Analysis of the Public Transportation System

Maren Reinig and Alison Compton

CITY OF COLUMBIA, MISSOURI

Columbia Transit

Columbians for Modern, Efficient Transit

Public Health
Prevent. Promote. Protect.
Columbia/Boone County Department of Public Health and Human Services

Problem/ Purpose of Project

- Where within the Transit System should changes be made and how can that change be funded?

Development of Project

- Over 100 year old Public Transportation System
- What do the people want
- Ridership decline (Due to two main problems):
  - Routes do not cover entire City of Columbia
    - Prathersville, Lake of the Woods, and Scott Blvd.
  - Inconvenient/non-flexible time schedule
    - Monday, Tuesday, Wednesday Routes

Background to Project

- Project Development (Re-cap):
  - Columbia Transit desired to know what people wanted to see changed.
  - Most convenient method of data collection for this project: Survey

- Survey Development:
  - Demographics, Personal Preferences, Customer Satisfaction

Overview: Design of Project

- Development of categories for survey questions
- Desire to reach riders on a more personal level to understand needs
- Help the City of Columbia to make happy customers/staff
- Increase ridership, funding, overall reliability and satisfaction ratings.

Design of Project (Survey)

- Astute Intelligence Gathering
  - Data collection/understanding ridership
- Ability to Cope with Disturbances
  - Customer preferences/ why a customer will or will not ride the bus
- Coherent Organizational and Operational Strategies
  - Customer Satisfaction with bus system and customer service methods
- Adequate Overall Structure
  - Possible changes to system
- Adequate Sub-System Structures (Each Individual Route)
  - Direct opinions/ comments for reliability, flow of routes, etc.
- Effective Communication
  - Bus driver communication with managerial staff and communication to community (i.e. updates/ fliers)

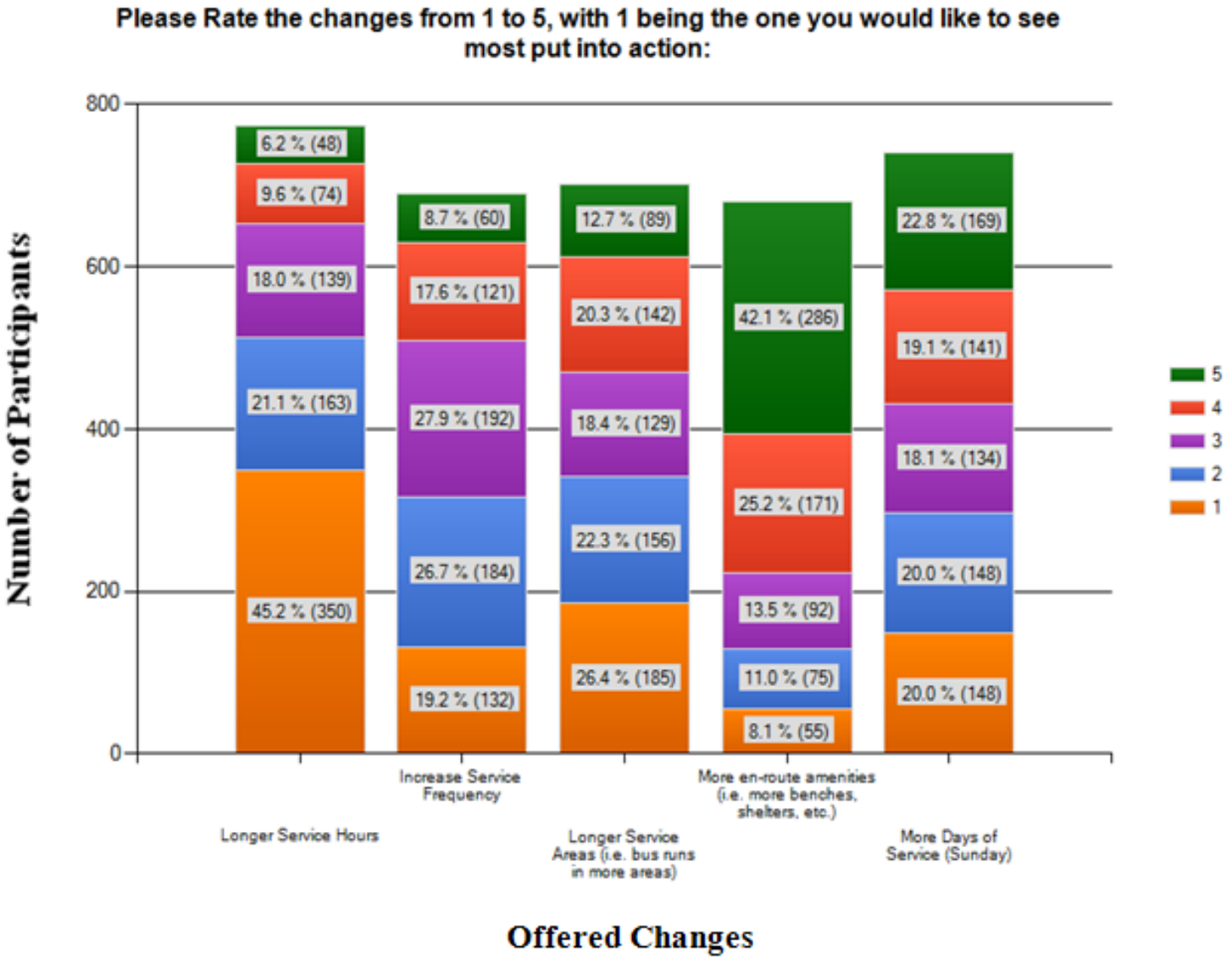
Overview: Data Collection

- Goal: Clarify the direction of the Columbia Transit System and identify primary customer needs

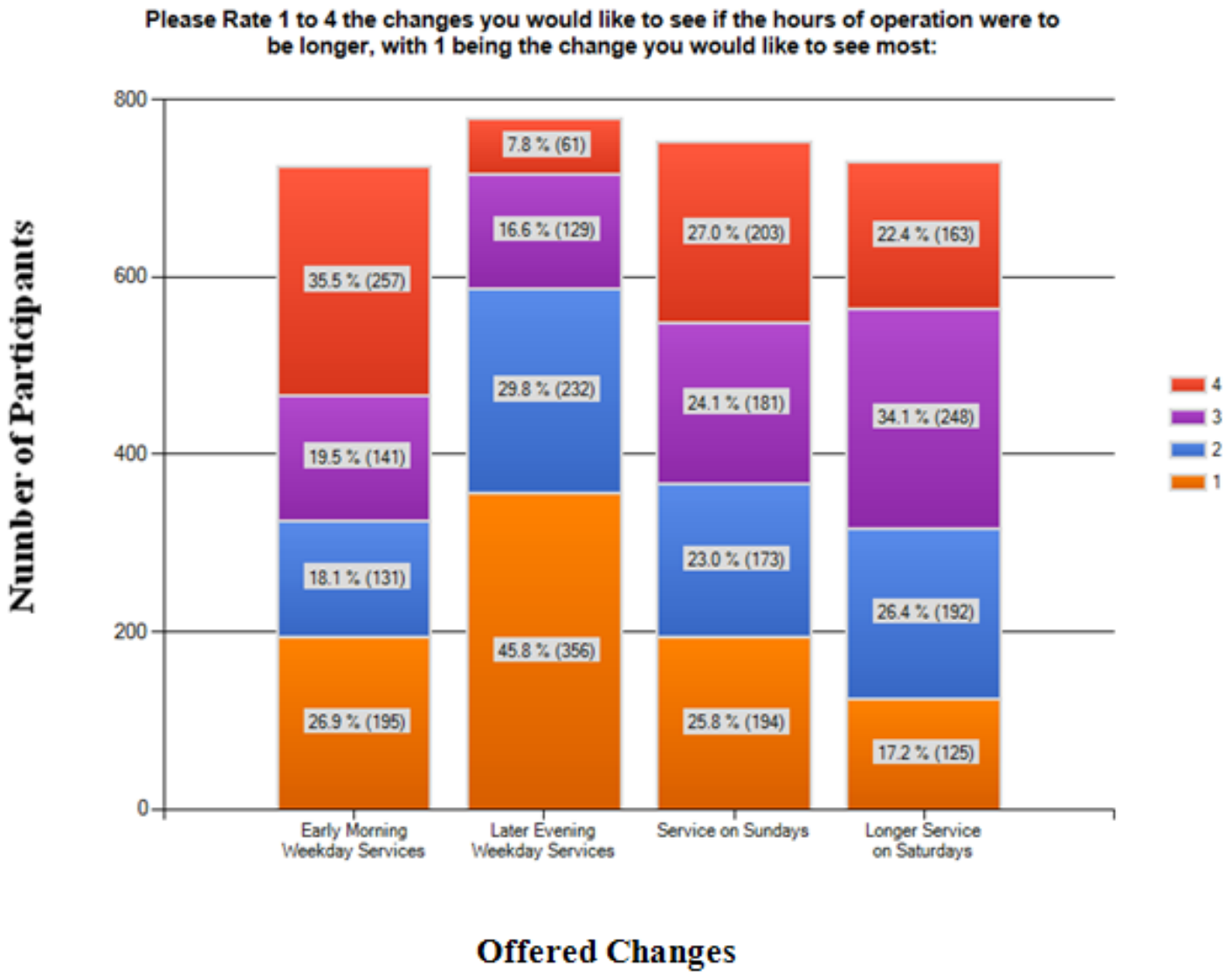
Survey Results:

- Total Number of Participants: 907
  - Methods of distribution: Online survey and Paper survey (distributed on all 15 bus routes)
- Results:
  - Customer Satisfaction:
    - Rating of Columbia Transit overall: Good
    - Customer Service ratings: Good
    - Columbia Transit Reliability Rating: Good
  - Personal Preferences:
    - Primary reason for riding: Work
    - Bus Fare options: Raise from $1.00 – $1.50
    - Majority bus stop distance: 0-5 minutes
    - Majority use of bus: Daily
    - Majority Community Communication: Email/ Fliers on bus
  - Demographics:
    - Majority annual income: Less than $9,999
    - Majority age: 25-40

Primary Customer Needs



Primary Customer Needs



Conclusions of Primary Customer Needs

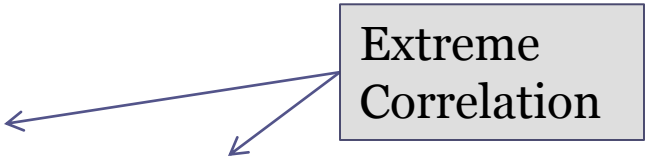
- Changes ridership would most like to see Overall:
  - Longer Service Hours (45.2 %)
  - Longer Service Areas (26.4%)

- Changes ridership would most like to see if hours of operation were increased:
  - **Later Evening Weekday Services (45.8%)

CURRENT SYSTEM

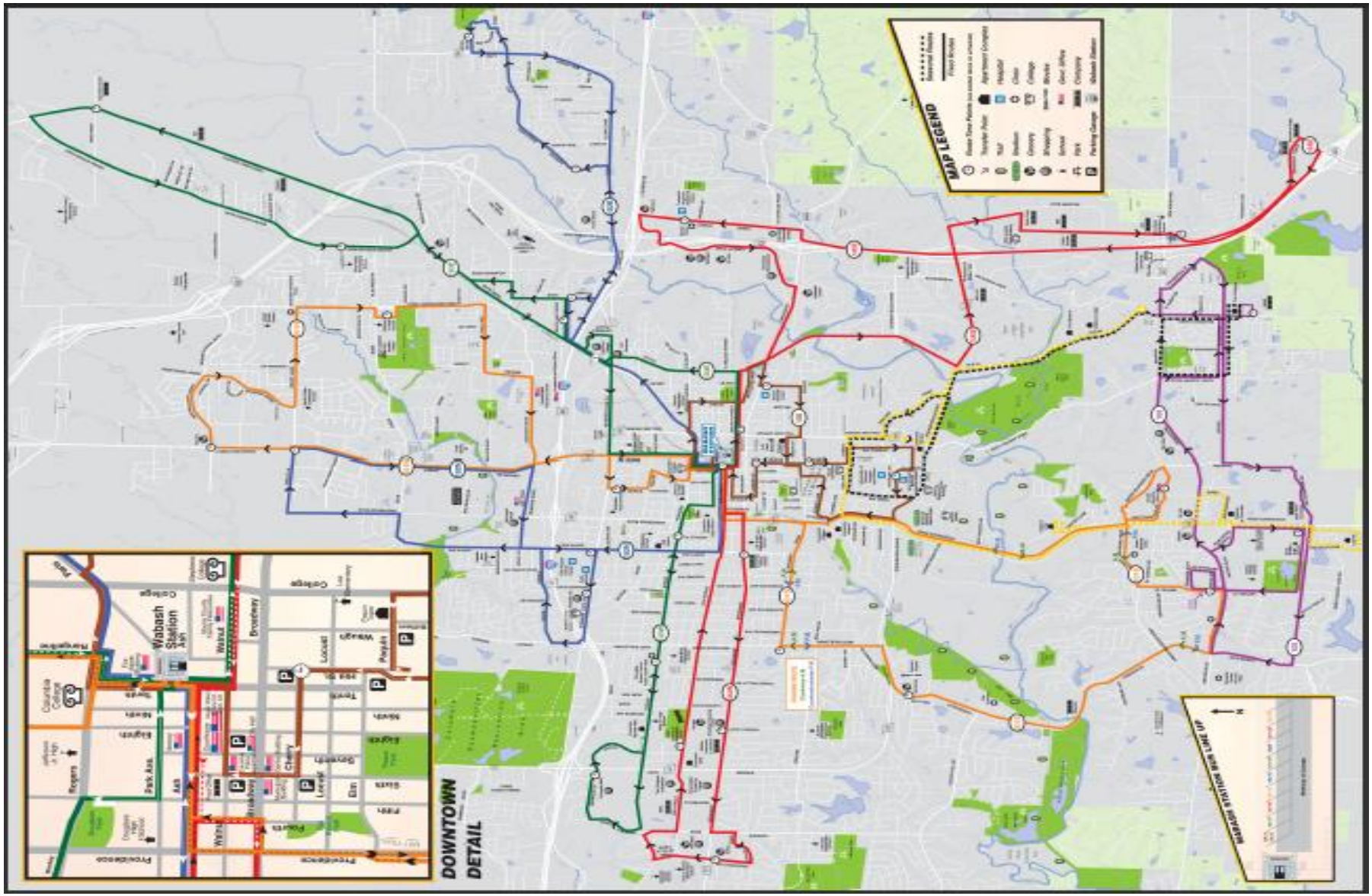
Overview: Problem Solving

- Break-down of all primary options:
  - Detailed analysis of each possible solution:
    - 1) Longer Service Areas (26.4%)
    - 2) Longer Service Hours (45.2%)
    - 3) Later Evening Weekday Services (45.8 %)



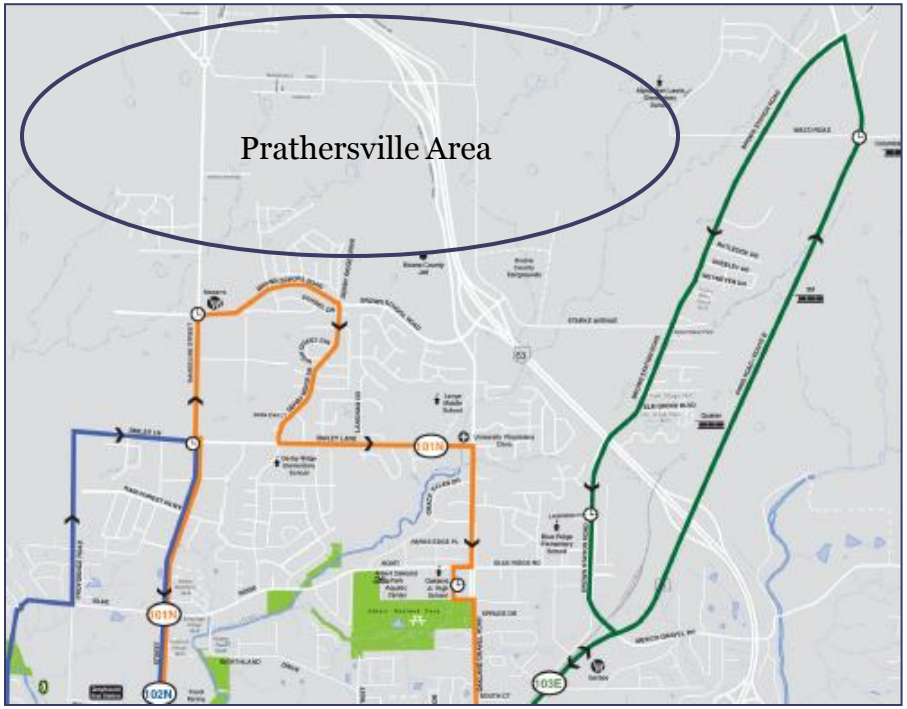
- Choose the best solution that will implement best change for Columbia Transit System

Longer Service Areas: Current Map



1) Longer Service Areas- New Extension

Prathersville Area



Scott Blvd.

1) Longer Service Areas Cont.- New Extension

Lake of the Woods

2&3) Longer Service Hours/ Later Weekday Services: Current System

Monday- Wednesday

- 6:25 A.M to 6:25 P.M

Thursday and Friday

- 6:25 A.M to 10:25 P.M

Saturday

- 10:00 A.M to 7:30 P.M

Sunday

- Busses do not run

2&3) Longer Service Hours/Later Weekday Services: New System

Monday- Wednesday

- **6:25 A.M to 10:25 P.M**

Thursday and Friday

- 6:25 A.M to 10:25 P.M

Saturday

- 10:00 A.M to 7:30 P.M

Sunday

- Busses do not run

NEW SYSTEM

DECISION (Best Solution):

Later Evening Weekday Services

(Highest Rating of 45.8%)

Analysis of Optimal Solution: Later Evening Weekday Services

- Main Analysis:
  - Majority of ridership rides the bus daily and for the purpose of work
  - Need an adjustment to the current hours of operation to accommodate those whose work shifts end in the later evening hours during the week
  - Use Current System (buses, employees, routes, etc.) to account for time changes.
  - Budgetary Changes

New Time Schedule Adjustments:

Monday- Wednesday

- **6:25 A.M to 10:25 P.M**

Thursday and Friday

- 6:25 A.M to 10:25 P.M

Saturday

- 10:00 A.M to 7:30 P.M

Sunday

- Busses do not run

New Budget: Fuel Costs

Fuel Cost

CURRENT

Number of buses:	31			
Hours per week the buses run:	77.5			
Hours per year the buses run:	4045.5			
Approxamate Fuel Cost/Month/Bus:	$4,000			
Annual Fuel Cost/Year/Bus:	($4,000/month/bus)(12 months/year)=			$48,000
Annual Cost of fuel for all 31 Buses:	*($48,000)(31 buses)*	=	*$1,488,000*	

INCREASE (*note the number of buses is being kept the same)

Increase in hours/week:	12		
Increase in hours/year: (12)(52.2)=	626.4		
New total hours per year: (626.4 + 4045.5)=		4671.9	
New fuel cost:	4671.9 hours / 4045.5 hours	=	New fuel cost / $1,488,000

New fuel cost: *$1,718,400*

TOTAL INCREASE IN FUEL COST:	$230,400 /year

New Budget: Employee Wages Adjustments:

Bus Driver Wages

CURRENTLY

27 Full-time bus drivers

47 Part-time bus drivers

Full-time hourly wage: $13.095

Part time hourly wage: $11.25

INCREASE *(note: we are assuming there is no need for an increase in drivers. Use part time driver)

Extra hours per week: 12 = (4 hours extra per day)(3 days [M,T,W])

Extra weekly cost of compensation to bus drivers:

= (15 routes)(12 hour increase)($11.25/hour)

= $2025 /week

Yearly increase of wages: =($2025/week)(52.2 weeks/year)

=$105,705/year

New Budget: Total Funding

Total Budget Increase

(Increase due to driver wages)+(Increase due to fuel cost)

= ($105,705) + ($230,400)

= $336,105

Estimating other possible increases leads to a new estimated total of: **$450,000**

This is a lot to ask for….

- Suggested Options:
  - Option 1: $450,000 budget increase
    - This would be a "Big Step" toward changing the Transit system and would require a large donation from the City of Columbia to the Public Transportation Fund
  - **Option 2:
    - 6 Month Trial Period
    - Only extend the hours of 2 routes out of total 15 routes for Monday through Wednesday to 10:25 P.M.
    - Increase bus fare to $1.50 for all 15 routes
      - Measure this income to see if results in an increase revenue for Transit System and a beneficial investment for the City of Columbia
    - Budget Adjustment

Option 2: Budget Adjustment

6 Month, 2 Route Trial Period

$\frac{\$336,105}{2} = \$168,052.5$ *Cost now in terms of 6 months

$\frac{\$168,052.50}{15 \text{ routes}} = \$11,203.5$

$\$11,203.5 \times 2 \text{ routes} =$ **$22,407**

Option 2: Summary

- Benefits:
  - Less of a financial risk than Proposal in Option 1
  - 6 month trial period will be an indicative way of showing how much ridership there is weekly on the 2 routes and how much money the Transit would make from those same 2 routes. Once that data is gathered then this can be spread to the additional 15 routes.
  - Increase in revenue will allow funds for advertising, renovation options, additional changes for Wabash Station, etc.

Solution/ Conclusion (Option 1 Only)

- Based upon the budgetary changes described in Option 1, it is apparent that funding is necessary to implement these changes for the Transit system.

- Lengthening the weekday service hours is the most cost effective solution because changes can be made to the Transit system without forcing the current system to drastically change.
  - No need to buy new buses, employ more staff, change current bus routes

- Only changes being suggested are to extend weekday hours from Monday- Wednesday to 10:25 P.M. from its original 6:25 P.M.

- Budget estimate is a rise of $400,000- 450,000 (based on fluctuation of gas prices and employee wages)

Final Statement

- The primary goal of this analysis project has been to put the best interests and needs of those who live in Columbia, Missouri and meet or exceed their current and future public busing transport needs.

References:

- GoColumbiaMo.com. 2007. “Columbia Transit Map.” City of Columbia, 2010. Web. 15 Apr. 2011. http://www.gocolumbiamo.com/PublicWorks/Transportation/documents/2010_columbiatransitmap.pdf
- GoColumbiaMo.com. 2007. “Columbia Transit Schedule.” City of Columbia, 2010. Web. 14 Apr. 2011. http://www.gocolumbiamo.com/PublicWorks/Transportation/documents/2010_columbiatransitschedules.pdf.
- GoColumbiaMo.com. 2007. “Transportation.” City of Columbia, 2007. Web. 27 Apr. 2011. http://www.gocolumbiamo.com/PublicWorks/Transportation/.
- “2011 Poverty Guidelines.” http://www.uscis.gov/files/form/i-864p.pdf. Form I-864P. Web. 1 Mar. 2011. 25 May. 2011.
- “Public Works Department Summary: Budget Detail.” http://www.gocolumbiamo.com/Finance/Services/Financial_Reports/FY2011_Budget/document/11-public-works.pdf. Web. 2011. 25 May. 2011.
- SurveyMonkey. “Public Transportation Survey 2011.” 1999-2011. SurveyMonkey.com. . Web. 25 Apr. 2011 – 19 May. 2011.