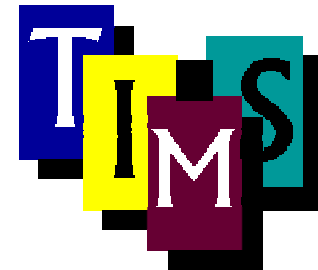


TIMS Session – Summer Conference 2008

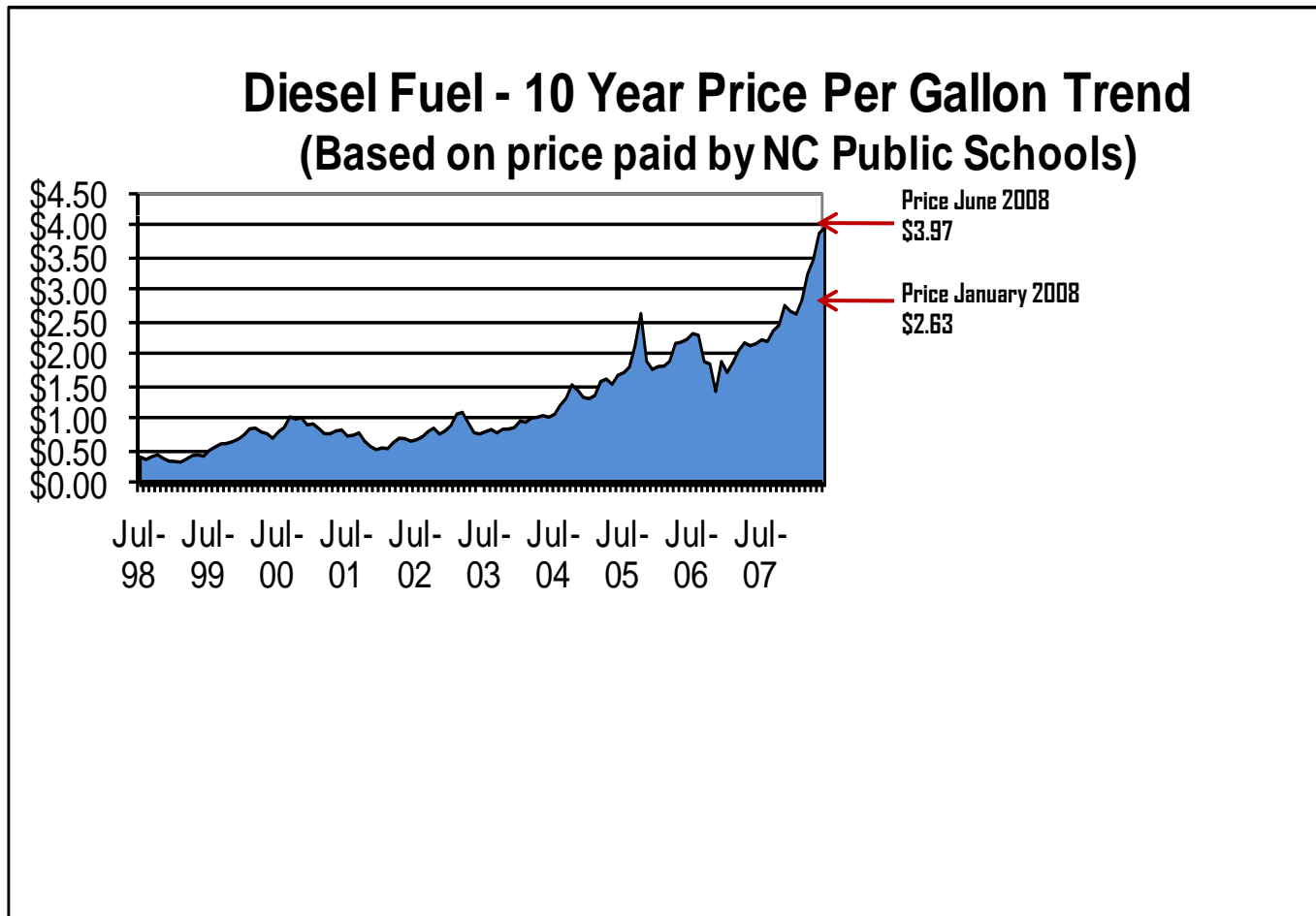
Ways to Use TIMS to examine Stops, Runs and
Routes to increase Fuel Efficiency

Welcome!

- Thursday, June 19, 2008
- TIMS session – Using TIMS Data for Boundary Analysis
- HAS BEEN CHANGED to Ways to Use TIMS to examine Stops, Runs and Routes to increase Fuel Efficiency



Record Fuel Prices!!



Cost of Fuel

- We all have been affected by the price of fuel
- How will your district make up the cost of fuel when it was budgeted at \$2.80 a gallon and now just over \$4.00 a gallon?
- What if more students ride this fall?
- Are you prepared if things get worse?
- Legislators are dealing with funding the higher cost of fuel since the budgets were created.



What to Expect

- The high cost of fuel will impact everyone
- You may be asked to examine stops, runs and routes to decrease the amount of fuel used
- Derek Graham will be speaking to NC Superintendents on this matter at the end of June with some recommendations you see today



A Transportation Self-Assessment

- We know district decisions and policies affect the cost and efficiency of transportation
- Many of these policies are not within your realm and scope of input
- Look for ways to communicate your needs with the Superintendent and Board



Transportation Responsibilities

- Do you have written stop placement and routing policies and are they consistent with state policies?
- Are your routing decisions being made by someone at the school level, by staff without a stake in the cost of the decision? (this is a big one!)
- Who sets bell times for each school – is there any coordination?
- Are transportation staff involved in IEP meetings related to transportation decisions?
- Do you regularly review and audit bus routes? Who does it? How often? Who is responsible?
- Do parent complaints dictate your transportation plan?



Transportation Planning

- Do internal planning policies consider the costs of transportation in both dollars and ride time?
- Do the right people make the right decisions about special program and magnet locations?
- Is anyone looking at the big picture – like staggering bell times – it doesn't have to be a big time change – sometimes 15 minutes either way makes a big difference in transportation without disturbing parents day care plans, etc!
- Are bus stops reviewed so the total number of stops is limited and placed strategically?
- Is routing reviewed prior to each school opening?
- Do school, transportation staff and bus drivers communicate effectively?

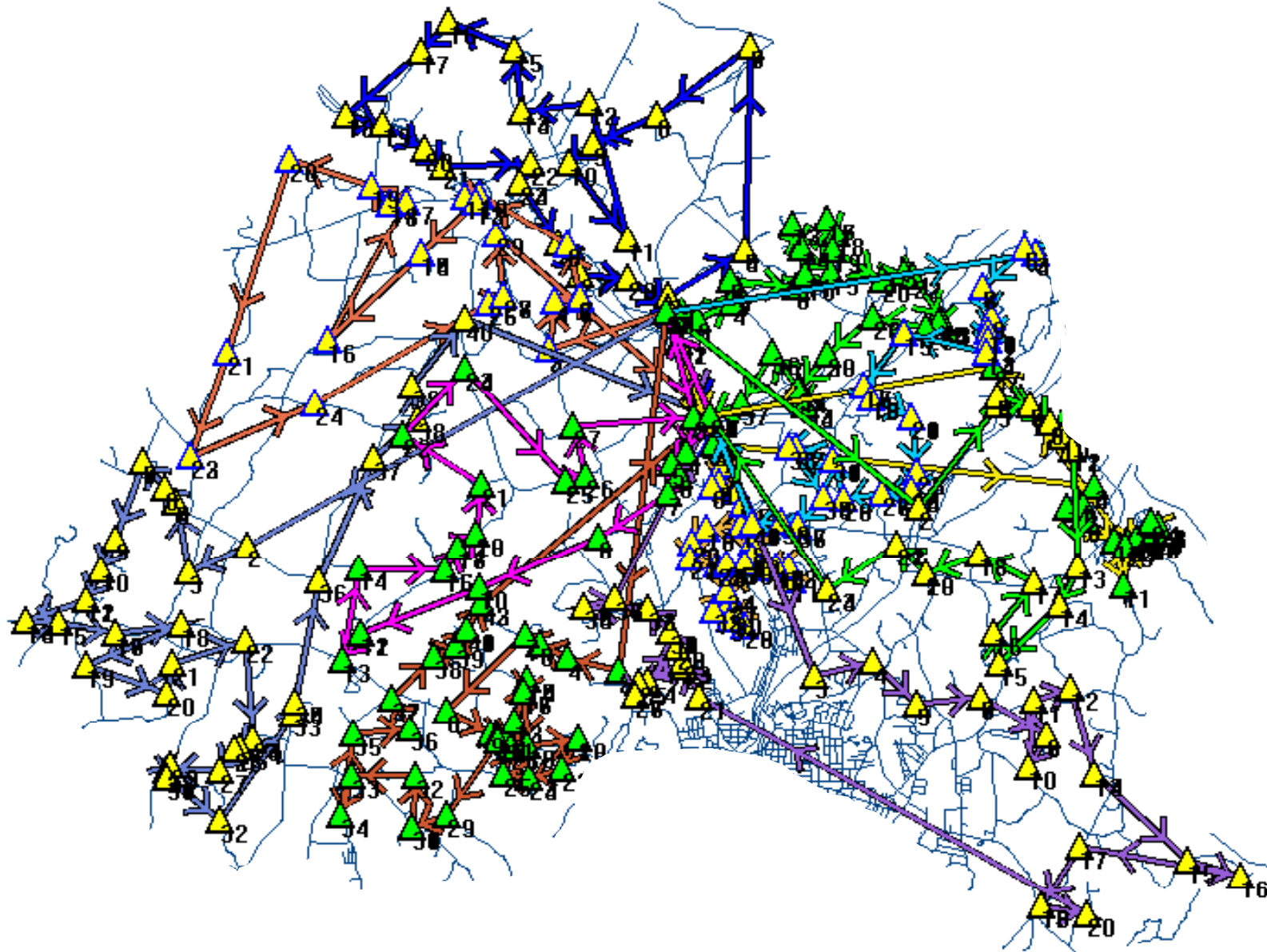


Ways TIMS can help

- TIMS staff were recently asked to take a sampling of runs to examine ways to cut down ride time; even if it meant adding more buses to the fleet
- Staff took a sample of runs from different areas of the state to seek ways of cutting down on ride time using optimization
- The results were 3 separate issues
 - Run design
 - Bell Times
 - Double Runs



Run Design Problems



Long ride times

Max – 101 minutes

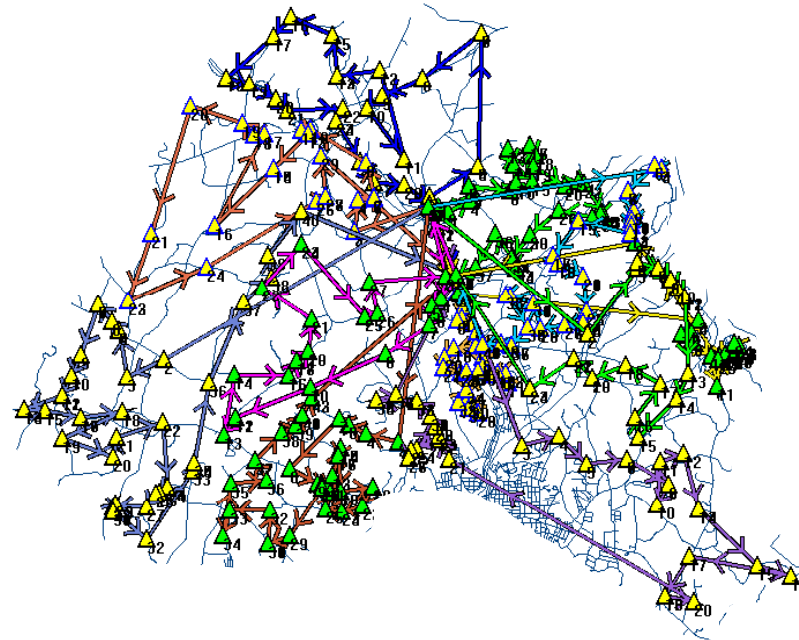
101 – 110 count: 1

91-100 count: 1

81-90 count: 7

71-80 count: 17

61-70 count: 39



Original 428/432 Runs

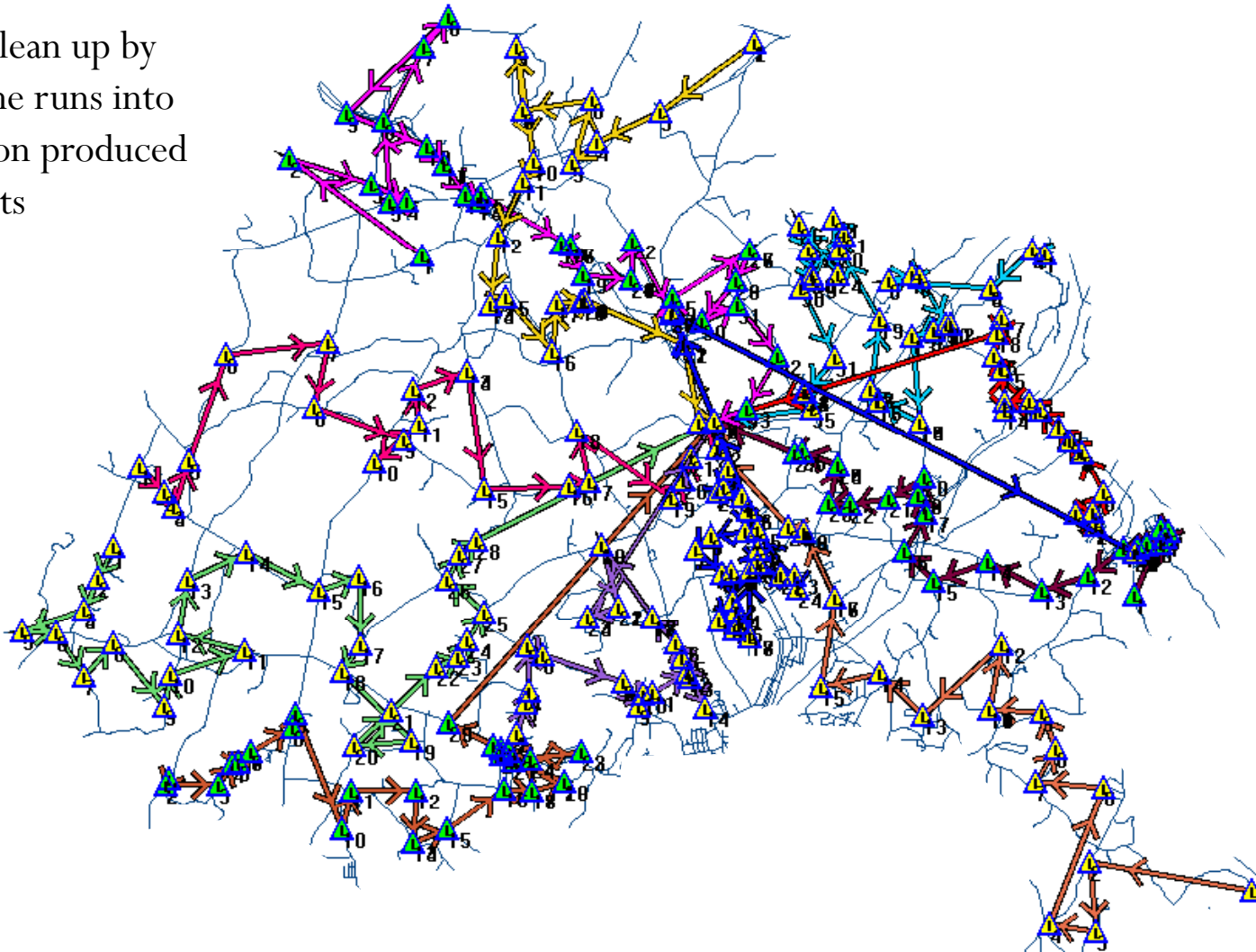
<u>Run</u>	<u>Len</u>	<u>Load</u>	<u>Run</u>	<u>Len</u>	<u>Load</u>
428.001	81	37	428.007	110	47
428.002	47	40	428.009	53	43
428.003	77	40	428.010	59	50
428.004	92	45	428.011	51	35
428.005	70	62	428.012	58	28
428.006	42	40			

Len = Length in Minutes = First Stop to Last School

Total Load = 467

Optimization results: No Buses Added; reduced ride time

A simple clean up by
bringing the runs into
optimization produced
these results



After optimization

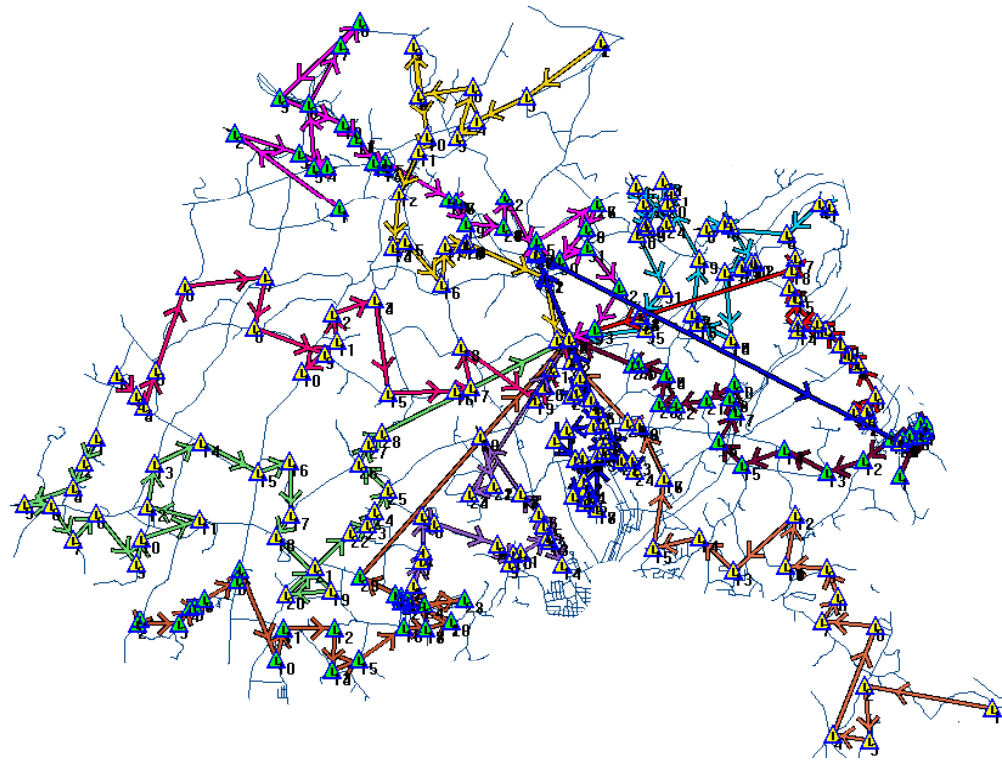
Max: 82

91-100 count: 0

81-90 count: 2

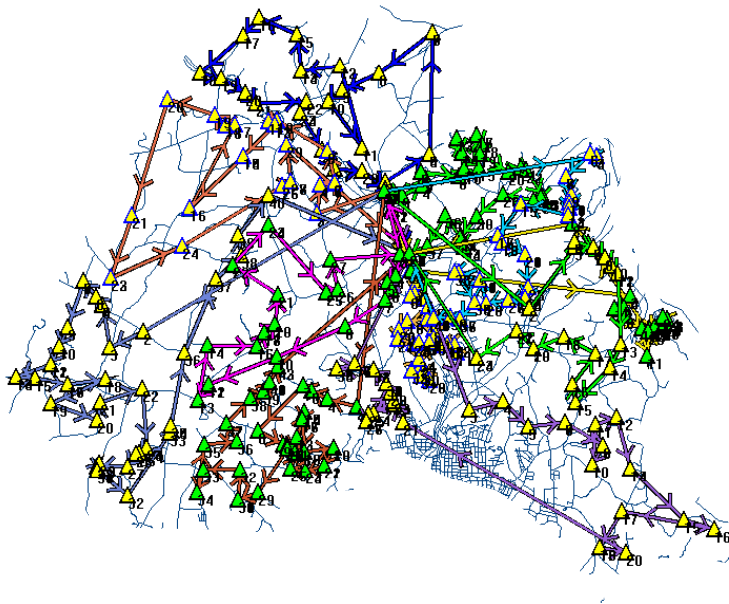
71-80 count: 8

61-70 count: 46

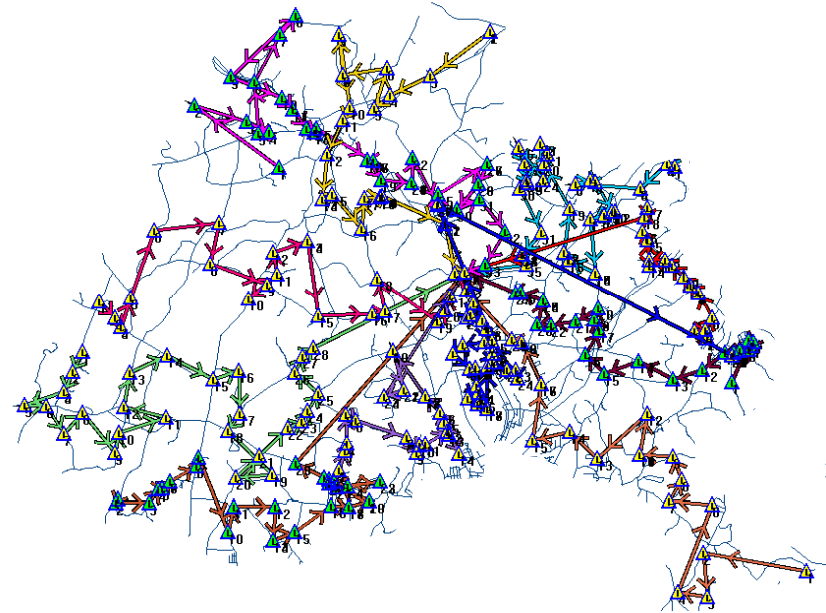


Before/after

Before Optimization



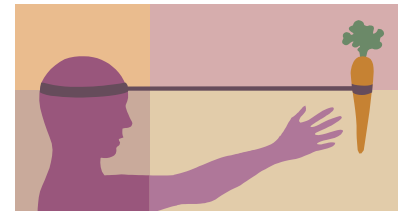
After Optimization



Summary – Simple run clean up resulted in a 20 minute overall reduction in ride time – no buses added

What if I can't control what the buses are doing?

- Good question!
- Showing how much savings can be realized is a good start
- Even if you cut miles slightly by simple clean up, any savings can quickly be recognized
- Provide a potential cost savings by adding up the total miles and then apply your cost per mile before and after optimization; compare the difference



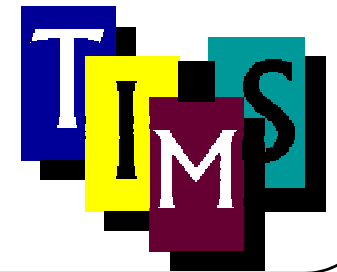
How to Figure the Savings

- Before Optimization
- 12 buses, averaging 70 miles a day to/from school
 - 840 miles
- Total miles, multiplied by \$2.00 (average cost per mile – it may be more!) for cost of service per day
 - $840 \text{ miles} \times \$2.00 = \$1680.00$
- Cost of service multiplied by 180 days of school
 - $\$1680.00 \times 180 \text{ days} = \$30,240.00$
- After Optimization
- 12 buses, averaging 60 miles a day to/from school
 - 720 miles
- Total miles, multiplied by \$2.00 (average cost per mile – it may be more!) for cost of service per day
 - $720 \text{ miles} \times \$2.00 = \$1440.00$
- Cost of service multiplied by 180 days of school
 - $\$1440.00 \times 180 \text{ days} = \$25,920.00$

A total savings of \$4,320.00
($\$30,240.00 - \$25,920.00$)

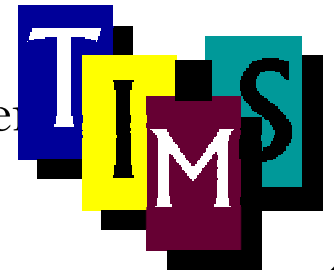
Second Example

- Another county's ride times were examined the same way
 - Findings –
 - Shuttles were involved with double runs
 - Most students were not actually on the bus 90 minutes, but the wait time at the building gave the students a long wait to actually get home
 - No staggered bell times
 - Found gaps in run directions, meaning times were not accurate for data, giving a false interpretation of the actual student ride time
 - Summary – Clean up runs, obtain accurate runs times in an effort to show accurate ride times and consider small bell time staggers to reduce double runs



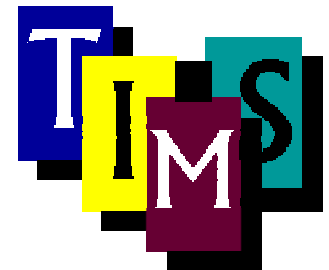
Last example

- District runs were examined in the same fashion
 - Runs were ok; distance covered was an issue; largely rural area
 - To get runs under 90 minutes, 4 buses would need to be added and the overall mileage added was no more than 25 miles; added driver salary and vehicle cost would be the main cost added
 - This example showed more fleet would be needed to reduce the time
 - Summary – if district considered staggering bell times, more buses would be available cutting the cost of purchasing additional buses and may add small amount additional driver time and miles.



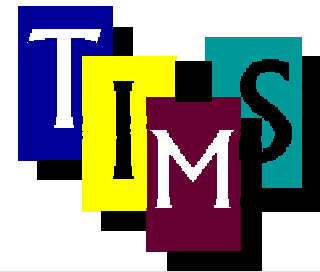
What was learned and questions raised by this exercise

- The need for districts to do a self assessment
- What if fuel prices go higher?
- What if more students ride this fall?
- Remember just using TIMS doesn't make things efficient or save fuel. It has to be used with these objectives in mind
- How can TIMS help?
 - Graphic Bus run review
 - Bus stop location review
 - Optimization



Ways to Use TIMS

- Examine the bus runs
 - Look at stops – do they fall within state general statues guidelines for walk distance?
 - Are there areas where stops can be consolidated?
 - Use optimization to provide a better pairing of stops on runs
 - You usually know of at least a few runs that could be examined or where door-to-door stops are being made



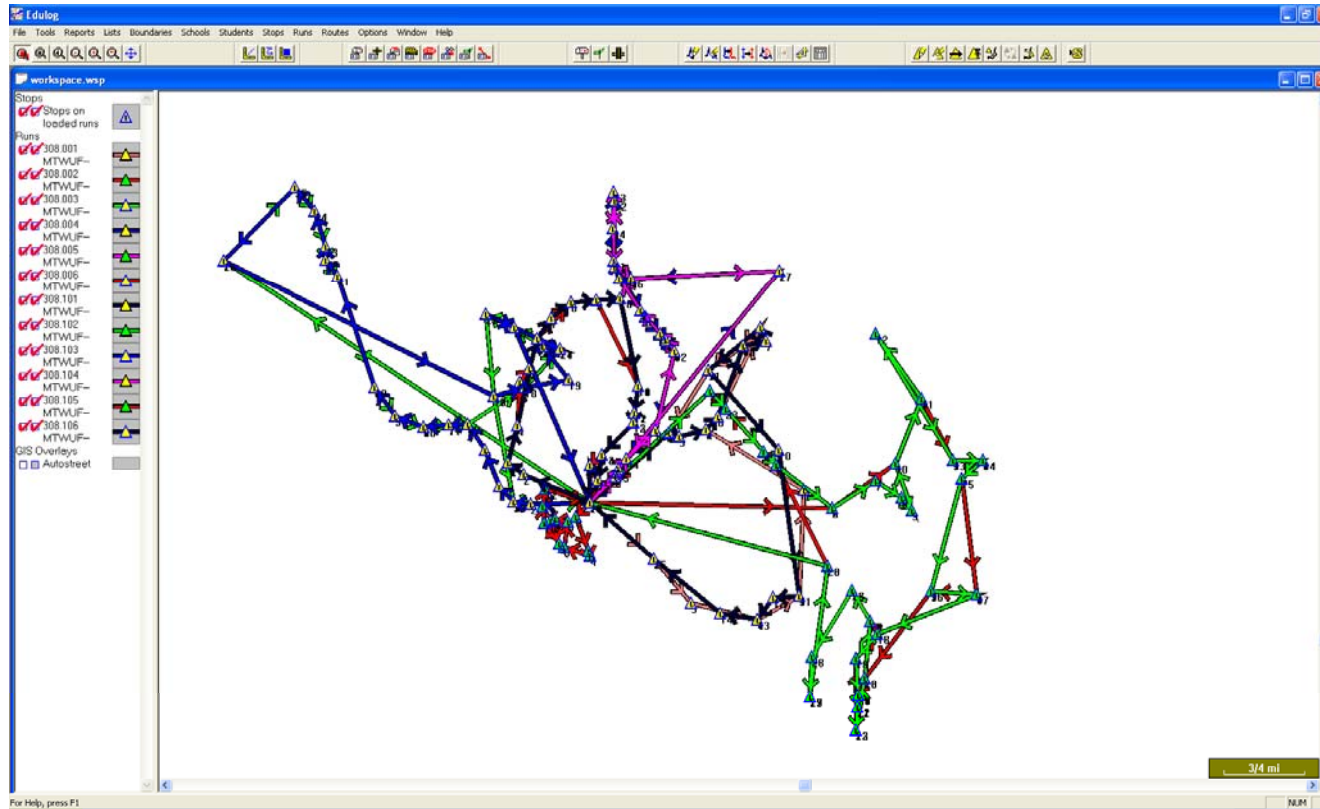
Graphic bus run – a review

- EdulogNT is graphic-based, but we find many data managers using the tabular method of working with bus runs
- Using Runs/Tabular a majority of the time results in:
 - Stops being placed in the wrong sequence – many don't pay attention to the before/after criteria of placing stops
 - This results in too much mileage, giving inaccurate results for reports – especially the data reports submitted to TDTIMS for the Service Indicator data, which is reported to EVERYONE



Graphic bus run – a review

- Review your bus runs graphically; you will instantly see stops that are in the wrong sequence or need to be moved to another run



Evaluating Student walk to stops in an effort to conserve fuel

- The 2007-2008 Service Indicator reports show students across North Carolina have lots of door-to-door stops
- Are state guidelines for stop distances being followed in your district?
- The state-wide average student-to-stop distance is **.08** - **the state guideline states: “*unless safety factors require otherwise, superintendents may not plan bus stops closer together than 0.2 miles.*”**



Consolidating stops to conserve fuel

- Things to consider
 - Neighborhood logistics
 - Is it safe – rabid dogs on every corner? Sex offenders at every other house?
 - Is there a place to create a common neighborhood stop where common access is available and walk distance to stop is at least .20?

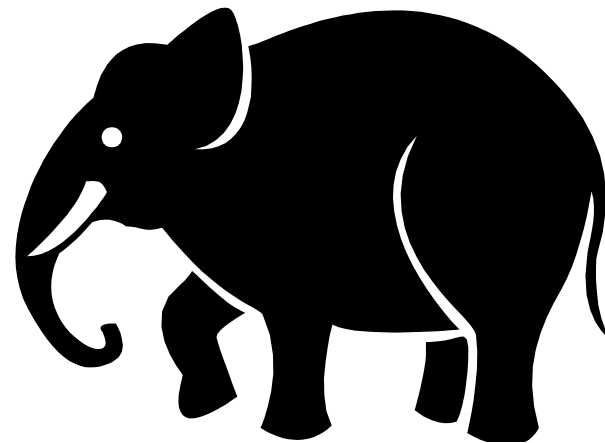


Suggested steps to consider when Consolidating Stops

- Using the GeBndPln program:
 - Draw neighborhood boundary
 - Analyze Current Data for consolidation feasibility
 - Number of students, stops, runs, average distance to stop, etc.
 - Check current miles and times for stops and runs
 - Determine where consolidated stops could be located

This is a big elephant to eat....

- But, you eat it once piece at a time....you will slowly chip away at it and be able to show significant savings!



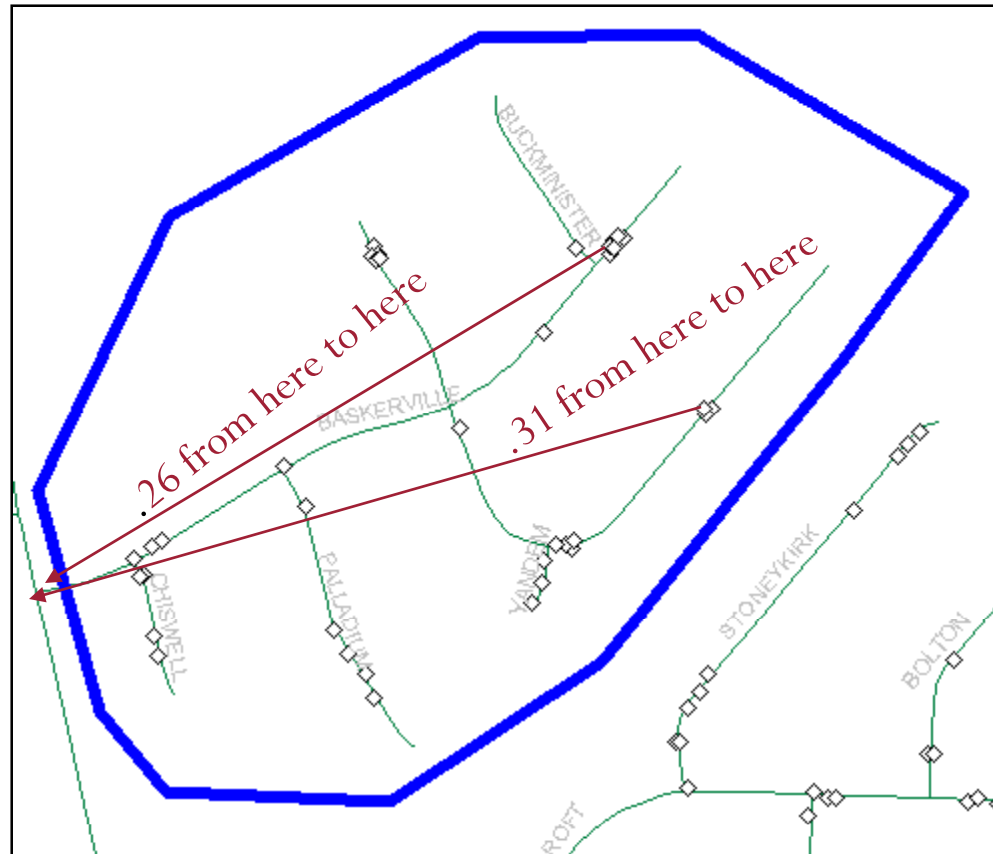
Items/Questions for Consideration

- As data was being analyzed, many questions with neighborhood logistics arose as to how to handle certain situations
 - Board discussion seemed to indicate that high school students could walk further than elementary students
 - Neighborhoods should be more clearly defined with student distance information along with student density analysis in order to determine appropriate common stop locations – the “neighborhood” could possibly be defined by 42 smaller, distinct neighborhoods
 - Should number of students in a neighborhood dictate whether or not a bus even enters the neighborhood?
 - What walking distances will be allowed to common stop?
 - Is adequate lighting/sidewalks available for early am stops?
 - Other items to take into consideration – safety issues, road hazards, etc.?
 - (this is 7 pieces of the elephant here..)



Neighborhood Facts – Baskerville & Prosperity Church Rd – 1 of 42

- 62 Students
- Attend mostly two schools in the area



Baskerville Neighborhood Students data from gebndpln

	Baskerville	Grades	1	2	3	4	5	6	7	8	9	10	11	12	A4	Total
Schools	305		0	0	0	0	0	3	5	2	0	0	0	0	0	10
	316		0	0	1	0	1	0	0	0	0	0	0	0	0	2
	362		0	0	0	1	0	0	0	0	0	0	0	0	0	1
	411		0	0	1	0	0	0	0	0	0	0	0	0	0	1
	429		1	0	0	0	0	0	0	0	0	0	0	0	0	1
	439		0	0	0	0	0	0	0	1	0	0	0	0	0	1
	441		1	0	1	0	1	0	0	0	0	0	0	0	0	3
	445		0	0	0	0	0	0	0	0	2	4	2	0	0	8
	446		9	6	3	4	1	0	0	0	0	0	0	0	0	23
	482		0	0	0	0	0	1	0	0	0	0	0	0	0	1
	497		0	0	0	0	0	1	2	0	0	0	0	0	0	3
	571		0	0	0	2	0	0	0	0	0	0	0	0	0	2
	586		0	0	0	0	0	0	0	0	0	0	0	0	1	1
	592		0	0	0	0	0	0	0	0	0	1	1	3	0	5
	Total		11	6	6	7	3	5	7	3	2	5	3	3	1	62

Resources for Consideration

Google Earth

- Shows a right turn only out of community
- An available clubhouse on corner?
- Sidewalks show up
- BUT, it will not replace local knowledge!!



Create a sample Bus Run with Consolidated Stops

- Using a high school run, stops were consolidated to the main road
- Given the median in the road and a 4-lane highway, stops were brought out to the corner; bus has to travel up one side and down the other to accommodate right-side pickups



After Consolidating Stops

After Consolidating stops

18 Miles long

6:14 am – 6:49 am

Let's do the math;

31 miles – 18 miles = 13

miles saved

13 miles x twice a day =

26 miles

26 miles x \$2.00 = 52.00

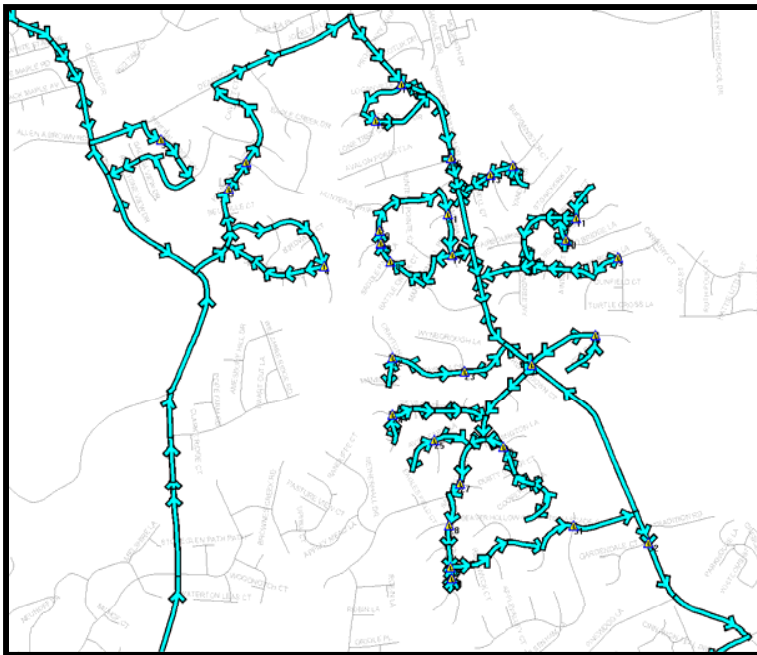
52.00 x 180 days =

\$936.00



Results

Before



Cost: 31 miles one way
62 miles per day
 $62 \times \$2.00 = 124.00$
 $\$124.00 \times 180 \text{ days} = \$2,232.00$

After



Cost: 18 miles one way
36 miles per day
 $36 \times \$2.00 = 72.00$
 $\$72.00 \times 180 \text{ days} = \$1,296.00$

\$936.00 savings for 1 bus

Results

- This exercise moved bus stops to within the state walking guidelines of .20
- While this was a small savings, if you did this district wide, significant savings would be realized

Optimization

- A review

