437	\$49,988,384	\$2,715,394	\$12,759,593
<i>Oper. Cost/Train-Hour</i>	<i>\$31.22</i>	<i>\$78.05</i>	<i>\$47.14</i>	<i>\$57.11</i>	<i>\$38.03</i>	<i>\$119.99</i>	<i>\$266.74</i>	<i>\$32.10</i>	<i>\$86.75</i>
Vehicle Maintenance									
Contract Services	\$178,269	\$643,515	\$84,722	\$419,499	\$71,403	\$193,922	\$7,006	\$255,162	\$231,687
Materials & Supplies	\$2,947,331	\$2,309,824	\$3,437,915	\$3,381,088	\$3,528,062	\$2,710,861	\$11,770,737	\$2,820,029	\$4,113,231
Miscellaneous	\$3,370	\$3,842	\$55,426	\$39,120	\$0	\$22,077	\$0	\$511,058	\$79,362
Fuel & Lube	\$218,658	\$234,056	\$89,065	\$282,749	\$164,887	\$45,352	\$175,490	\$38,275	\$156,067
Subtotal	\$3,347,628	\$3,191,237	\$3,667,128	\$4,122,456	\$3,764,352	\$2,972,212	\$11,953,233	\$3,624,524	\$4,580,346
<i>Veh. Maint. Cost/Car-Mile</i>	<i>\$1.03</i>	<i>\$0.55</i>	<i>\$0.46</i>	<i>\$1.37</i>	<i>\$0.46</i>	<i>\$0.73</i>	<i>\$1.24</i>	<i>\$1.14</i>	<i>\$0.81</i>
Facilities Maintenance									
Materials & Supplies	\$506,903	\$1,330,599	\$747,177	\$682,222	\$7,175,601	\$992,682	\$1,672,571	\$641,730	
Track/Way/Signals	\$167,278	\$1,317,293	\$239,097	\$204,667	\$4,664,141	\$327,585	\$669,028	\$385,038	\$996,766
Stations	\$167,278	\$13,306	\$448,306	\$307,000	\$1,435,120	\$327,585	\$501,771	\$192,519	\$424,111
Yard/Shop/Central Control	\$167,278	\$0	\$59,774	\$170,556	\$1,076,340	\$327,585	\$501,771	\$64,173	\$295,935
Contract Services	\$604,489	\$4,724,951	\$3,683,522	\$1,708,076	\$1,392,648	\$731,141	2794502	3820400	
Track/Way/Signals	\$199,481	\$4,724,951	\$1,510,244	\$1,024,846	\$905,221	\$365,571	\$1,117,801	\$382,040	\$1,278,769
Stations	\$199,481	\$0	\$147,341	\$256,211	\$278,530	\$365,571	\$838,351	\$3,056,320	\$642,726
Yard/Shop/Central Control	\$199,481	\$0	\$2,025,937	\$256,211	\$208,897	\$0	\$838,351	\$382,040	\$488,865
Miscellaneous	\$35,800	\$54,567	\$432	\$66,061	\$0	\$9,538	\$0	\$10,010	\$22,051
Subtotal	\$1,100,278	\$6,055,550	\$4,430,699	\$2,219,490	\$8,568,249	\$1,713,896	\$4,467,073	\$4,462,130	\$4,149,222
<i>Fac. Maint. Cost/Track-Mile</i>	<i>\$27,947</i>	<i>\$66,501</i>	<i>\$63,296</i>	<i>\$27,415</i>	<i>\$76,257</i>	<i>\$23,230</i>	<i>\$36,881</i>	<i>\$77,468</i>	<i>\$51,364</i>
<i>Fac. Maint. Cost/Station</i>	<i>\$39,296</i>	<i>\$163,664</i>	<i>\$123,075</i>	<i>\$34,146</i>	<i>\$225,480</i>	<i>\$35,706</i>	<i>\$84,284</i>	<i>\$135,216</i>	<i>\$98,206</i>
LRT General Administration									
Contract Services	\$704,338	\$2,179,190	\$22,578,023	\$576,478	\$6,463,875	\$1,838,955	\$5,669,538	\$47,837	\$5,007,279
Materials & Supplies	\$121,725	\$699,992	\$389,339	\$258,712	\$504,878	\$245,547	\$1,529,118	\$615,899	\$545,651
Miscellaneous	\$238,721	\$187,716	\$699,731	\$137,444	\$1,086,152	\$166,263	\$956,564	\$7,606	\$435,025
Casualty & Liability	\$148,496	\$1,095,585	\$52,189	\$289,406	\$23,528	\$488,555	\$556,259	\$1,046,485	\$462,563
Casualty & Liability	\$148,496	\$1,095,585	\$52,189	\$289,406	\$23,528	\$488,555	\$556,259	\$1,046,485	\$462,563
Taxes	\$0	\$39,799	\$28,171	\$0	\$0	\$51,969	\$19,740	\$0	\$17,460
Utilities	\$465,468	\$757,987	\$383,178	\$68,661	\$849,985	\$263,203	\$762,469	\$560,989	\$513,992
Utilities	\$465,468	\$757,987	\$383,178	\$68,661	\$849,985	\$263,203	\$762,469	\$560,989	\$513,992
Subtotal	\$2,292,711	\$6,813,841	\$24,565,996	\$1,688,768	\$9,801,931	\$3,806,249	\$10,812,415	\$3,886,290	\$7,958,525
<i>Admin. Cost/Peak Car</i>	<i>\$53,319</i>	<i>\$136,277</i>	<i>\$236,212</i>	<i>\$35,931</i>	<i>\$89,108</i>	<i>\$67,969</i>	<i>\$91,631</i>	<i>\$102,271</i>	<i>\$112,488</i>
TOTAL	\$9,383,533	\$25,166,286	\$41,331,956	\$15,639,475	\$33,735,594	\$18,238,794	\$77,221,105	\$14,688,338	\$29,447,686

NOTES:

- Cost for insurance and utilities, other than traction power, have been split between two lines on this worksheet. 50% to yard and shops and 50% to passenger stations.
- Non-labor costs are from FY 2010 National Transit Database Reports.
- \$2010 inflated to ___ Budget with CPI-U: 1.0000 (South CPI, Dec. 2010)

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

SR7/Broward Alt

Table 3b. Non-Labor Unit Costs

Cost Item	Code	Driving Variable	UNIT COSTS							Average	Use	Unit Cost x Unit	
			Salt Lake	St. Louis	Denver	San Jose	Portland	Sacramento	Los Angeles				Baltimore
Vehicle Operations													
Contract Services	100.1	TRNHR	\$0.26	\$55.50	\$17.82	\$25.79	\$24.20	\$68.12	\$196.24	\$0.62	\$27.47	\$27.47 ^{1.}	\$4,040,936
Materials & Supplies	100.2	VO empl	\$0	\$1,050	\$318	\$214	\$519	\$2,045	\$162	\$1,441	\$529.01	\$529.01 ^{2.}	\$101,695
Miscellaneous	100.3	VO empl	\$213	\$15	\$113	\$421	\$0	\$207	\$0	\$45	\$126.89	\$126.89	\$24,392
Propulsion Power	100.4	CARMI	\$0.80	\$0.42	\$0.66	\$1.35	\$0.50	\$0.97	\$1.36	\$0.77	\$0.86	\$0.86	\$4,826,379
											\$8,993,402		
											Veh. Operations Cost/Train-Hr =		\$61.14
Vehicle Maintenance													
Contract Services	200.1	CARMI	\$0.05	\$0.11	\$0.01	\$0.14	\$0.01	\$0.05	\$0.00	\$0.08	\$0.06	\$0.06	\$318,784
Materials & Supplies	200.2	CARMI	\$0.91	\$0.40	\$0.43	\$1.12	\$0.43	\$0.67	\$1.22	\$0.89	\$0.76	\$0.76	\$4,271,281
Miscellaneous	200.3	VM empl	\$41	\$71	\$724	\$502	\$0	\$325	\$0	\$8,243	\$237.40	\$237.40 ^{3.}	\$23,336
Fuel & Lube	200.4	PKCAR	\$5,085	\$4,681	\$856	\$6,016	\$1,499	\$810	\$1,487	\$1,007	\$2,680.22	\$2,680.22	\$189,626
											\$4,803,027		
											Veh. Maintenance Cost/Car-Mile =		\$0.85
Facilities Maintenance													
Materials & Supplies													
Track/Way/Signals	300.1	RTMILE	\$4,249	\$14,466	\$3,416	\$2,528	\$41,511	\$4,440	\$5,524	\$6,685	\$5,901.02	\$5,901.02 ^{4.}	\$476,692
Stations	300.2	STATION	\$4,249	\$360	\$12,453	\$4,723	\$37,766	\$4,440	\$9,467	\$5,834	\$5,932.26	\$5,932.26 ^{4.}	\$250,638
Yard/Shop/Central Ctrl.	300.3	YARD	\$4,249	\$0	\$29,887	\$170,556	\$269,085	\$4,440	\$167,257	\$32,087	\$14,132.49	\$14,132.49 ^{1,4,5}	\$30,032
Contract Services													
Track/Way/Signals	300.4	RTMILE	\$5,067	\$51,888	\$21,575	\$12,659	\$8,056	\$4,955	\$9,229	\$6,633	\$7,766.39	\$7,766.39 ^{6,7}	\$627,378
Stations	300.5	STATION	\$5,067	\$0	\$4,093	\$3,942	\$7,330	\$7,616	\$15,818	\$92,616	\$4,674.52	\$4,674.52 ^{1,3}	\$197,499
Yard/Shop/Central Ctrl.	300.6	YARD	\$5,067	\$0	\$1,012,969	\$256,211	\$52,224	\$0	\$279,450	\$191,020	\$111,996.11	\$111,996.11 ⁷	\$237,992
Miscellaneous	300.7	FM empl	\$494	\$567	\$5	\$734	\$0	\$187	\$0	\$128	\$264.45	\$264	\$26,601
											\$1,846,831		
											Fac. Maint. Cost/Track-Mile =		\$22,862
											Fac. Maint. Cost/Station =		\$43,712
General Administration													
Contract Services	400.1	PKCAR	\$16,380	\$43,584	\$217,096	\$12,265	\$58,763	\$32,838	\$48,047	\$1,259	\$30,448.00	\$30,448 ⁷	\$2,154,196
Materials & Supplies	400.2	Total empl	\$420	\$1,887	\$786	\$715	\$802	\$824	\$1,720	\$2,180	\$1,166.68	\$1,167	\$527,529
Miscellaneous	400.3	Total empl	\$824	\$506	\$1,412	\$380	\$1,725	\$558	\$1,076	\$27	\$813.48	\$813	\$367,825
Casualty & Liability	400.4	CARMI	\$0.05	\$0.19	\$0.01	\$0.10	\$0.00	\$0.12	\$0.06	\$0.33	\$0.11	\$0	\$596,195
Casualty & Liability	400.5	RTMILE	\$3,772	\$12,031	\$746	\$3,575	\$209	\$6,622	\$4,593	\$18,168	\$3,252.64	\$3,253 ^{3,6}	\$262,752
Taxes	400.6	PKCAR	\$0	\$796	\$271	\$0	\$0	\$928	\$167	\$0	\$270.27	\$270	\$19,122
Utilities	400.7	STATION	\$16,624	\$20,486	\$10,644	\$1,056	\$22,368	\$5,483	\$14,386	\$17,000	\$13,505.93	\$13,506	\$570,625
Utilities	400.8	YARD	\$465,468	\$378,994	\$191,589	\$68,661	\$212,496	\$131,602	\$254,156	\$280,495	\$247,932.40	\$247,932	\$526,856
											\$5,025,101		
											Admin. Cost/Peak Car =		\$71,026
											Calibration Non-Labor Cost		\$20,668,361

NOTES: The following cities were not included in the calculation of average unit costs where specified, because they were considered outliers:

1. Los Angeles
2. Sacramento
3. Baltimore
4. Portland
5. San Jose
6. St. Louis
7. Denver

Calculation of Propulsion Power Costs		Estimated kwh per month = 145,920				
CHARGE		UNIT COST	MONTHLY COST		ANNUAL COST	
1 Customer Charge		\$179.19	\$538		\$6,451	
2 Energy Charge			6.0 kwh per REVCARMI			
		\$0.1019	\$14,865		\$178,378	
3 Demand Charge			13.2 KW per substation			
		\$7.60	\$301		\$3,612	
TOTAL STREETCAR TRACTION POWER					\$188,440	
Cost per kwh =					\$0.11	
Cost per Rev. Car-Mile =					\$0.65	

1. FPL Business Rate Schedule GSLD-2 (General Service Large Demand), effective 1/1/12.
2. One Customer Charge assumed for each substation; assume 1 substation per route-mile.
3. Average energy consumption rate for Salt Lake City, St. Louis, San Jose and Portland (see calculation below).
4. Maximum demand assumed supplied to each substation = 13.2KV (Portland); assume 1 substation per route-mile.
5. Assume negotiated rates with no transmission/distribution charges and no rate riders.

				Average kwh Consumption Rate			
	Propulsion \$	\$/kwh		kwh	rev. car-mi	kwh/rev. car-mi	
	\$2,600,654	\$0.11	<i>Salt Lake</i>	23,196,953	2,982,557	7.78	
	\$2,466,842	\$0.07	<i>St. Louis</i>	36,302,117	5,024,244	7.23	
	\$4,087,109	\$0.18	<i>San Jose</i>	22,358,361	2,459,638	9.09	
	\$4,085,751	\$0.08	<i>Portland</i>	53,556,304	6,023,056	8.89	
	\$13,240,356	\$0.10	Subtotal	135,413,735	16,489,495	8.21	<<< Use 8.0
	\$3,951,671	\$0.11	<i>Sacramento</i>	34,946,640	3,429,277	10.19	
	\$4,072,291	\$0.06	<i>Dallas</i>	70,181,785	5,153,160	13.62	
	\$5,274,759	\$0.11	<i>Denver</i>	46,339,256	3,869,345	11.98	
	\$13,152,029	\$0.14	<i>Los Angeles</i>	95,971,346	8,114,242	11.83	
	\$2,460,431	\$0.07	<i>Baltimore</i>	33,758,160	2,060,331	16.38	
	\$42,151,537	\$0.10	Total	416,610,922	39,115,850	10.65	

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

Table 4. Line Item Detail

SR7/Broward Alt

04/12 Calibration

Cost Item	Dept.	Code	Type	Annual Earnings	Productivity Factor	Driver	FTEs	Annual Cost (04/'12 dollars)
Rail Vehicle Operations								
General Superintendent MDT (8473)	100	10.01	LABOR	\$109,955	0	Fixed	0.0	\$0
Chief Supervisor Rail Traffic Control (8161)	100	10.02	LABOR	\$98,107	0	# of Controllers	0.0	\$0
Rail Traffic Controller (8160)	100	10.03	LABOR	\$67,750	0	# of Operators	0.0	\$0
Instructor (Ops & Maintenance)	100	10.04	LABOR	\$58,094	0.020	# of Operators	0.0	\$0
Secretary (0031)	100	10.05	LABOR	\$37,559	0	YARD	0.0	\$0
Rail Supervisor (8163)	100	10.06	LABOR	\$58,251	0.17	# of Operators	3.0	\$174,753
Train Operator (8073)	100	10.07	LABOR	\$43,610	0.769	TRNHR	15.0	\$654,152
Fare Inspector	100	10.08	LABOR	\$39,548	0.015	CARMI	3.0	\$118,644
Overtime, Operators	100		LABOR		5.0%	Operator Wages		\$32,708
Overtime, Other ATU Empl.	100		LABOR		5.0%	Other ATU Wages		\$5,932
System Police Officers	100		SERV	\$0.394		1,000 TRNHR		\$0
Other Contract Services	100	100.1	SERV	\$27.47		TRNHR		\$570,906
Materials & Supplies	100	100.2	MATL	\$529		Dept. Employee		\$11,725
Miscellaneous	100	100.3	MISC	\$126.89		Dept. Employee		\$2,812
Propulsion Power	100	100.4	UTIL		n/a	Calculated Separately		\$188,440
Subtotal							21.0	\$1,760,072
						<i>Train-Hours/Operations Employee</i>		937.5
						<i>Operations Non-Labor Cost/Train-Hour</i>		\$39.31
Rail Vehicle Maintenance								
General Superintendent MDT (8473)	200	20.01	LABOR	\$109,955	0	Fixed	0.0	\$0
Administrative Secretary (0094)	200	20.02	LABOR	\$39,335	0	YARD	0.0	\$0
Chief Supervisor Rail Vehicle Repair (8169)	200	20.03	LABOR	\$86,438	0	YARD	0.0	\$0
Rail Stock Clerk (8074)	200	20.04	LABOR	\$43,217	2.0	Shifts, YARD	1.0	\$43,217
MDT Operation Maintenance Instructor (Rail Maintenance) (8106)	200	20.05	LABOR	\$58,094	1.0	YARD	0.0	\$0
Foreman, LRV Shops	200	20.06	LABOR	\$58,094	2.0	Shifts, YARD	1.0	\$58,094
Rail Vehicle Mechanic (8071)	200	20.07	LABOR	\$57,238	0.133	10,000 CARM	4.0	\$228,953
Rail Maintenance Worker (8063)	200	20.08	LABOR	\$39,548	0.167	# Elec./Mech.	0.0	\$0
Rail Vehicle Cleaner (8069)	200	20.09	LABOR	\$39,548	0.20	PKCAR	1.0	\$39,548
Overtime, ATU Employees	200		LABOR		5.0%	Dept. ATU Wages		\$15,586
Contract Services	200	200.1	SERV	\$0.06		CARMI		\$8,709
Materials & Supplies	200	200.2	MATL	\$0.76		CARMI		\$116,686
Miscellaneous	200	200.3	MISC	\$237.40		Dept. Employee		\$1,754
Fuel & Lube	200	200.4	FUEL	\$2,680.22		PKCAR		\$19,802
Subtotal							7.0	\$532,349
						<i>Car-Miles/Vehicle Maint. Employee</i>		41,691
						<i>Veh. Maint. Non-Labor Cost/Car-Mile</i>		\$0.50

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

Table 4. Line Item Detail

SR7/Broward Alt

04/12 Calibration

Cost Item	Dept.	Code	Type	Annual Earnings	Productivity Factor	Driver	FTEs	Annual Cost (04/'12 dollars)
Rail Facilities Maintenance								
Chief MDT Facilities Maintenance (8331)	300	30.01	LABOR	\$102,260	0	Fixed	0.5	\$51,130
Secretary (0031)	300	30.02	LABOR	\$37,559	0	YARD	0.0	\$0
General Superintendent Track & Guideway (8473)	300	30.03	LABOR	\$109,955	0	Fixed	0.0	\$0
Manager, Power & Signals	300	30.04	LABOR	\$58,094	0	Fixed	0.0	\$0
MDT Property Manager (8265)	300	30.05	LABOR	\$49,158	0	Fixed	0.0	\$0
Rail Structure & Track Supervisor (8180)	300	30.06	LABOR	\$66,295	0.2	# T&W Maint.	0.3	\$22,098
Supervisor, Power	300	30.07	LABOR	\$58,094	0.2	# P&S Maint.	0.3	\$19,365
Facilities Maintenance Supervisor	300	30.08	LABOR	\$49,158	0.2	# B&G Maint.	0.3	\$16,386
Account Clerk (0310)	300	30.09	LABOR	\$35,036	1.0	YARD	1.0	\$35,036
Track Repairer (8064)	300	30.10	LABOR	\$41,199	0.125	RTMILE	1.0	\$41,199
Power Maintainer	300	30.11	LABOR	\$57,238	0.100	RTMILE	1.0	\$57,238
Transit Facilities Maintainer	300	30.12	LABOR	\$57,238	0.10	STATION	1.0	\$57,238
Electrician	300	30.13	LABOR	\$49,158	0.10	STATION	1.0	\$49,158
Power Inspector	300	30.14	LABOR	\$57,238	0.05	RTMILE	0.0	\$0
Rail Vehicle Electronic Technician (8068)	300	30.15	LABOR	\$58,816	0.07	RTMILE	0.0	\$0
Mechanic Helper	300	30.16	LABOR	\$37,559	0.20	# Maintainers	0.0	\$0
Overtime, ATU Employees	300		LABOR		5.0%	Dept. ATU Wages		\$14,886
Materials & Supplies								
Track/Way	300	300.1	MATL		\$5,901	RTMILE		\$19,931
Stations	300	300.2	MATL		\$5,932	STATION		\$31,307
Yard/Shop	300	300.3	MATL		\$14,132	YARD, PK VEH		\$3,729
Contract Services								
Track/Way	300	300.4	SERV		\$7,766	RTMILE		\$26,231
Stations	300	300.5	SERV		\$4,675	STATION		\$24,669
Yard/Shop	300	300.6	SERV		\$111,996	YARD, PK VEH		\$29,552
Miscellaneous	300	300.7	MISC		\$264.45	Dept. Employee		\$1,814
Subtotal							6.5	\$500,967
						<i>Track-Miles/Facil. Maint. Employee</i>		0.98
						<i>Facil. Maint. Non-Labor Cost/Track-Mile</i>		\$21,443
Rail Administration & Support								
General Manager	400	40.01	LABOR	\$193,140	0	Fixed	0.0	\$0
Chief Safety & Security	400	40.02	LABOR	\$98,107	1	Fixed	0.0	\$0
MDT, Grant Resources (0346)	400	40.03	LABOR	\$110,096	0	Fixed	0.0	\$0
Operations Analyst	400	40.04	LABOR	\$43,217	0	PKCAR	0.0	\$0
Administrative Secretary (0094)	400	40.05	LABOR	\$39,335	0	Fixed	0.0	\$0
MDT Field Test Engineer (Civil) (8358)	400	40.06	LABOR	\$115,474	0.033	RTMILE	0.0	\$0
MDT Field Test Engineer (Electrical) (8358)	400	40.07	LABOR	\$115,474	0.040	PKCAR	0.0	\$0
Engineering Technician	400	40.08	LABOR	\$43,217	1.0	# Engineer	0.0	\$0
Other Support Staff	400		LABOR	\$37,559	0	Total LRT empl.	0.0	\$0
Overtime, ATU Employees	400		LABOR		5.0%	Dept. ATU Wages		\$0
Contract Services	400	400.1	SERV		\$30,448	PKCAR		\$112,479
Materials & Supplies	400	400.2	MATL		\$1,167	Total LRT empl.		\$21,242
Miscellaneous	400	400.3	MISC		\$813.48	Total LRT empl.		\$14,811
Casualty & Liability	400	400.4	INSUR		\$0.11	CARMI		\$32,575
Casualty & Liability	400	400.5	INSUR		\$3,253	RTMILE		\$21,972
Taxes	400	400.6	TAX		\$270	PKCAR		\$1,997
Station Utilities	400	400.7	UTIL		\$13,506	STATION		\$142,551
Yard Utilities	400	400.8	UTIL		\$247,932	YARD		\$130,843
							0.0	\$478,469
						<i>G/A FTE/Other G&A FTE (%age)</i>		0%
						<i>G/A Non-Labor Costs/Other Non-Labor Costs</i>		45%
TOTAL EMPLOYEES AND COST							34.5	\$3,271,858

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

SR7/Broward Alt

Table 5. Summary of Alternative

04/12 Calibration

I. INPUT VARIABLES

Operating Statistic	Input Value
Peak Cars	7
Revenue Car-Miles	291,840
Revenue Train-Hours	19,688
Passenger Stations	10
Directional Route Miles	6.4
Maintenance Facilities	1

II. COST SUMMARY BY COST CATEGORY/COST TYPE (04/12\$)

	Dept.	FUEL	INSUR	LABOR	MATL	MISC	SERV	TAX	UTIL	TOTAL
LR Operations	100			\$986,188	\$11,725	\$2,812	\$570,906		\$188,440	\$1,760,072
LRV Maintenance	200	\$19,802		\$385,398	\$116,686	\$1,754	\$8,709			\$532,349
LR Facilities Maint.	300			\$363,734	\$54,967	\$1,814	\$80,452			\$500,967
LR Administration	400		\$54,546	\$0	\$21,242	\$14,811	\$112,479	\$1,997	\$273,394	\$478,469
Grand Total	Grand Total	\$19,802	\$54,546	\$1,735,320	\$204,620	\$21,192	\$772,547	\$1,997	\$461,834	\$3,271,858

III. ANNUAL COST FACTORS (04/12\$)

Total Cost per Revenue Train-Hour =	\$166.19
Total Cost per Revenue Car-Mile =	\$11.21
Veh. Ops. Cost per Train-Hour =	\$89
Veh. Maint. Cost per Car-Mile =	\$1.82
Facil. Maint. Cost per Station =	\$50,097
Administrative Cost per Peak Car =	\$68,353

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

Griffin Alt with Bus

Table 1. Input Statistics

		TEST CASE	CALIBRATION SYSTEMS								BASE
<i>Variable</i>	<i>Code</i>	<i>Alignment Calibration</i>	<i>FY 10 Salt Lake City</i>	<i>FY 10 St. Louis</i>	<i>FY 10 Denver</i>	<i>FY 10 San Jose</i>	<i>FY 10 Portland</i>	<i>FY 10 Sacramento</i>	<i>FY 10 Los Angeles</i>	<i>FY 10 Baltimore</i>	<i>12/10 Calibration</i>
Peak Cars	PKCAR	7	43	50	104	47	110	56	118	38	71
Revenue Car-Miles	CARMI	287,280	3,248,740	5,818,779	7,969,738	3,019,865	8,145,575	4,073,674	9,645,684	3,179,325	5,637,673
Revenue Train-Hours	TRNHR	19,437	84,644	116,669	183,865	133,236	305,050	81,226	187,402	84,579	147,084
Passenger Stations	STATION	12	28	37	36	65	38	48	53	33	42
Directional Route Miles	RTMILE	6	39.4	91.1	70.0	81.0	112.4	73.8	121.1	57.6	81
Maintenance Facilities	YARD	1.0	1	2	2	1	4	2	3	2	2.1
Inflation Factor	INFLATE	1.06									1.00
Alternative Name	NAME	04/12 Calibration									12/10 Calibration
Total Oper Cost Efficiencies			\$28,006,024	\$53,945,130	\$71,424,851	\$56,685,665	\$106,374,746	\$47,846,225	\$167,914,954	\$39,400,273	\$71,449,734
	Cost/Peak Car		\$651,303	\$1,078,903	\$686,777	\$1,206,078	\$967,043	\$854,397	\$1,423,008	\$1,036,849	\$988,045
	Cost/Car-Mile		\$8.62	\$9.27	\$8.96	\$18.77	\$13.06	\$11.75	\$17.41	\$12.39	\$12.53
	Cost/Train-Hour		\$331	\$462	\$388	\$425	\$349	\$589	\$896	\$466	\$488
	Cost/Station		\$1,000,215	\$1,457,976	\$1,984,024	\$872,087	\$2,799,335	\$996,796	\$3,168,207	\$1,193,948	\$1,684,074
	Cost/Track-Mile		\$711,354	\$592,413	\$1,020,355	\$700,169	\$946,731	\$648,499	\$1,386,352	\$684,033	\$836,238
Labor Productivity											
Vehicle Operations	Train Hrs. / Emp.		910	759	673	994	1,178	700	502	621	792
Vehicle Maintenance	Car Miles. / Emp.		39,141	108,156	104,044	38,716	52,893	59,907	45,714	51,279	62,481
Facilities Maintenance	Dir. Rt. Miles/Emp.		0.54	0.95	0.83	0.90	0.84	1.45	0.61	0.74	0.86
Rail Admin. & Support	% Non G&A FTE's		17%	22%	14%	20%	15%	27%	14%	2%	16%
Non-Labor Productivity											
Vehicle Operations	Non Labor Cost/Train Hrs.		\$31	\$78	\$47	\$57	\$38	\$120	\$267	\$32	\$84
Vehicle Maintenance	Non Labor Cost/Car Mile		\$1.03	\$0.55	\$0.46	\$1.37	\$0.46	\$0.73	\$1.24	\$1.14	\$0.87
Facilities Maintenance	Non Labor Cost/Dir. Rt. Miles		\$27,947.12	\$66,500.66	\$63,295.70	\$27,414.65	\$76,257.11	\$23,229.82	\$36,881.38	\$77,467.53	\$49,874.25
Rail Admin. & Support	% Non G&A Non-labor Costs		32%	37%	147%	12%	41%	26%	16%	36%	43%

Source: RY 2010 National Transit Database Reports.

CENTRAL BROWARD EAST-WEST TRANSIT STUDY					
CBEWT Streetcar O&M Cost Model					
Griffin Alt with Bus					
Table 2. Labor Cost Listing - Metro Dade Transit, FL					
<i>Position</i>	<i>Lookup</i>	<i>2012 Salary/Wage</i>	<i>Fringe Rate</i>	<i>Total</i>	
Rail Transportation					
General Superintendent MDT (8473)	10.01	\$87,266	26.00%	\$109,955	
Chief Supervisor Rail Traffic Control (8161)	10.02	\$77,863	26.00%	\$98,107	
Rail Traffic Controller (8160)	10.03	\$53,770	26.00%	\$67,750	
Instructor (Ops & Maintenance)	10.04	\$46,107	26.00%	\$58,094	
Secretary (0031)	10.05	\$29,808	26.00%	\$37,559	
Rail Supervisor (8163)	10.06	\$46,231	26.00%	\$58,251	
Train Operator (8073)	10.07	\$34,611	26.00%	\$43,610	
Fare Inspector	10.08	\$31,387	26.00%	\$39,548	
Rail Vehicle Maintenance					
General Superintendent MDT (8473)	20.01	\$87,266	26.00%	\$109,955	
Administrative Secretary (0094)	20.02	\$31,218	26.00%	\$39,335	
Chief Supervisor Rail Vehicle Repair (8169)	20.03	\$68,601	26.00%	\$86,438	
Rail Stock Clerk (8074)	20.04	\$34,299	26.00%	\$43,217	
MDT Operation Maintenance Instructor (Rail Maintenance) (8074)	20.05	\$46,107	26.00%	\$58,094	
Foreman, LRV Shops	20.06	\$46,107	26.00%	\$58,094	
Rail Vehicle Mechanic (8071)	20.07	\$45,427	26.00%	\$57,238	
Rail Maintenance Worker (8063)	20.08	\$31,387	26.00%	\$39,548	
Rail Vehicle Cleaner (8069)	20.09	\$31,387	26.00%	\$39,548	
Rail Facilities Maintenance					
Chief MDT Facilities Maintenance (8331)	30.01	\$81,158	26.00%	\$102,260	
Secretary (0031)	30.02	\$29,808	26.00%	\$37,559	
General Superintendent Track & Guideway (8473)	30.03	\$87,266	26.00%	\$109,955	
Manager, Power & Signals	30.04	\$46,107	26.00%	\$58,094	
MDT Property Manager (8265)	30.05	\$39,014	26.00%	\$49,158	
Rail Structure & Track Supervisor (8180)	30.06	\$52,615	26.00%	\$66,295	
Supervisor, Power	30.07	\$46,107	26.00%	\$58,094	
Facilities Maintenance Supervisor	30.08	\$39,014	26.00%	\$49,158	
Account Clerk (0310)	30.09	\$27,806	26.00%	\$35,036	
Track Repairer (8064)	30.10	\$32,698	26.00%	\$41,199	
Power Maintainer	30.11	\$45,427	26.00%	\$57,238	
Transit Facilities Maintainer	30.12	\$45,427	26.00%	\$57,238	
Electrician	30.13	\$39,014	26.00%	\$49,158	
Power Inspector	30.14	\$45,427	26.00%	\$57,238	
Rail Vehicle Electronic Technician (8068)	30.15	\$46,679	26.00%	\$58,816	
Mechanic Helper	30.16	\$29,808	26.00%	\$37,559	
LRT General Administration					
General Manager	40.01	\$153,285	26.00%	\$193,140	
Chief Safety & Security	40.02	\$77,863	26.00%	\$98,107	
MDT, Grant Resources (0346)	40.03	\$87,378	26.00%	\$110,096	
Operations Analyst	40.04	\$34,299	26.00%	\$43,217	
Transit Administrative Coordinator (8310)	40.05	\$58,058	26.00%	\$73,154	
MDT Field Test Engineer (Civil) (8358)	40.06	\$91,646	26.00%	\$115,474	
MDT Field Test Engineer (Electrical) (8358)	40.07	\$91,646	26.00%	\$115,474	
Engineering Technician	40.08	\$34,299	26.00%	\$43,217	
NOTES:					
1.	Comparable existing MDT positions are matched to new LRT positions.				
2.	Wage data from MDT FY 2012 salary and wage data.				
3.	Fringe benefit rate provided by MDT.				
4.	No inflation assumed:		1.00		

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

Griffin Alt with Bus

Table 3a. Non-Labor Cost Listing

<i>Cost Item</i>	<i>Salt Lake</i>	<i>St. Louis</i>	<i>Denver</i>	<i>San Jose</i>	<i>Portland</i>	<i>Sacramento</i>	<i>Los Angeles</i>	<i>Baltimore</i>	<i>Average</i>
Vehicle Operations									
Contract Services	\$22,426	\$6,475,126	\$3,275,705	\$3,436,682	\$7,380,872	\$5,533,499	\$36,775,838	\$52,504	\$7,869,082
Materials & Supplies	\$0	\$161,326	\$86,686	\$28,619	\$134,439	\$237,263	\$60,517	\$196,267	\$113,140
Miscellaneous	\$19,836	\$2,364	\$30,983	\$56,351	\$0	\$24,004	\$0	\$6,192	\$17,466
Propulsion Power	\$2,600,654	\$2,466,842	\$5,274,759	\$4,087,109	\$4,085,751	\$3,951,671	\$13,152,029	\$2,460,431	\$4,759,906
Subtotal	\$2,642,916	\$9,105,658	\$8,668,133	\$7,608,761	\$11,601,062	\$9,746,437	\$49,988,384	\$2,715,394	\$12,759,593
<i>Oper. Cost/Train-Hour</i>	<i>\$31.22</i>	<i>\$78.05</i>	<i>\$47.14</i>	<i>\$57.11</i>	<i>\$38.03</i>	<i>\$119.99</i>	<i>\$266.74</i>	<i>\$32.10</i>	<i>\$86.75</i>
Vehicle Maintenance									
Contract Services	\$178,269	\$643,515	\$84,722	\$419,499	\$71,403	\$193,922	\$7,006	\$255,162	\$231,687
Materials & Supplies	\$2,947,331	\$2,309,824	\$3,437,915	\$3,381,088	\$3,528,062	\$2,710,861	\$11,770,737	\$2,820,029	\$4,113,231
Miscellaneous	\$3,370	\$3,842	\$55,426	\$39,120	\$0	\$22,077	\$0	\$511,058	\$79,362
Fuel & Lube	\$218,658	\$234,056	\$89,065	\$282,749	\$164,887	\$45,352	\$175,490	\$38,275	\$156,067
Subtotal	\$3,347,628	\$3,191,237	\$3,667,128	\$4,122,456	\$3,764,352	\$2,972,212	\$11,953,233	\$3,624,524	\$4,580,346
<i>Veh. Maint. Cost/Car-Mile</i>	<i>\$1.03</i>	<i>\$0.55</i>	<i>\$0.46</i>	<i>\$1.37</i>	<i>\$0.46</i>	<i>\$0.73</i>	<i>\$1.24</i>	<i>\$1.14</i>	<i>\$0.81</i>
Facilities Maintenance									
Materials & Supplies	\$506,903	\$1,330,599	\$747,177	\$682,222	\$7,175,601	\$992,682	\$1,672,571	\$641,730	
Track/Way/Signals	\$167,278	\$1,317,293	\$239,097	\$204,667	\$4,664,141	\$327,585	\$669,028	\$385,038	\$996,766
Stations	\$167,278	\$13,306	\$448,306	\$307,000	\$1,435,120	\$327,585	\$501,771	\$192,519	\$424,111
Yard/Shop/Central Control	\$167,278	\$0	\$59,774	\$170,556	\$1,076,340	\$327,585	\$501,771	\$64,173	\$295,935
Contract Services	\$604,489	\$4,724,951	\$3,683,522	\$1,708,076	\$1,392,648	\$731,141	2794502	3820400	
Track/Way/Signals	\$199,481	\$4,724,951	\$1,510,244	\$1,024,846	\$905,221	\$365,571	\$1,117,801	\$382,040	\$1,278,769
Stations	\$199,481	\$0	\$147,341	\$256,211	\$278,530	\$365,571	\$838,351	\$3,056,320	\$642,726
Yard/Shop/Central Control	\$199,481	\$0	\$2,025,937	\$256,211	\$208,897	\$0	\$838,351	\$382,040	\$488,865
Miscellaneous	\$35,800	\$54,567	\$432	\$66,061	\$0	\$9,538	\$0	\$10,010	\$22,051
Subtotal	\$1,100,278	\$6,055,550	\$4,430,699	\$2,219,490	\$8,568,249	\$1,713,896	\$4,467,073	\$4,462,130	\$4,149,222
<i>Fac. Maint. Cost/Track-Mile</i>	<i>\$27,947</i>	<i>\$66,501</i>	<i>\$63,296</i>	<i>\$27,415</i>	<i>\$76,257</i>	<i>\$23,230</i>	<i>\$36,881</i>	<i>\$77,468</i>	<i>\$51,364</i>
<i>Fac. Maint. Cost/Station</i>	<i>\$39,296</i>	<i>\$163,664</i>	<i>\$123,075</i>	<i>\$34,146</i>	<i>\$225,480</i>	<i>\$35,706</i>	<i>\$84,284</i>	<i>\$135,216</i>	<i>\$98,206</i>
LRT General Administration									
Contract Services	\$704,338	\$2,179,190	\$22,578,023	\$576,478	\$6,463,875	\$1,838,955	\$5,669,538	\$47,837	\$5,007,279
Materials & Supplies	\$121,725	\$699,992	\$389,339	\$258,712	\$504,878	\$245,547	\$1,529,118	\$615,899	\$545,651
Miscellaneous	\$238,721	\$187,716	\$699,731	\$137,444	\$1,086,152	\$166,263	\$956,564	\$7,606	\$435,025
Casualty & Liability	\$148,496	\$1,095,585	\$52,189	\$289,406	\$23,528	\$488,555	\$556,259	\$1,046,485	\$462,563
Casualty & Liability	\$148,496	\$1,095,585	\$52,189	\$289,406	\$23,528	\$488,555	\$556,259	\$1,046,485	\$462,563
Taxes	\$0	\$39,799	\$28,171	\$0	\$0	\$51,969	\$19,740	\$0	\$17,460
Utilities	\$465,468	\$757,987	\$383,178	\$68,661	\$849,985	\$263,203	\$762,469	\$560,989	\$513,992
Utilities	\$465,468	\$757,987	\$383,178	\$68,661	\$849,985	\$263,203	\$762,469	\$560,989	\$513,992
Subtotal	\$2,292,711	\$6,813,841	\$24,565,996	\$1,688,768	\$9,801,931	\$3,806,249	\$10,812,415	\$3,886,290	\$7,958,525
<i>Admin. Cost/Peak Car</i>	<i>\$53,319</i>	<i>\$136,277</i>	<i>\$236,212</i>	<i>\$35,931</i>	<i>\$89,108</i>	<i>\$67,969</i>	<i>\$91,631</i>	<i>\$102,271</i>	<i>\$112,488</i>
TOTAL	\$9,383,533	\$25,166,286	\$41,331,956	\$15,639,475	\$33,735,594	\$18,238,794	\$77,221,105	\$14,688,338	\$29,447,686

NOTES:

1. Cost for insurance and utilities, other than traction power, have been split between two lines on this worksheet. 50% to yard and shops and 50% to passenger stations.
2. Non-labor costs are from FY 2010 National Transit Database Reports.
3. \$2010 inflated to ___ Budget with CPI-U: 1.0000 (South CPI, Dec. 2010)

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

Griffin Alt with Bus

Table 3b. Non-Labor Unit Costs

Cost Item	Code	Driving Variable	UNIT COSTS							Average	Use	Unit Cost x Unit	
			Salt Lake	St. Louis	Denver	San Jose	Portland	Sacramento	Los Angeles				Baltimore
Vehicle Operations													
Contract Services	100.1	TRNHR	\$0.26	\$55.50	\$17.82	\$25.79	\$24.20	\$68.12	\$196.24	\$0.62	\$27.47	\$27.47 ^{1.}	\$4,040,936
Materials & Supplies	100.2	VO empl	\$0	\$1,050	\$318	\$214	\$519	\$2,045	\$162	\$1,441	\$529.01	\$529.01 ^{2.}	\$101,695
Miscellaneous	100.3	VO empl	\$213	\$15	\$113	\$421	\$0	\$207	\$0	\$45	\$126.89	\$126.89	\$24,392
Propulsion Power	100.4	CARMI	\$0.80	\$0.42	\$0.66	\$1.35	\$0.50	\$0.97	\$1.36	\$0.77	\$0.86	\$0.86	\$4,826,379
											\$8,993,402		
											Veh. Operations Cost/Train-Hr =	\$61.14	
Vehicle Maintenance													
Contract Services	200.1	CARMI	\$0.05	\$0.11	\$0.01	\$0.14	\$0.01	\$0.05	\$0.00	\$0.08	\$0.06	\$0.06	\$318,784
Materials & Supplies	200.2	CARMI	\$0.91	\$0.40	\$0.43	\$1.12	\$0.43	\$0.67	\$1.22	\$0.89	\$0.76	\$0.76	\$4,271,281
Miscellaneous	200.3	VM empl	\$41	\$71	\$724	\$502	\$0	\$325	\$0	\$8,243	\$237.40	\$237.40 ^{3.}	\$23,336
Fuel & Lube	200.4	PKCAR	\$5,085	\$4,681	\$856	\$6,016	\$1,499	\$810	\$1,487	\$1,007	\$2,680.22	\$2,680.22	\$189,626
											\$4,803,027		
											Veh. Maintenance Cost/Car-Mile =	\$0.85	
Facilities Maintenance													
Materials & Supplies													
Track/Way/Signals	300.1	RTMILE	\$4,249	\$14,466	\$3,416	\$2,528	\$41,511	\$4,440	\$5,524	\$6,685	\$5,901.02	\$5,901.02 ^{4.}	\$476,692
Stations	300.2	STATION	\$4,249	\$360	\$12,453	\$4,723	\$37,766	\$4,440	\$9,467	\$5,834	\$5,932.26	\$5,932.26 ^{4.}	\$250,638
Yard/Shop/Central Ctr.	300.3	YARD	\$4,249	\$0	\$29,887	\$170,556	\$269,085	\$4,440	\$167,257	\$32,087	\$14,132.49	\$14,132.49 ^{1,4,5}	\$30,032
Contract Services													
Track/Way/Signals	300.4	RTMILE	\$5,067	\$51,888	\$21,575	\$12,659	\$8,056	\$4,955	\$9,229	\$6,633	\$7,766.39	\$7,766.39 ^{6,7}	\$627,378
Stations	300.5	STATION	\$5,067	\$0	\$4,093	\$3,942	\$7,330	\$7,616	\$15,818	\$92,616	\$4,674.52	\$4,674.52 ^{1,3}	\$197,499
Yard/Shop/Central Ctr.	300.6	YARD	\$5,067	\$0	\$1,012,969	\$256,211	\$52,224	\$0	\$279,450	\$191,020	\$111,996.11	\$111,996.11 ⁷	\$237,992
Miscellaneous	300.7	FM empl	\$494	\$567	\$5	\$734	\$0	\$187	\$0	\$128	\$264.45	\$264	\$26,601
											\$1,846,831		
											Fac. Maint. Cost/Track-Mile =	\$22,862	
											Fac. Maint. Cost/Station =	\$43,712	
General Administration													
Contract Services	400.1	PKCAR	\$16,380	\$43,584	\$217,096	\$12,265	\$58,763	\$32,838	\$48,047	\$1,259	\$30,448.00	\$30,448 ⁷	\$2,154,196
Materials & Supplies	400.2	Total empl	\$420	\$1,887	\$786	\$715	\$802	\$824	\$1,720	\$2,180	\$1,166.68	\$1,167	\$527,529
Miscellaneous	400.3	Total empl	\$824	\$506	\$1,412	\$380	\$1,725	\$558	\$1,076	\$27	\$813.48	\$813	\$367,825
Casualty & Liability	400.4	CARMI	\$0.05	\$0.19	\$0.01	\$0.10	\$0.00	\$0.12	\$0.06	\$0.33	\$0.11	\$0	\$596,195
Casualty & Liability	400.5	RTMILE	\$3,772	\$12,031	\$746	\$3,575	\$209	\$6,622	\$4,593	\$18,168	\$3,252.64	\$3,253 ^{3,6}	\$262,752
Taxes	400.6	PKCAR	\$0	\$796	\$271	\$0	\$0	\$928	\$167	\$0	\$270.27	\$270	\$19,122
Utilities	400.7	STATION	\$16,624	\$20,486	\$10,644	\$1,056	\$22,368	\$5,483	\$14,386	\$17,000	\$13,505.93	\$13,506	\$570,625
Utilities	400.8	YARD	\$465,468	\$378,994	\$191,589	\$68,661	\$212,496	\$131,602	\$254,156	\$280,495	\$247,932.40	\$247,932	\$526,856
											\$5,025,101		
											Admin. Cost/Peak Car =	\$71,026	
											Calibration Non-Labor Cost	\$20,668,361	

NOTES: The following cities were not included in the calculation of average unit costs where specified, because they were considered outliers:

1. Los Angeles
2. Sacramento
3. Baltimore
4. Portland
5. San Jose
6. St. Louis
7. Denver

Calculation of Propulsion Power Costs		Estimated kwh per month = 143,640					
CHARGE		UNIT COST	MONTHLY COST		ANNUAL COST		
1 Customer Charge		\$179.19	\$538		\$6,451		
2 Energy Charge			6.0 kwh per REVCARMI				
		\$0.1019	\$14,633		\$175,591		
3 Demand Charge			13.2 KW per substation				
		\$7.60	\$301		\$3,612		
TOTAL STREETCAR TRACTION POWER					\$185,653		
	Cost per kwh =				\$0.11		
	Cost per Rev. Car-Mile =				\$0.65		
<p>1. FPL Business Rate Schedule GSLD-2 (General Service Large Demand), effective 1/1/12. 2. One Customer Charge assumed for each substation; assume 1 substation per route-mile. 3. Average energy consumption rate for Salt Lake City, St. Louis, San Jose and Portland (see calculation below). 4. Maximum demand assumed supplied to each substation = 13.2KV (Portland); assume 1 substation per route-mile. 5. Assume negotiated rates with no transmission/distribution charges and no rate riders.</p>							
					Average kwh Consumption Rate		
		Propulsion \$	\$/kwh		kwh	rev. car-mi	kwh/rev. car-mi
		\$2,600,654	\$0.11	<i>Salt Lake</i>	23,196,953	2,982,557	7.78
		\$2,466,842	\$0.07	<i>St. Louis</i>	36,302,117	5,024,244	7.23
		\$4,087,109	\$0.18	<i>San Jose</i>	22,358,361	2,459,638	9.09
		\$4,085,751	\$0.08	<i>Portland</i>	53,556,304	6,023,056	8.89
		\$13,240,356	\$0.10	Subtotal	135,413,735	16,489,495	8.21 <<< Use 8.0
		\$3,951,671	\$0.11	<i>Sacramento</i>	34,946,640	3,429,277	10.19
		\$4,072,291	\$0.06	<i>Dallas</i>	70,181,785	5,153,160	13.62
		\$5,274,759	\$0.11	<i>Denver</i>	46,339,256	3,869,345	11.98
		\$13,152,029	\$0.14	<i>Los Angeles</i>	95,971,346	8,114,242	11.83
		\$2,460,431	\$0.07	<i>Baltimore</i>	33,758,160	2,060,331	16.38
		\$42,151,537	\$0.10	Total	416,610,922	39,115,850	10.65

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

Griffin Alt with Bus

Table 4. Line Item Detail

04/12 Calibration

Cost Item	Dept.	Code	Type	Annual Earnings	Productivity Factor	Driver	FTEs	Annual Cost (04/'12 dollars)
Rail Vehicle Operations								
General Superintendent MDT (8473)	100	10.01	LABOR	\$109,955	0	Fixed	0.0	\$0
Chief Supervisor Rail Traffic Control (8161)	100	10.02	LABOR	\$98,107	0	# of Controllers	0.0	\$0
Rail Traffic Controller (8160)	100	10.03	LABOR	\$67,750	0	# of Operators	0.0	\$0
Instructor (Ops & Maintenance)	100	10.04	LABOR	\$58,094	0.020	# of Operators	0.0	\$0
Secretary (0031)	100	10.05	LABOR	\$37,559	0	YARD	0.0	\$0
Rail Supervisor (8163)	100	10.06	LABOR	\$58,251	0.17	# of Operators	3.0	\$174,753
Train Operator (8073)	100	10.07	LABOR	\$43,610	0.769	TRNHR	15.0	\$654,152
Fare Inspector	100	10.08	LABOR	\$39,548	0.015	CARMI	3.0	\$118,644
Overtime, Operators	100		LABOR		5.0%	Operator Wages		\$32,708
Overtime, Other ATU Empl.	100		LABOR		5.0%	Other ATU Wages		\$5,932
System Police Officers	100		SERV		\$0.394	1,000 TRNHR		\$0
Other Contract Services	100	100.1	SERV		\$27.47	TRNHR		\$563,628
Materials & Supplies	100	100.2	MATL		\$529	Dept. Employee		\$11,725
Miscellaneous	100	100.3	MISC		\$126.89	Dept. Employee		\$2,812
<u>Propulsion Power</u>	<u>100</u>	<u>100.4</u>	<u>UTIL</u>		n/a	Calculated Separately		\$185,653
Subtotal							21.0	\$1,750,007
						Train-Hours/Operations Employee		925.6
						Operations Non-Labor Cost/Train-Hour		\$39.30
Rail Vehicle Maintenance								
General Superintendent MDT (8473)	200	20.01	LABOR	\$109,955	0	Fixed	0.0	\$0
Administrative Secretary (0094)	200	20.02	LABOR	\$39,335	0	YARD	0.0	\$0
Chief Supervisor Rail Vehicle Repair (8169)	200	20.03	LABOR	\$86,438	0	YARD	0.0	\$0
Rail Stock Clerk (8074)	200	20.04	LABOR	\$43,217	2.0	Shifts, YARD	1.0	\$43,217
MDT Operation Maintenance Instructor (Rail Maintenance) (8106)	200	20.05	LABOR	\$58,094	1.0	YARD	0.0	\$0
Foreman, LRV Shops	200	20.06	LABOR	\$58,094	2.0	Shifts, YARD	1.0	\$58,094
Rail Vehicle Mechanic (8071)	200	20.07	LABOR	\$57,238	0.133	10,000 CARMI	4.0	\$228,953
Rail Maintenance Worker (8063)	200	20.08	LABOR	\$39,548	0.167	# Elec./Mech.	0.0	\$0
Rail Vehicle Cleaner (8069)	200	20.09	LABOR	\$39,548	0.20	PKCAR	1.0	\$39,548
Overtime, ATU Employees	200		LABOR		5.0%	Dept. ATU Wages		\$15,586
Contract Services	200	200.1	SERV		\$0.06	CARMI		\$8,573
Materials & Supplies	200	200.2	MATL		\$0.76	CARMI		\$114,863
Miscellaneous	200	200.3	MISC		\$237.40	Dept. Employee		\$1,754
<u>Fuel & Lube</u>	<u>200</u>	<u>200.4</u>	<u>FUEL</u>		\$2,680.22	PKCAR		\$19,802
Subtotal							7.0	\$530,390
						Car-Miles/Vehicle Maint. Employee		41,040
						Veh. Maint. Non-Labor Cost/Car-Mile		\$0.50

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

Griffin Alt with Bus

Table 4. Line Item Detail

04/12 Calibration

Cost Item	Dept.	Code	Type	Annual Earnings	Productivity Factor	Driver	FTEs	Annual Cost (04/'12 dollars)	
Rail Facilities Maintenance									
Chief MDT Facilities Maintenance (8331)	300	30.01	LABOR	\$102,260	0	Fixed	0.5	\$51,130	
Secretary (0031)	300	30.02	LABOR	\$37,559	0	YARD	0.0	\$0	
General Superintendent Track & Guideway (8473)	300	30.03	LABOR	\$109,955	0	Fixed	0.0	\$0	
Manager, Power & Signals	300	30.04	LABOR	\$58,094	0	Fixed	0.0	\$0	
MDT Property Manager (8265)	300	30.05	LABOR	\$49,158	0	Fixed	0.0	\$0	
Rail Structure & Track Supervisor (8180)	300	30.06	LABOR	\$66,295	0.2	# T&W Maint.	0.3	\$22,098	
Supervisor, Power	300	30.07	LABOR	\$58,094	0.2	# P&S Maint.	0.3	\$19,365	
Facilities Maintenance Supervisor	300	30.08	LABOR	\$49,158	0.2	# B&G Maint.	0.3	\$16,386	
Account Clerk (0310)	300	30.09	LABOR	\$35,036	1.0	YARD	1.0	\$35,036	
Track Repairer (8064)	300	30.10	LABOR	\$41,199	0.125	RTMILE	1.0	\$41,199	
Power Maintainer	300	30.11	LABOR	\$57,238	0.100	RTMILE	1.0	\$57,238	
Transit Facilities Maintainer	300	30.12	LABOR	\$57,238	0.10	STATION	1.0	\$57,238	
Electrician	300	30.13	LABOR	\$49,158	0.10	STATION	1.0	\$49,158	
Power Inspector	300	30.14	LABOR	\$57,238	0.05	RTMILE	0.0	\$0	
Rail Vehicle Electronic Technician (8068)	300	30.15	LABOR	\$58,816	0.07	RTMILE	0.0	\$0	
Mechanic Helper	300	30.16	LABOR	\$37,559	0.20	# Maintainers	0.0	\$0	
Overtime, ATU Employees	300		LABOR		5.0%	Dept. ATU Wages		\$14,886	
Materials & Supplies									
Track/Way	300	300.1	MATL		\$5,901	RTMILE		\$19,619	
Stations	300	300.2	MATL		\$5,932	STATION		\$37,568	
Yard/Shop	300	300.3	MATL		\$14,132	YARD, PK VEH		\$3,729	
Contract Services									
Track/Way	300	300.4	SERV		\$7,766	RTMILE		\$25,821	
Stations	300	300.5	SERV		\$4,675	STATION		\$29,603	
Yard/Shop	300	300.6	SERV		\$111,996	YARD, PK VEH		\$29,552	
Miscellaneous	300	300.7	MISC		\$264.45	Dept. Employee		\$1,814	
Subtotal							6.5	\$511,441	
								Track-Miles/Facil. Maint. Employee	0.97
								Facil. Maint. Non-Labor Cost/Track-Mile	\$23,446
Rail Administration & Support									
General Manager	400	40.01	LABOR	\$193,140	0	Fixed	0.0	\$0	
Chief Safety & Security	400	40.02	LABOR	\$98,107*	1	Fixed	0.0	\$0	
MDT, Grant Resources (0346)	400	40.03	LABOR	\$110,096	0	Fixed	0.0	\$0	
Operations Analyst	400	40.04	LABOR	\$43,217	0	PKCAR	0.0	\$0	
Administrative Secretary (0094)	400	40.05	LABOR	\$39,335	0	Fixed	0.0	\$0	
MDT Field Test Engineer (Civil) (8358)	400	40.06	LABOR	\$115,474	0.033	RTMILE	0.0	\$0	
MDT Field Test Engineer (Electrical) (8358)	400	40.07	LABOR	\$115,474	0.040	PKCAR	0.0	\$0	
Engineering Technician	400	40.08	LABOR	\$43,217	1.0	# Engineer	0.0	\$0	
Other Support Staff	400		LABOR	\$37,559*	0	Total LRT empl.	0.0	\$0	
Overtime, ATU Employees	400		LABOR		5.0%	Dept. ATU Wages		\$0	
Contract Services	400	400.1	SERV		\$30,448	PKCAR		\$112,479	
Materials & Supplies	400	400.2	MATL		\$1,167	Total LRT empl.		\$21,242	
Miscellaneous	400	400.3	MISC		\$813.48	Total LRT empl.		\$14,811	
Casualty & Liability	400	400.4	INSUR		\$0.11	CARMI		\$32,066	
Casualty & Liability	400	400.5	INSUR		\$3,253	RTMILE		\$21,628	
Taxes	400	400.6	TAX		\$270	PKCAR		\$1,997	
Station Utilities	400	400.7	UTIL		\$13,506	STATION		\$171,061	
Yard Utilities	400	400.8	UTIL		\$247,932	YARD		\$130,843	
								0.0	\$506,127
								G/A FTE/Other G&A FTE (%age)	0%
								G/A Non-Labor Costs/Other Non-Labor Costs	48%
TOTAL EMPLOYEES AND COST							34.5	\$3,297,965	

CENTRAL BROWARD EAST-WEST TRANSIT STUDY

CBEWT LRT O&M Cost Model

Griffin Alt with Bus

Table 5. Summary of Alternative

04/12 Calibration

I. INPUT VARIABLES

Operating Statistic	Input Value
Peak Cars	7
Revenue Car-Miles	287,280
Revenue Train-Hours	19,437
Passenger Stations	12
Directional Route Miles	6.3
Maintenance Facilities	1

II. COST SUMMARY BY COST CATEGORY/COST TYPE (04/12\$)

Dept.	FUEL	INSUR	LABOR	MATL	MISC	SERV	TAX	UTIL	TOTAL	
LR Operations	100		\$986,188	\$11,725	\$2,812	\$563,628		\$185,653	\$1,750,007	
LRV Maintenance	200	\$19,802	\$385,398	\$114,863	\$1,754	\$8,573			\$530,390	
LR Facilities Maint.	300		\$363,734	\$60,916	\$1,814	\$84,976			\$511,441	
LR Administration	400		\$0	\$21,242	\$14,811	\$112,479	\$1,997	\$301,904	\$506,127	
Grand Total	Grand Total	\$19,802	\$53,694	\$1,735,320	\$208,746	\$21,192	\$769,657	\$1,997	\$487,557	\$3,297,965

III. ANNUAL COST FACTORS (04/12\$)

Total Cost per Revenue Train-Hour =	\$169.67
Total Cost per Revenue Car-Mile =	\$11.48
Veh. Ops. Cost per Train-Hour =	\$90
Veh. Maint. Cost per Car-Mile =	\$1.85
Facil. Maint. Cost per Station =	\$42,620
Administrative Cost per Peak Car =	\$72,304