

Brunswick County Transportation Analysis

Implementation of New Boundaries

Education Logistics, Inc.

March 31, 2020

Background

- Brunswick County Schools (BCS) contracted with Cropper GIS for the generation of alternative school boundaries for the opening of Town Creek Middle School. Cropper provided 4 redistricting scenarios
- Edulog performed a transportation analysis of each scenario to provide the BCS Board of Education with transportation impact data related to each of the four scenarios
 - In terms of mileage, average student travel time, etc. there was not significant difference between the four scenarios to outweigh other considerations not related to transportation
 - The BCS Board of Education selected Scenario 1
- Edulog was asked to analyze the transportation implementation for Scenario 1 and to further analyze alternatives for bell times for Town Creek Elementary and Town Creek Middle School

Terminology

- Bus Runs – Where the bus picks up students and drops them off at school, emptying the bus. The bus may then proceed to service another run
- Bus Route – “What a bus does for the day” comprising all morning runs and afternoon runs
- Deadhead – Bus traveling empty from the end of one run to the beginning of another (only when at least 2 runs pairs in AM and/or PM)

Our Task – Provide Options for Consideration

.....from an efficiency and funding perspective.

Data presented are projected ***district-wide*** changes in buses and cost, as impacted by the changes in the Town Creek study area.

Three scenarios evaluated for Town Creek

- SCENARIO 1 – Separate Town Creek Elementary and Town Creek Middle School transportation. TCM 7:30 start; TCE 8:30 start
- SCENARIO 2 – Combine TCE and TCM students on the same bus routes. Both TCE and TCM on Tier 1 (7:30 start)
- SCENARIO 3 – Combine TCE and TCM students on the same bus routes. Both TCE and TCM on Tier 2 (8:30 start)

Current (Live) data	Full-Day Mileage	Mileage per run (226 runs)
Checkpoint	1419.5	6.28
Deadhead	287.9	
Loaded	4386.3	19.41
TOTAL	6093.7	

Study Area Data

Additional Daily Mileage For Each Scenario

MILEAGE						
OPTIMIZED VS. CURRENT	Scenario 01	Scenario 02	Scenario 03	Δ - 01	Δ - 02	Δ - 03
	TCM Tier1 TCE Tier 2	TCM and TCE combined on Tier 1	TCM and TCE Combined on Tier 2			
Added Chkpt Mileage @ 20.875/bus	1,420	1,482	1,461	0	63	42
Deadhead	697.9	624.2	638.1	410	336.3	350.2
Loaded	4467.6	4324.1	4324.1	81.3	-62.2	-62.2
Buses				0	3	2
Total Mileage	6,585.00	6,430.43	6,423.45	491.30	336.72	329.75

North Carolina Department of Public Instruction
District Operations Division
Transportation Services
Refund Rates for School Buses
October 11, 2019

Brunswick County - 100

Per Mile Cost Calculation		
Code	Description	Bus Cost Per Mile
6550-58-175	Transportation Salaries	\$0.3665
* 6550-58-171	Wages of Drivers	\$1.0826
6550-58-424	Oil	\$0.0114
6550-58-425	Tires and Tubes	\$0.0287
6550-58-422	Vehicle Repair Parts	\$0.1956
** 6550-58-423	Fuel (Gasoline and Diesel)	\$0.3269
XXXX-XX-XXXX	Bus Replacement Costs	\$0.3600
6550-58-211	Social Security	\$0.1038
6550-58-221	Retirement	\$0.2180
6550-58-231	Hospitalization	\$0.2148
XXXX-XX-XXXX	Tort Insurance Cost	\$0.0370
	Total Cost Per Mile	\$2.9453

Time Calculations

BRUNSWICK COUNTY IMPLEMENTATION SCENARIOS

COST IMPACT BASED ON INCREASED ROUTE AND DEADHEAD TIME AND HOURLY WAGE RATES

Line #	TIME PER DAY			MILEAGE PER DAY			
	LIVE data	Time (minutes)	Time (hours)	MPH	LIVE data	Full-Day	Mileage per run (226 runs)
1					Checkpoint	1,419.50	6.28
2	Loaded	11,661.40	194.36	22.57	Loaded	4,386.30	19.41
3	Deadhead	675.00	11.25	25.59	Deadhead	287.90	
4	TOTAL	12,336.40	205.61		TOTAL	6,093.70	

LIVE vs. 2nd Round	Scenario 01	Scenario 02	Scenario 03	Δ - 01	Δ - 02	Δ - 03	
	TCM Tier1 TCE Tier 2	TCM and TCE combined on Tier 1	TCM and TCE Combined on Tier 2				
5	Loaded	11,641	11,382	11,338	-20	-280	-323
6	Deadhead	1,507	1,384	1,397	832	709	722
7	Combined	13,148	12,766	12,735	812	429	399
8			Hrs/Day	13.53	7.15	6.65	
9			Hrs/Year (172)	2,327.73	1,229.80	1,143.80	
10	* \$15.90 from TD-2R Report	36% estimated benefits from DPI Refund Rate	Cost per hour (\$15.90 x 1.36)*	\$ 21.62	\$ 21.62	\$ 21.62	
11	Total Driver Labor Cost			\$ 50,334.91	\$ 26,593.20	\$ 24,733.53	
12	Increase in Miles			84,503.60	57,916.70	56,717.00	
13	Fuel, parts, tires @ \$0.56 /mile			\$ 47,322.02	\$ 32,433.35	\$ 31,761.52	
14	Total Increase in Cost (Labor + Fuel, etc) Using Hourly Rate			\$ 97,656.92	\$ 59,026.55	\$ 56,495.05	

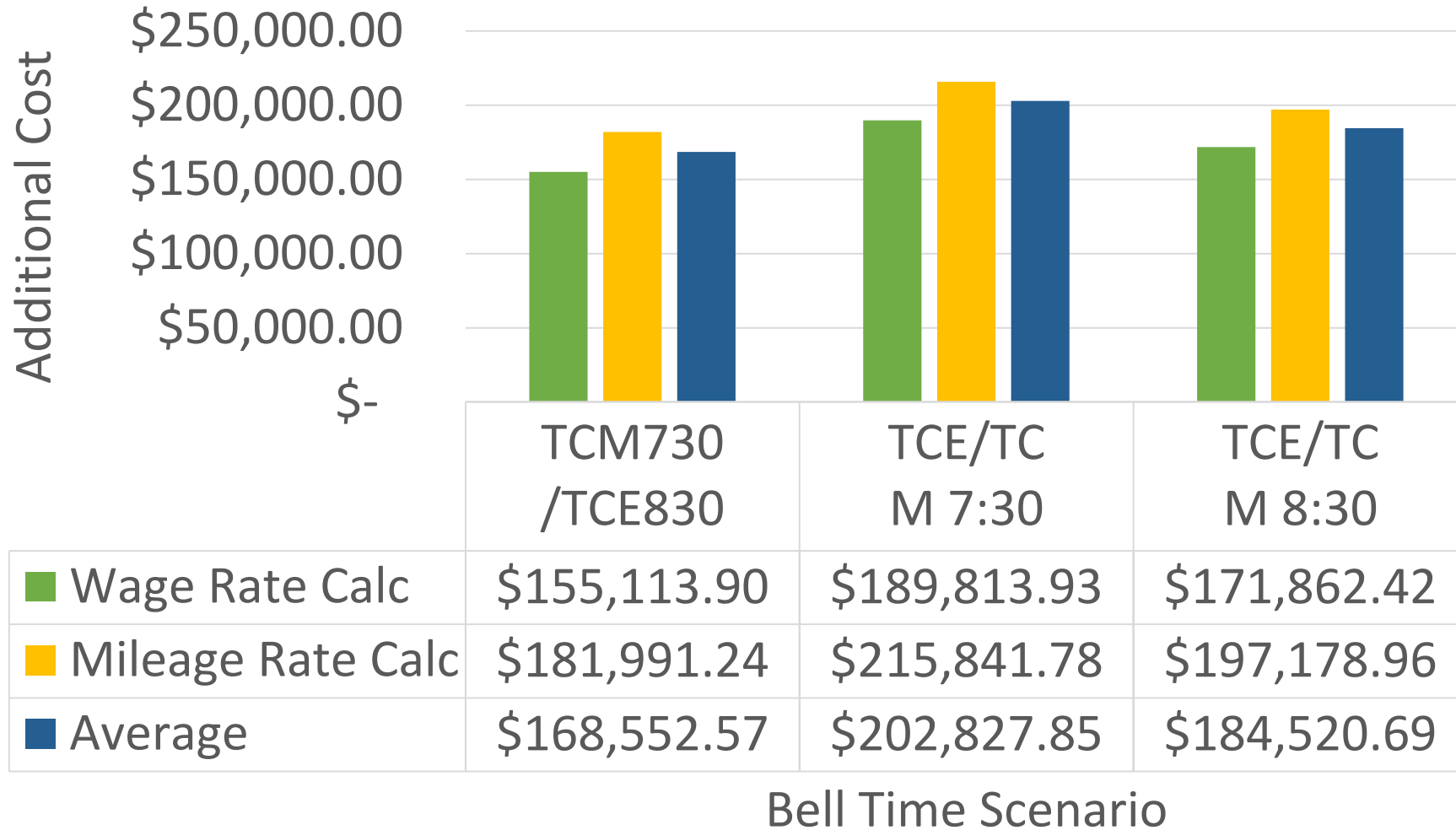
Funding Impact Per Scenario Using DPI Refund Rate

FUNDING IMPACT				
Calculations using the 2020 Budget Rating Simulator				
		Scenario 01	Scenario 02	Scenario 03
Line	Buses	TCM Tier1 TCE Tier 2	TCM and TCE combined on Tier 1	TCM and TCE Combined on Tier 2
1	Change in Number of Buses	0	3	2
2	Change in Daily Mileage	491.30	336.72	329.75
3	Change in Annual Mileage	84,503.60	57,916.70	56,717.00
4	Cost of Change in Mileage @ \$1.86 / mile	\$ 157,176.70	\$ 107,725.06	\$ 105,493.62
5	Budget Rating (current 85.31%)	84.53%	83.85%	84.15%
6	Total (increased) expenditures	\$ 6,152,496.70	\$ 6,103,045.06	\$ 6,100,813.62
7	Simulated State funding (total expenditures x Budget rating)	\$ 5,200,705.46	\$ 5,117,403.28	\$ 5,133,834.66
8	Current state funding ('19-'20 allotment)	\$ 5,225,520.00	\$ 5,225,520.00	\$ 5,225,520.00
9	Decrease in State Funding	\$ 24,814.54	\$ 108,116.72	\$ 91,685.34
10	Net Fiscal Impact (Additional Cost plus Decreased State Funding)	\$ 181,991.24	\$ 215,841.78	\$ 197,178.96

FUNDING IMPACT – Hourly Driver Time

FUNDING IMPACT USING HOURLY WAGES				
Calculations using the 2020 Budget Rating Simulator				
Line #	Buses	Scenario 01	Scenario 02	Scenario 03
		TCM Tier1 TCE Tier 2	TCM and TCE combined on Tier 1	TCM and TCE Combined on Tier 2
1	Change in Number of Buses	0	3	2
2	Total increased expenditures based on time calculations above	\$ 97,656.92	\$ 59,026.55	\$ 56,495.05
3	Budget Rating (current 85.31%)	84.82%	84.15%	84.44%
4	Total (increased) expenditures	\$ 6,092,976.92	\$ 6,054,346.55	\$ 6,051,815.05
5	Simulated State funding (total expenditures x Budget rating)	\$ 5,168,063.02	\$ 5,094,732.62	\$ 5,110,152.63
6	Current state funding ('19-'20 allotment)	\$ 5,225,520.00	\$ 5,225,520.00	\$ 5,225,520.00
7	Decrease in State Funding	\$ 57,456.98	\$ 130,787.38	\$ 115,367.37
From Wage Rate Calculations:				
8	Net Fiscal Impact (Additional Cost plus Decreased State Funding)	\$ 155,113.90	\$ 189,813.93	\$ 171,862.42
From Refund Rate Calculations:				
9	Net Fiscal Impact (Additional Cost plus Decreased State Funding)	\$ 181,991.24	\$ 215,841.78	\$ 197,178.96
Average		\$ 168,552.57	\$ 202,827.85	\$ 184,520.69

Additional Cost by Scenario



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