



Routing Efficiency Review

**Prepared for
East Islip UFSD
Islip Terrace, NY**

Submitted by:

**Dan Roberts, Director of Professional Services
Transfinder® Corporation
440 State St.
Schenectady, NY 12305
www.transfinder.com
1.800.373.3609**

Executive Summary

Transfinder Professional Services was contracted to develop efficient bus routes in the Transfinder routing system. Transfinder obtained an archive of current routes in the Transfinder routing system to begin the process. Four options were created. First, routes were analyzed and restructured in the Transfinder routing system to increase ridership loading while maintaining acceptable student ride times. Second, elementary and secondary schools were individually combined to allow bell time consolidations. Third, an option utilizing both efficiency runs and combination runs was developed. Fourth, a combination utilizing existing secondary runs and combined elementary runs was created. This report is generated to summarize the outcome of this project.

Overview

Transfinder's Professional Services took the existing East Islip run data and created two separate data sources for the four options. One data source showing efficiency routing where the current bell schedules remain constant and routes are reduced. There was also an additional data source where efficiency techniques are utilized to consolidate bell schedules into as few as two tiers. Options 3 and 4 were generated using these data sources.

The following chart shows the current configuration of East Islip bus service.

RT	1ST TIER		2ND TIER		3RD TIER		4TH TIER								EXTRA
	SJB		EI HS		EI MS		RCK ELEM		JFK ELEM		CONN ELEM		TP ELEM		
	AM	PM	AM	PM	AM	PM									
Bells	9:42	3:42	7:10	1:47	7:54	2:32	9:12	3:12	9:12	3:12	9:42	3:42	9:42	3:42	
ZEI001	SJB	SJB	X	X	X	X	X	X	X	X	X	X	X	X	
ZEI002	SJB	SJB	X	X	X	X	X	X	X	X	X	X	X	X	
ZEI003	SJB	SJB	X	X	X	X	X	X	X	X	X	X	X	X	
ZEI004	X	X	HS	HS	MS	MS	RCK	RCK	X	X	X	X	X	X	LATE
ZEI005	X	X	HS	HS	MS	MS	RCK	RCK	X	X	CONN	CONN	X	X	
ZEI006	X	X	HS	HS	MS	MS	X	X	JFK	JFK	X	X	TP	TP	
ZEI007	X	X	HS	HS	MS	MS	RCK	RCK	X	X	X	X	X	X	LATE
ZEI009	X	X	HS	HS	MS	MS	X	X	JFK	JFK	X	X	TP	TP	
ZEI010	X	X	HS	HS	MS	MS	X	X	JFK	JFK	X	X	TP	TP	
ZEI011	X	X	HS	HS	MS	MS	X	X	JFK	JFK	X	X	TP	TP	
ZEI012	X	X	HS	HS	MS	MS	RCK	RCK	X	X	CONN	CONN	X	X	
ZEI013	X	X	HS	HS	MS	MS	RCK	RCK	X	X	CONN	CONN	X	X	
ZEI014	X	X	HS	HS	MS	MS	RCK	RCK	X	X	CONN	CONN	X	X	
ZEI015	X	X	HS	HS	MS	MS	RCK	RCK	X	X	CONN	CONN	X	X	
ZEI016	X	X	HS	HS	MS	MS	RCK	RCK	X	X	CONN	CONN	X	X	
ZEI017	X	X	HS	HS	MS	MS	X	X	JFK	JFK	X	X	TP	TP	
ZEI018	X	X	HS	HS	MS	MS	X	X	JFK	JFK	X	X	TP	TP	
ZEI019	X	X	HS	HS	MS	MS	X	X	JFK	JFK	X	X	TP	TP	
ZEI021	X	X	HS	HS	MS	MS	X	X	JFK	JFK	X	X	TP	TP	
ZEI022	X	X	HS	HS	MS	MS	X	X	JFK	JFK	X	X	TP	TP	
TOTAL	3	3	17	17	17	17	8	8	9	9	6	6	9	9	2

Executive Conclusion

Transfinder Professional Services has modified existing runs through the efficiency process. There were routes created while students maintained their current bus stops. They were created using a conservative transit time of 19 miles per hour to account for virtually all traffic conditions. Due to conservative route speeds, we do not believe that any route will actually run later than projected in daily operation, barring driver error. The overall process will allow the district to consider multiple options for the future, a reduction in total routes, consolidating schools into as few as two bell schedules (secondary and elementary) or a combination of the two. It should be noted that all options allow schools to be moved between tiers. Options 2, 3, and 4 allow more compressed bell schedules which could decrease the cost per bus paid to the contractor.

The fiscal impact of the four presented options is expected to be:

	Projected Route Costs	Potential Late Run Costs
Option 1	(\$421,143)	2 Runs
Option 2	(\$7,626)	2 Runs
Option 3	\$48,507	0 Runs
Option 4	\$79,125	1 Run

There are no additional numbers of unfunded students (those students that reside within 1.5 miles of the school of attendance) that would reduce New York State Aide due to a higher non-allowable pupil decimal percentage.

Key Performance Indicators

Key Performance Indicators (KPIs) are a measurement of your current transportation operation. KPIs allow you to compare your operational performance year after year. They can also provide a comparison of your own performance in relation to other school districts of similar size, if that information is available. This report provides the route differences for you to use in further comparisons.

School bell times and student ride time form the basis for routing efficiency. The more time the bus has to pick up or deliver students, increases the potential for completely utilizing every bus. The district's walk to school policy for all students remains the same for every option in this project.

Run Time KPI

The charts shown in the various options have run times with the “dead time” (the time the bus is operating without students) included. The buses are shown on the vertical axis and run minutes are shown on the horizontal axis for both current and proposed runs. East Islip has been utilizing 25 mph for timing runs in the system. (This project utilizes 19 mph to provide a buffer to keep runs from arriving late at various schools.)

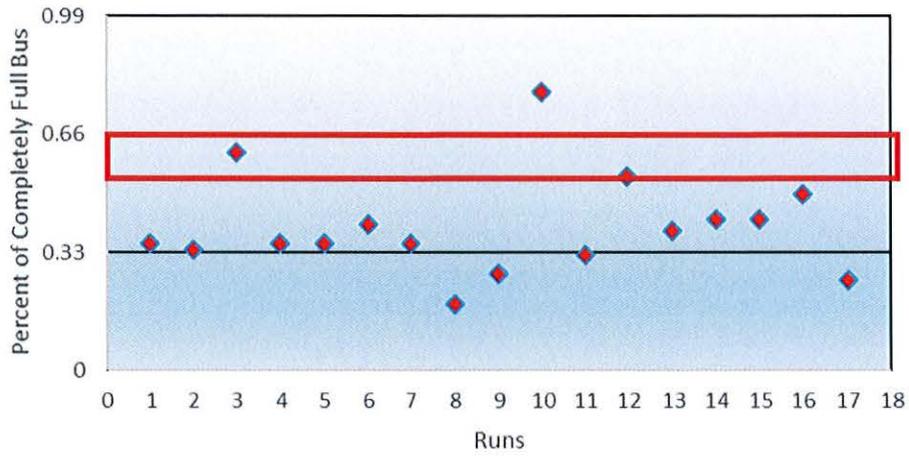
Ridership KPI

The ridership charts show current actual riders by run taken from district records while expected rider numbers are based on 80% of potential riders for elementary through middle school and 60% of riders at high school. (The district’s actual ridership percentages are 75% for the lower grades, 80% for middle school, and 60% for high school. The higher percentages shown in the charts provide an additional buffer to keep from potentially overloading any buses.) The rider loads were determined from actual rider counts generated by the district.

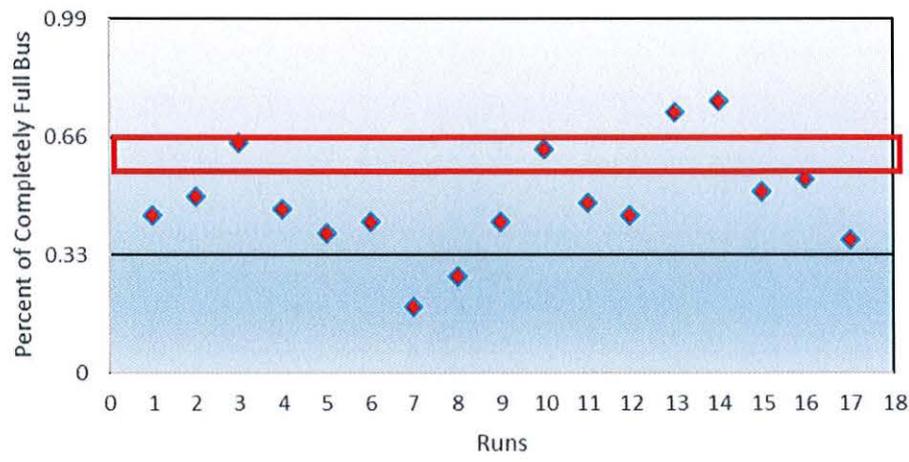
There are two schools of thought in routing theory. One is to route for every possible student that could ride the bus even though not all students ever ride at the same time. The other school of thought is to minimize the expenditures in Transportation by maximizing actual riders that use the service daily. East Islip has been scheduling students based on every possible rider up to this point. This review utilizes the efficiency process that exploits the actual empty seats currently in the district buses. The following charts show the starting points for the project based on district records for the highest number of actual riders utilizing the service on a daily basis. The runs that are below ridership target levels provide the ability to consolidate runs into fewer buses.

The following charts show expected utilization of individual buses based on the manufacturer’s rated capacity for each bus for actual riders. The rated capacity places three students on every seat which is not possible for most buses. An acceptable actual rider efficiency range for elementary runs is between 60% and 80% of capacity. Likewise, the actual rider efficiency range for secondary is between 55% and 66%. Sixty-six percent of capacity is 2 riders per seat and 80% is approximately 3 riders per seat for $\frac{1}{2}$ of the bus and 2 riders per seat for the rest.

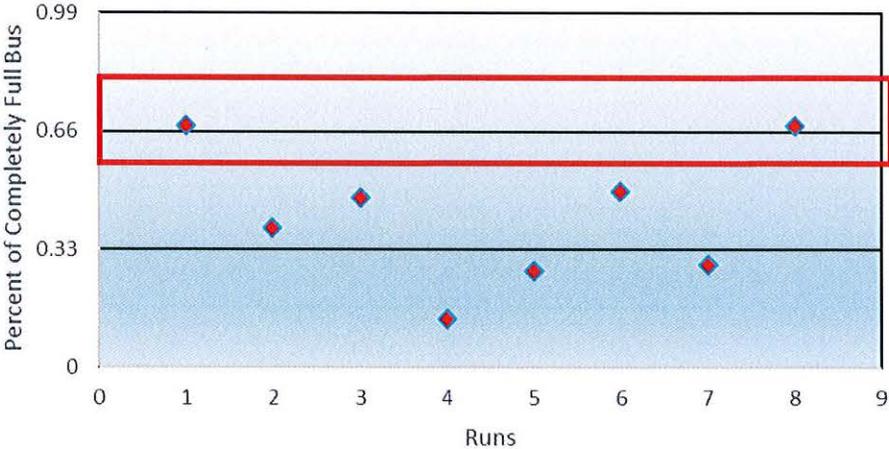
HS PM Actual Riders vs Capacity



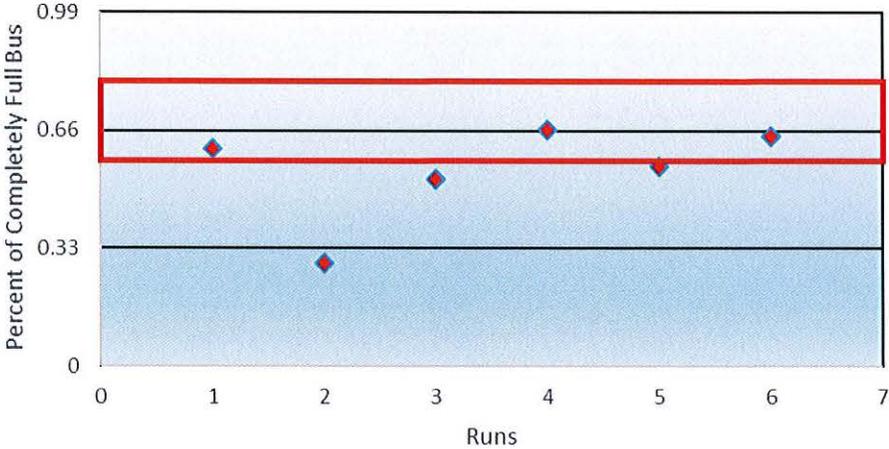
MS PM Actual Riders vs Capacity

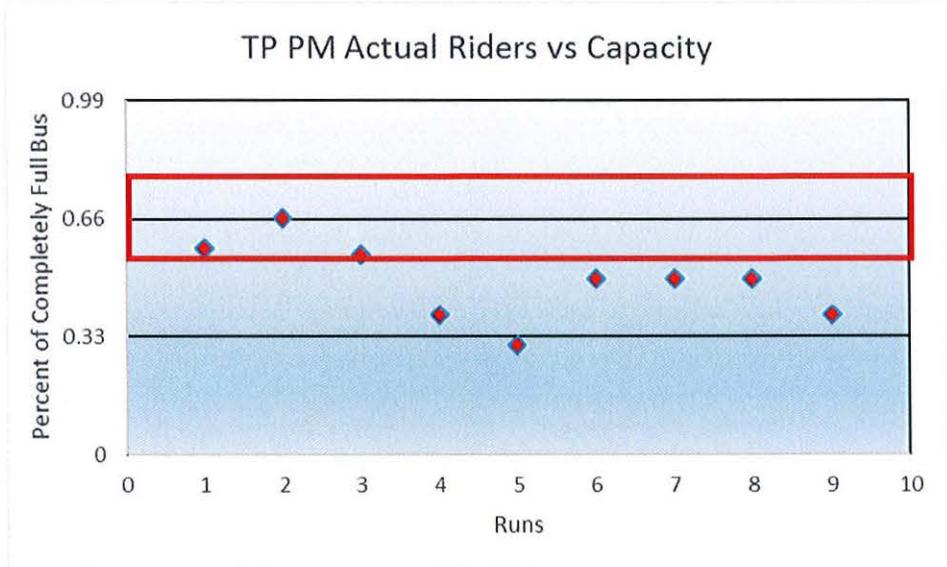
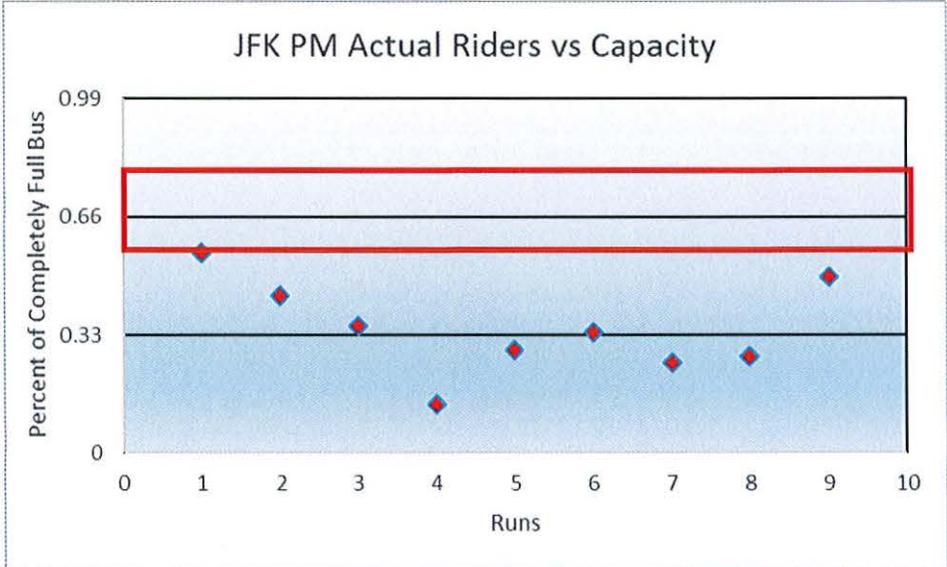


RCK PM Actual Riders vs Capacity



CONN PM Actual Riders vs Capacity





Option 1: Efficiency Route Changes

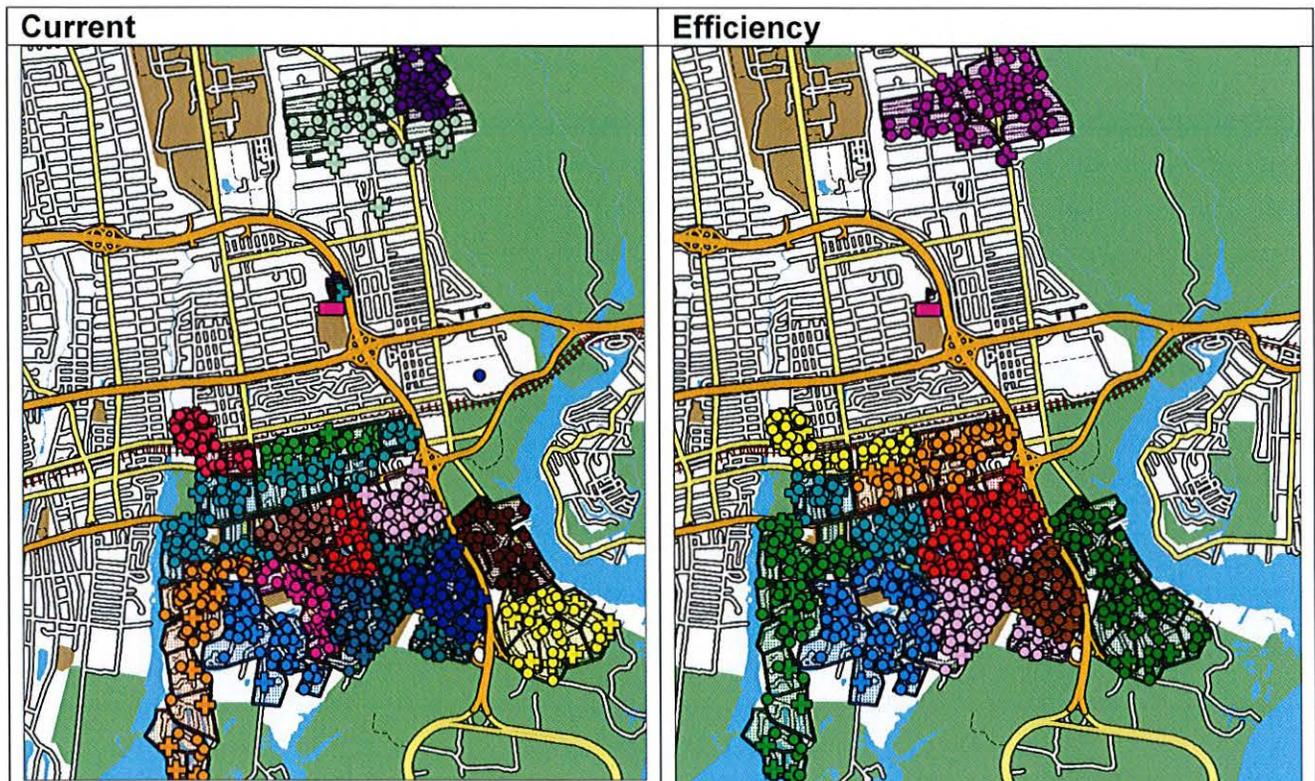
Transfinder's Professional Services Team has created potential routes to accommodate current actual riders on fewer runs. The version uses efficiency routing strategies at each school individually. The overall effect of the project has the district moving from 17 regular education buses to 12 buses which eliminates five buses from service.

The process of eliminating five runs consisted of utilizing existing stops for every school and recombining them to increase rider loads on the buses.

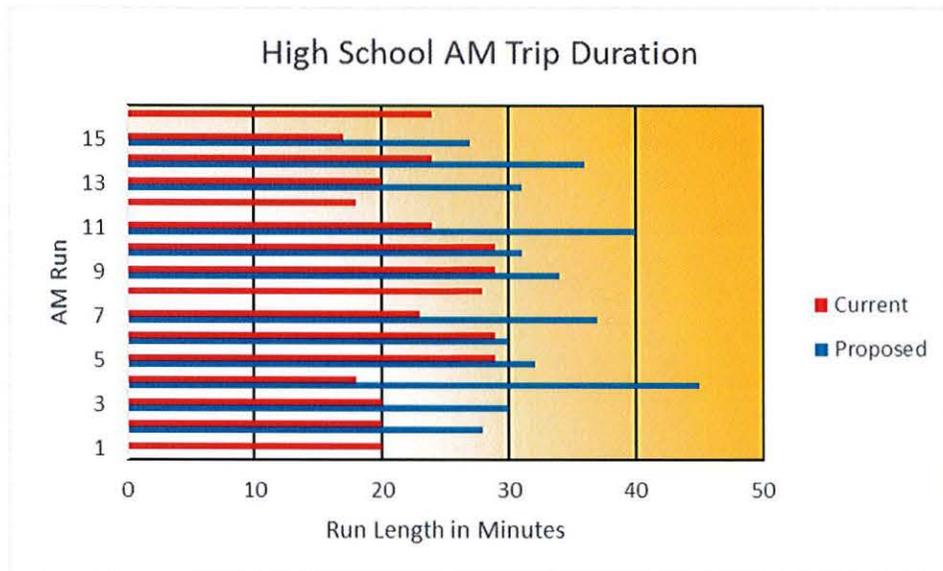
All of the runs displayed are morning runs. The afternoon runs are identical in all but a few instances where the route of the bus is reversed to shorten ride time. The proposed option utilizes 19 mph instead of the current 25 mph for the buses to allow some additional time for the buses to operate. It is also a buffer to make sure that all runs can operate in the existing bell time windows.

High School 2016-17

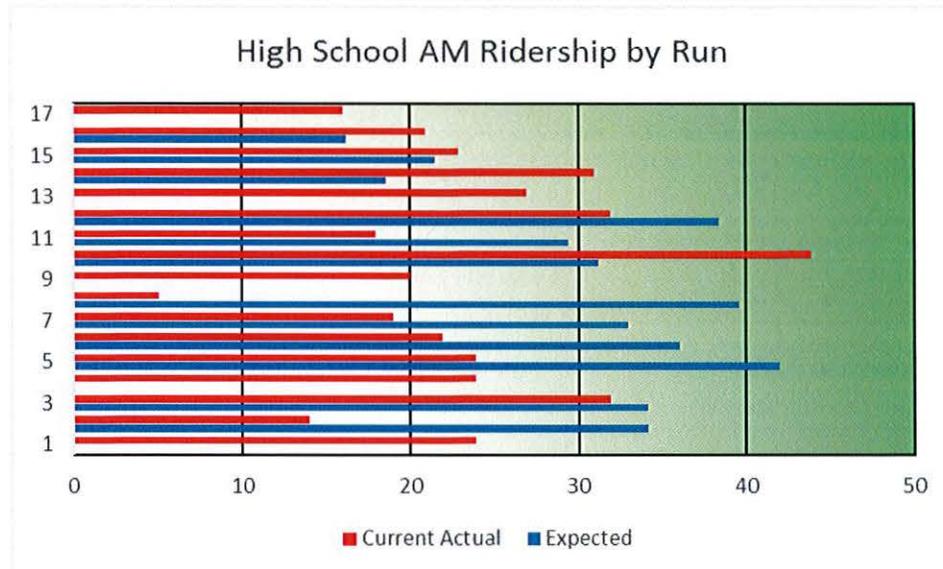
The efficiency process removed five runs from the High School tier as shown on the route maps that follow.



The efficiency process lengthened the High School runs slightly. The duration of the runs also includes “dead head” time from the bus terminal to the first stop. The runs are designed to fit into the current 40-minute window between tiers current in place.

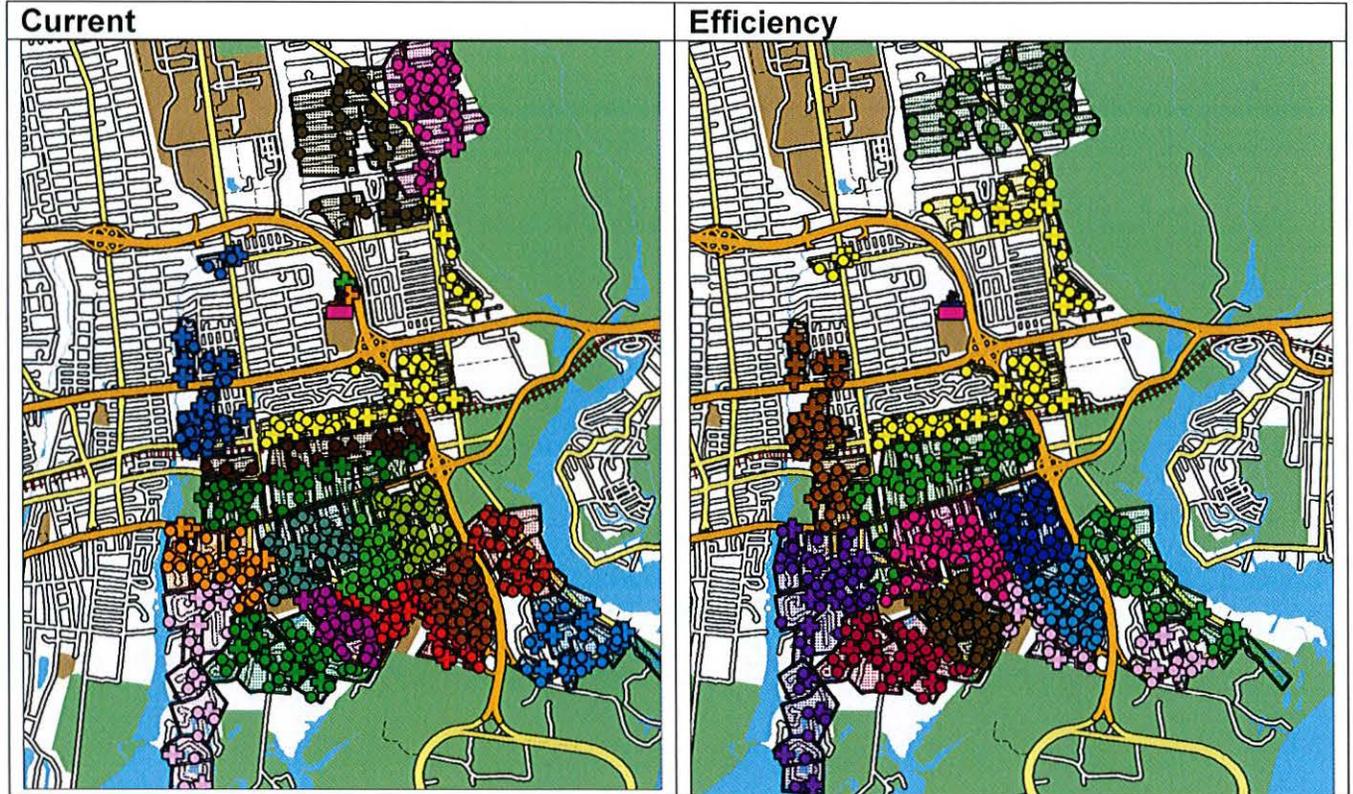


The ridership numbers shown in this chart indicate actual riders taken from district records in red and expected riders (60% of potential riders) in blue.

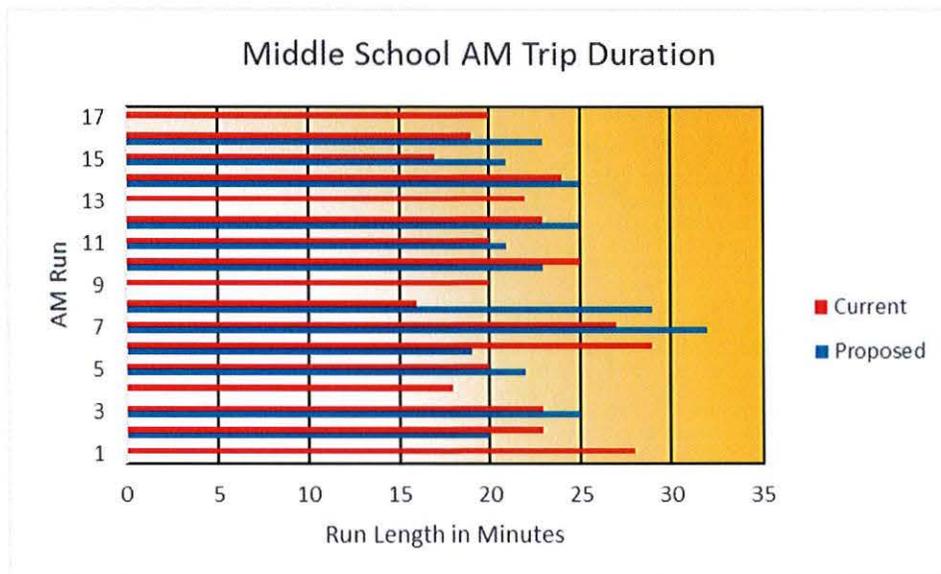


Middle School 2016-17

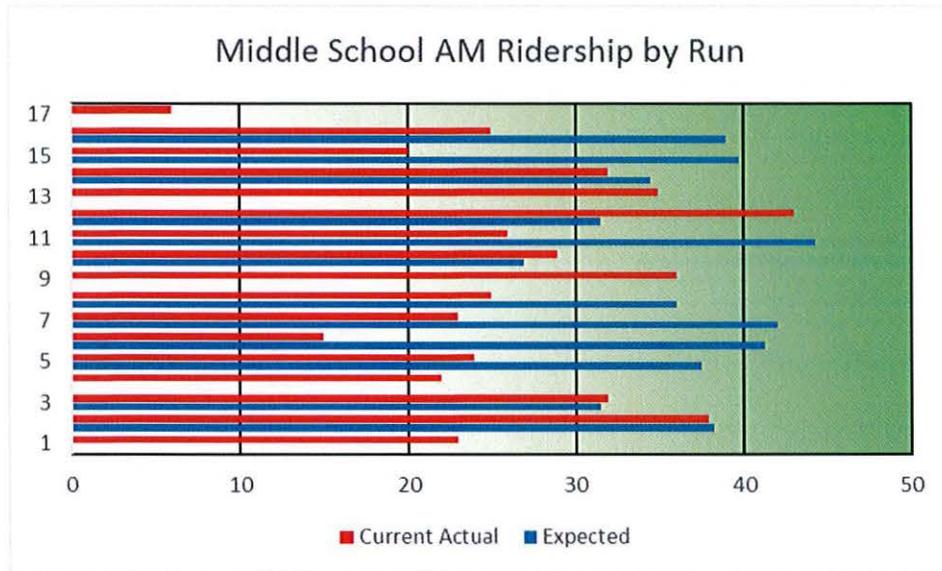
The Middle School has had five runs eliminated like the High School runs. Like the High School option, current stops are utilized in this version and recombined to achieve the reduction.



The duration times shown in this chart include the “dead head” times between trips.

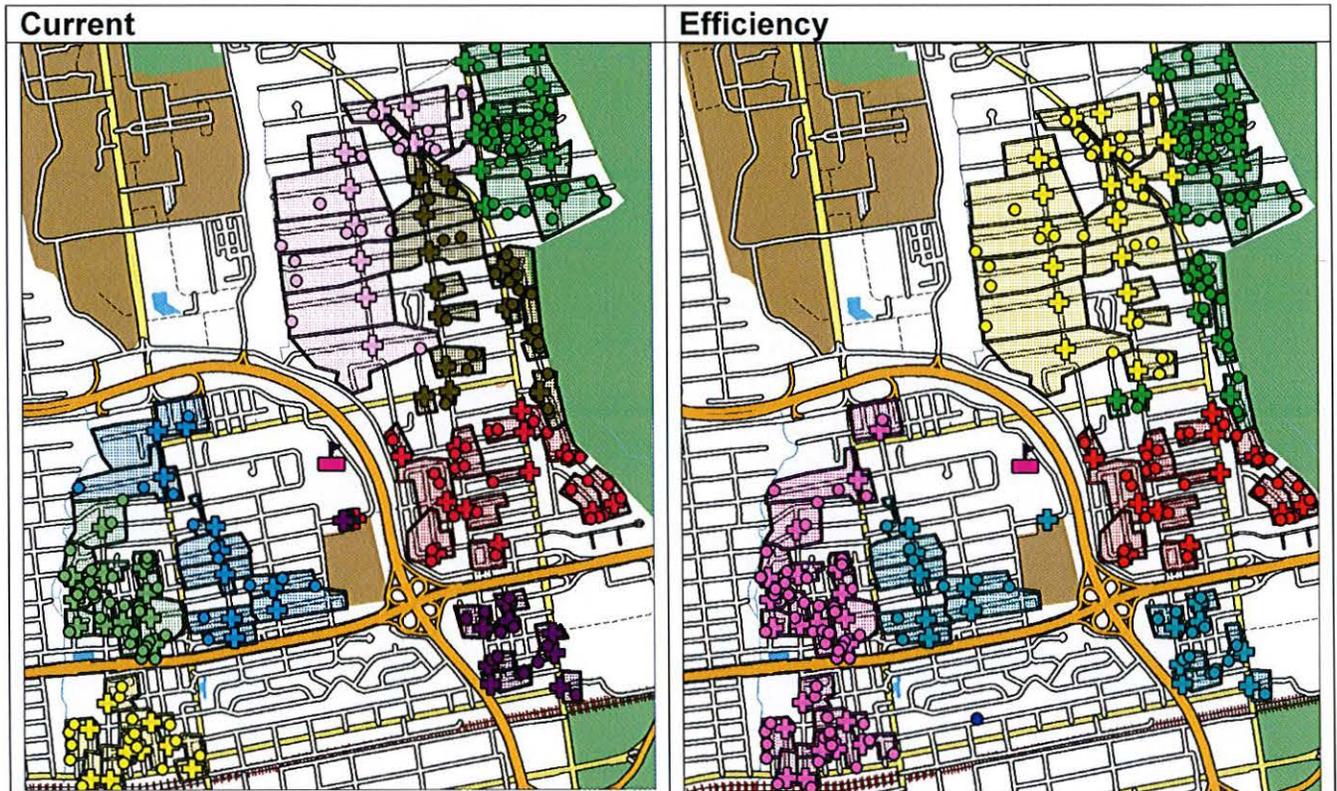


The ridership numbers shown in the following chart indicate actual riders taken from district records in red and expected riders (80% of potential riders) in blue.

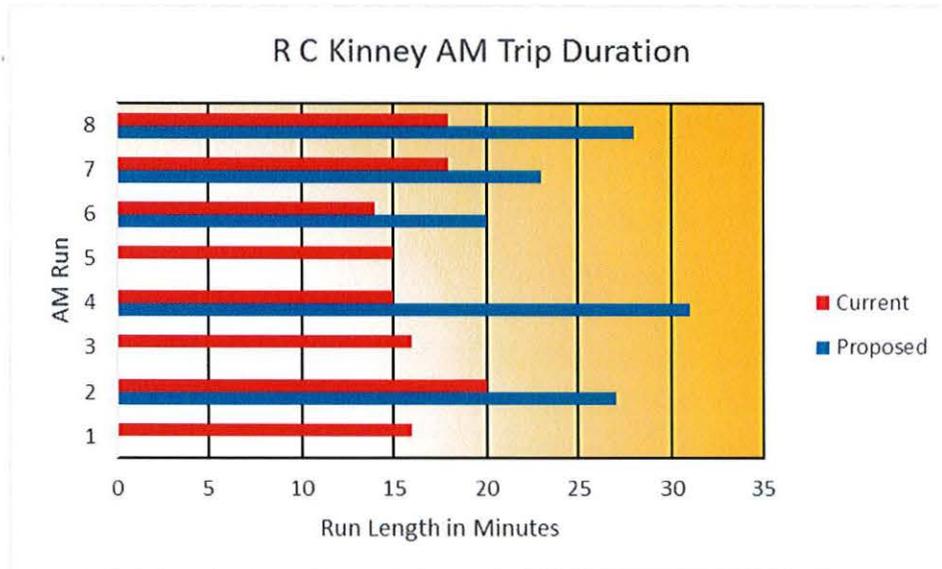


RCK 2016-17

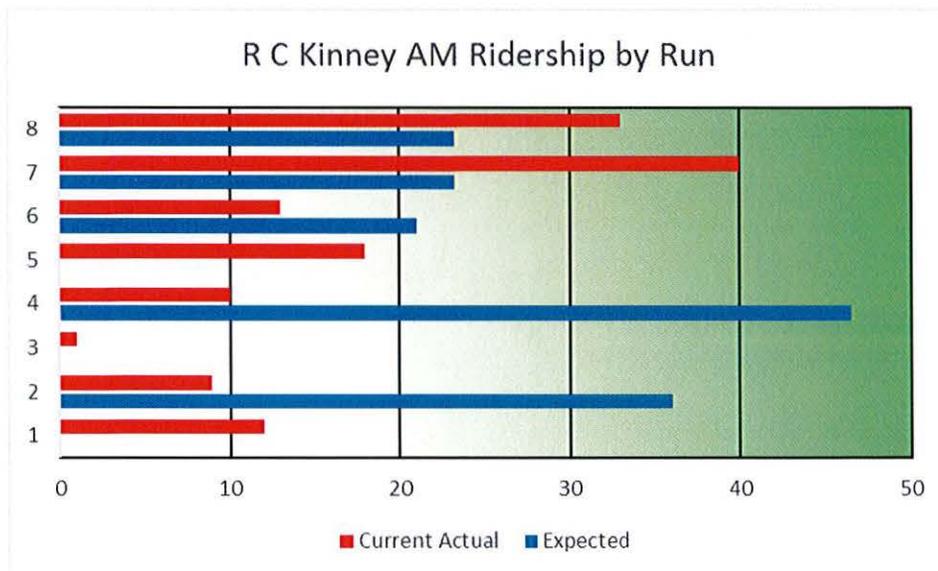
RCK has three runs eliminated in this option. Again, existing stops are utilized but recombined to achieve the reduction.



The duration times shown in this chart include the “dead head” times between trips.

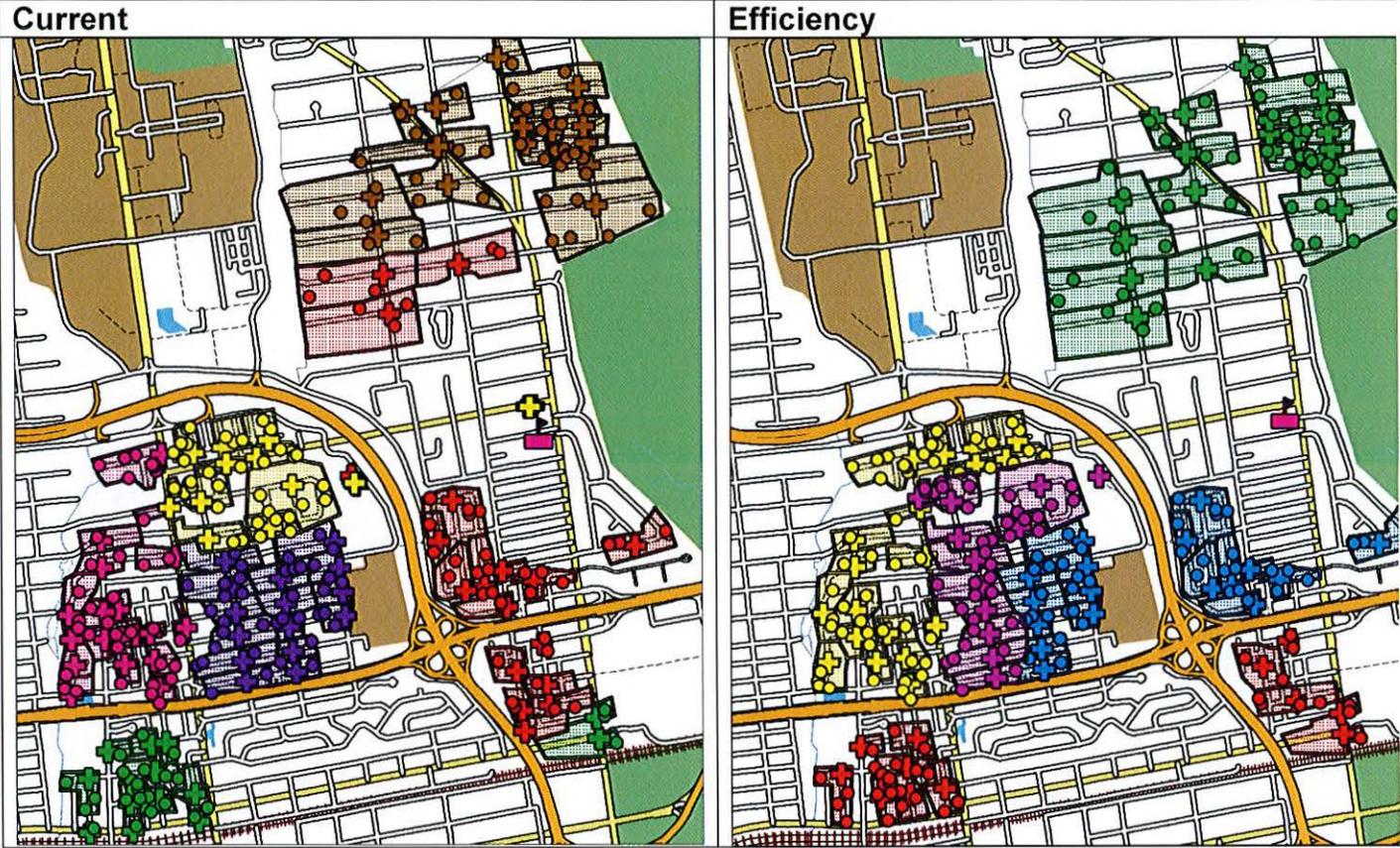


The ridership numbers shown in the following chart indicate actual riders taken from district records in red and expected riders (80% of potential riders) in blue.

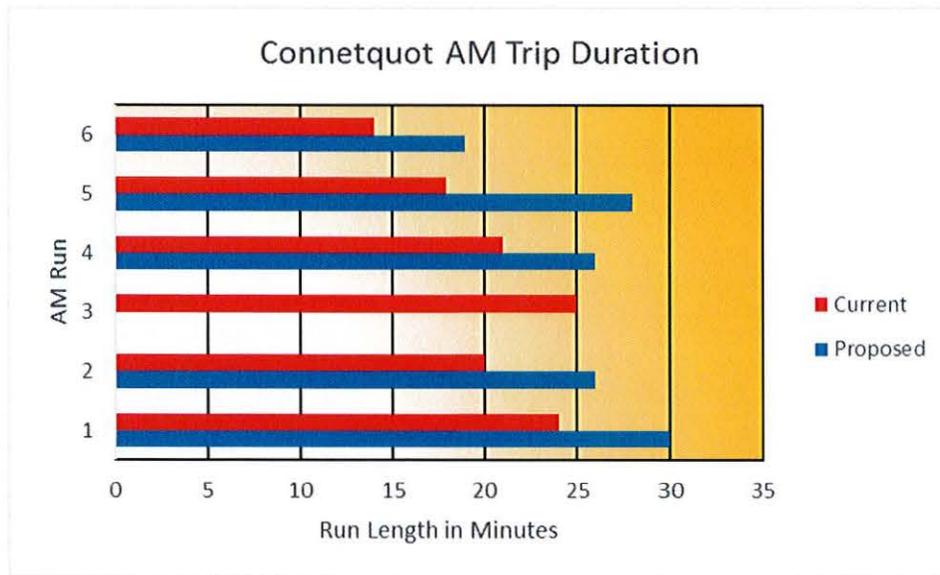


Connetquot 2016-17

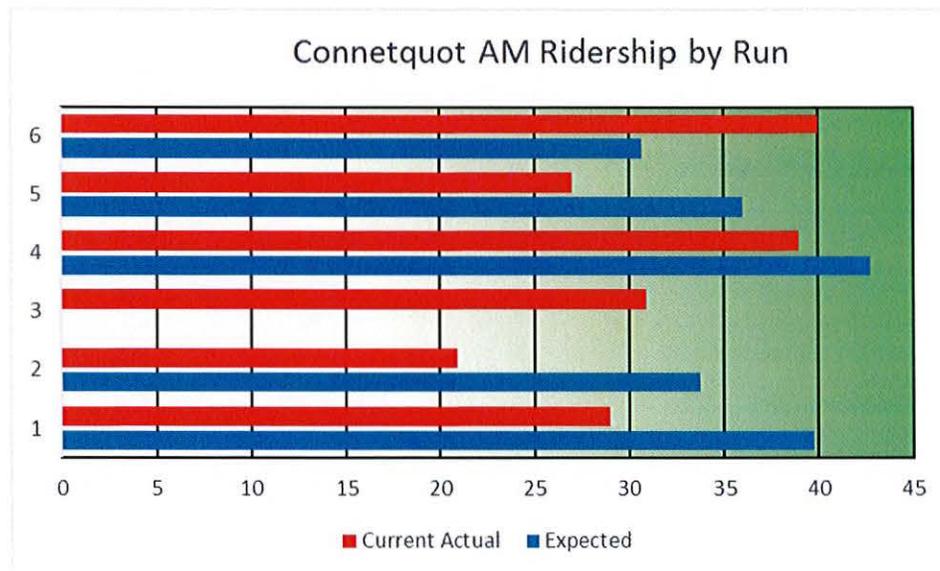
Connetquot had one run eliminated. This school has two runs less serving regular service compare with RCK so the overall runs still balance as shown at the end of this option.



The duration times shown in this chart include the “dead head” times between trips.

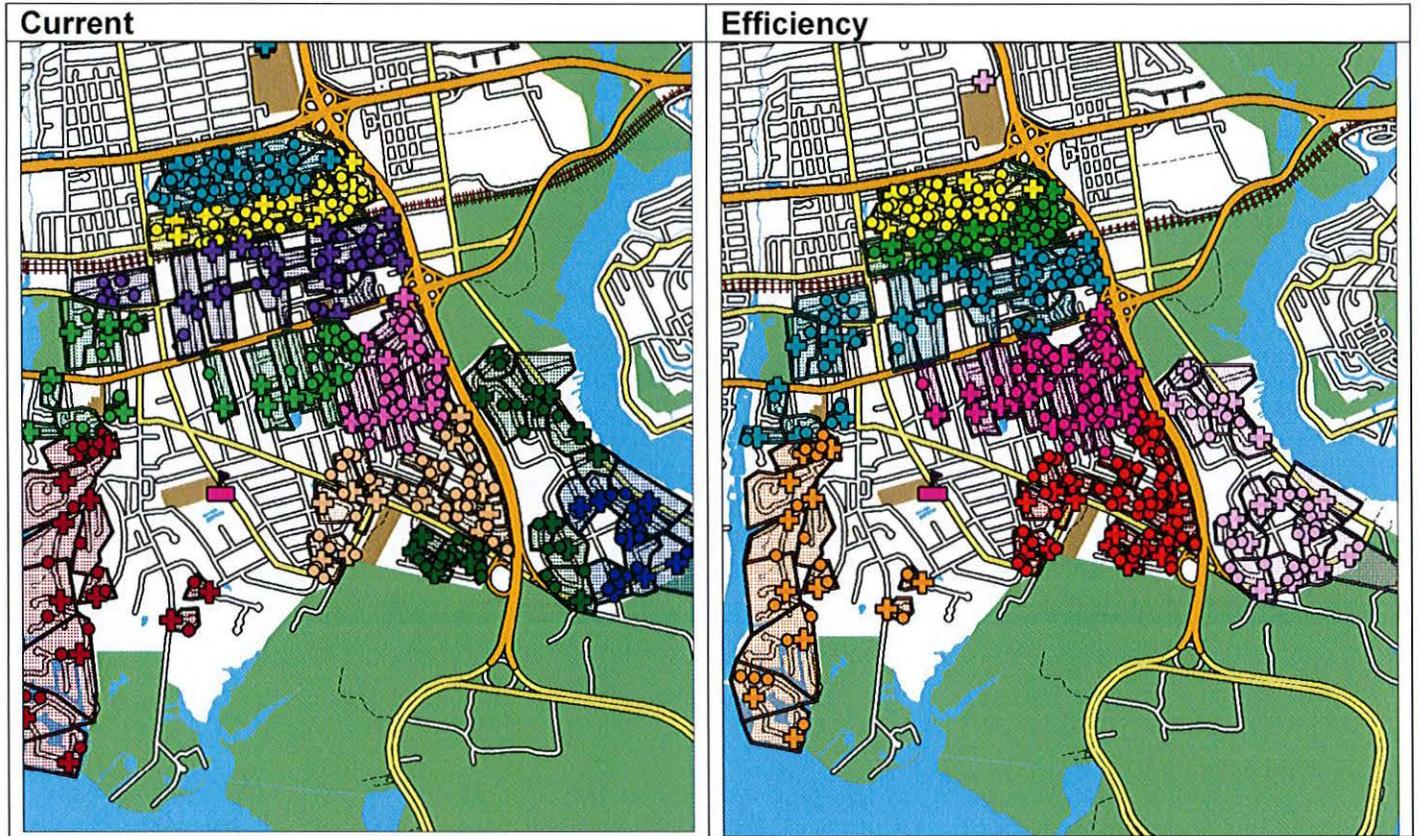


The ridership numbers shown in this chart indicate actual riders taken from district records in red and expected riders (80% of potential riders) in blue.

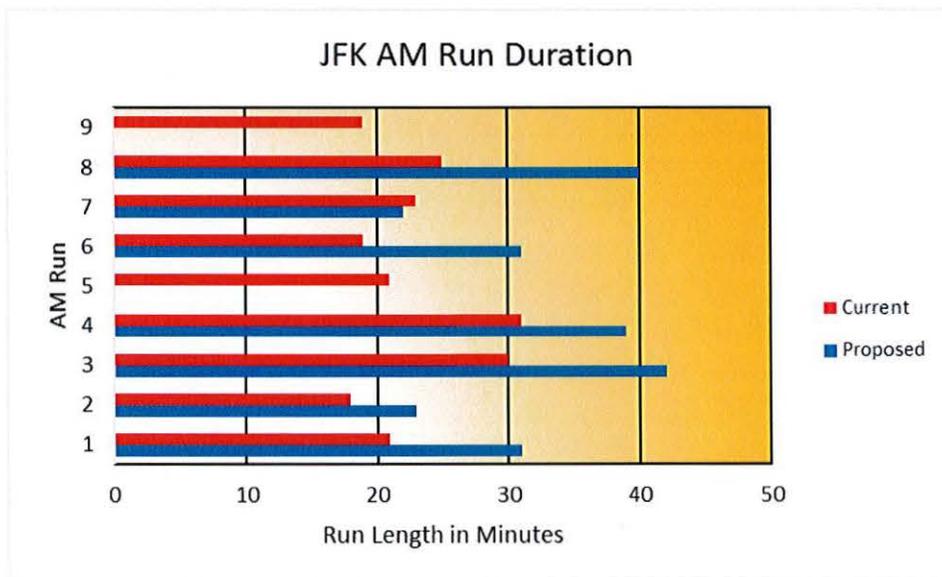


JFK 2016-17

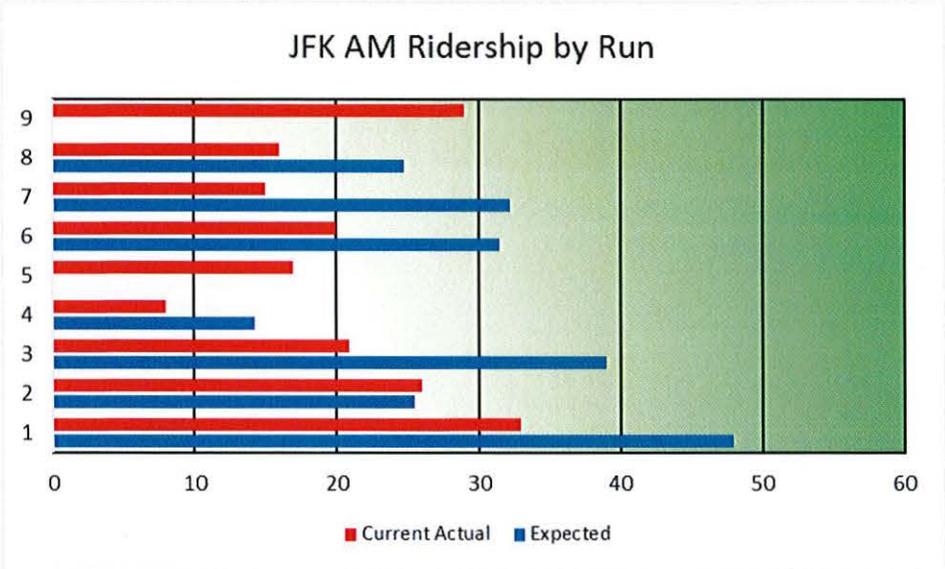
JFK has two runs eliminated.



The duration times shown in this chart include the “dead head” times between trips.

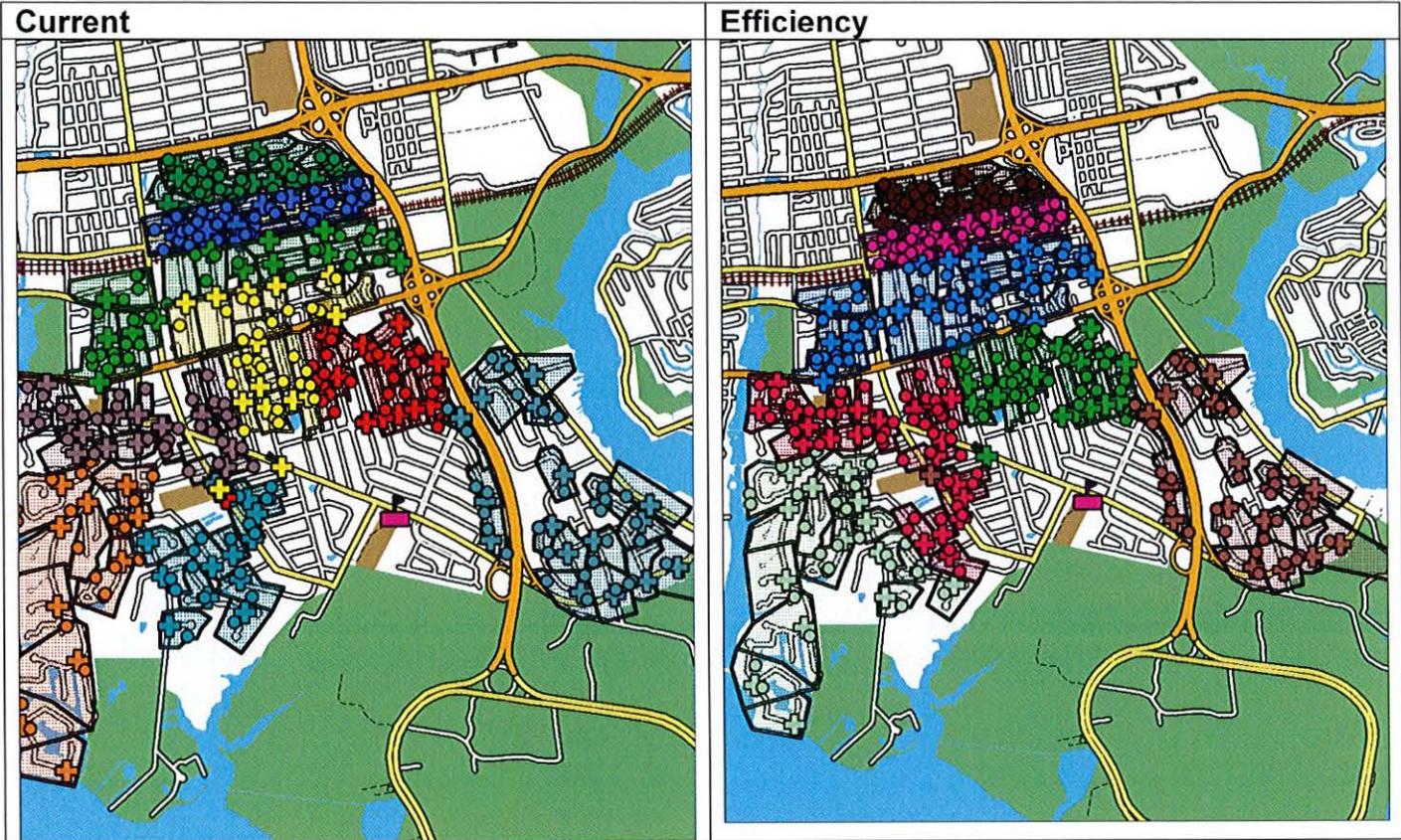


The ridership numbers shown in this chart indicate actual riders taken from district records in red and expected riders (80% of potential riders) in blue.

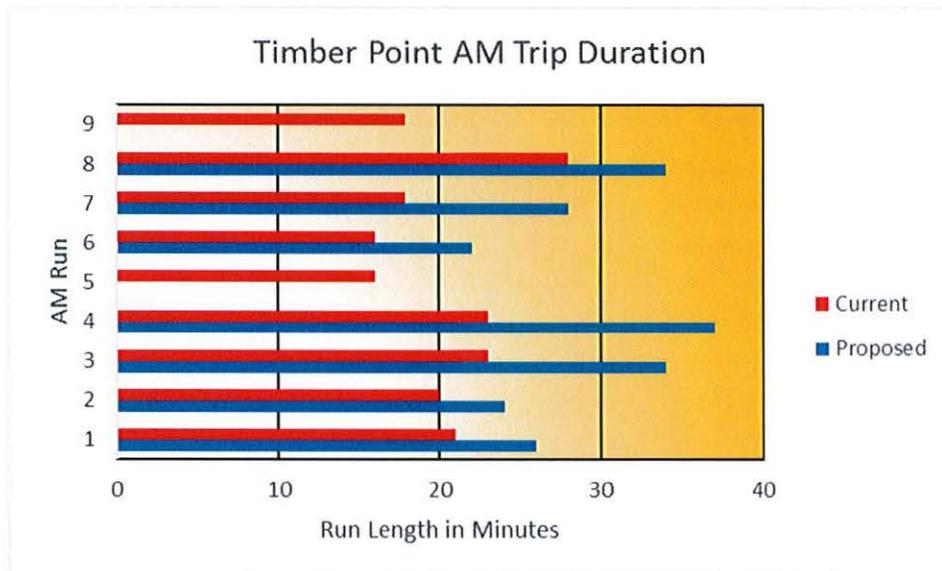


Timber Point 2016-17

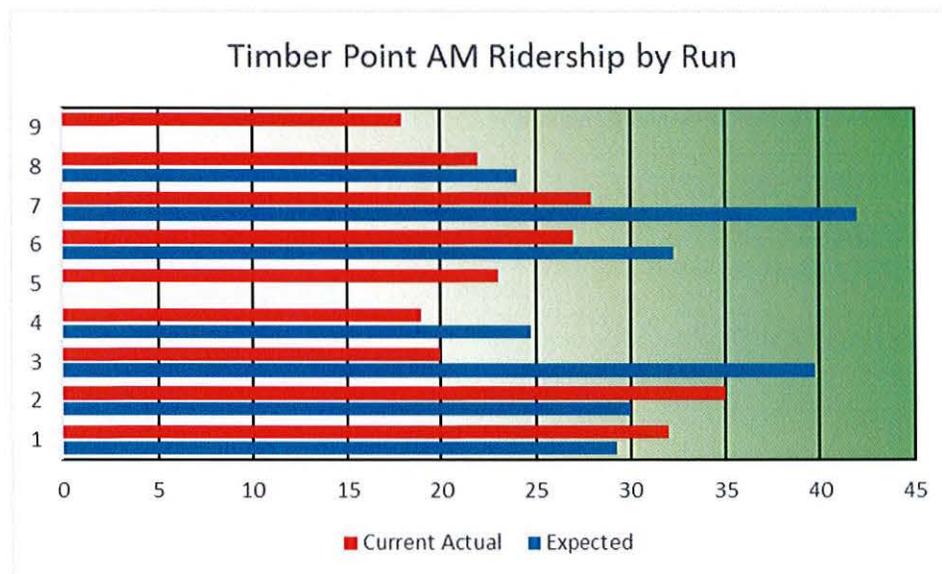
Timber Point has two runs eliminated.



The duration times shown in this chart include the “dead head” times between trips.



The ridership numbers shown in the following chart indicate actual riders taken from district records in red and expected riders (80% of potential riders) in blue.



Overall, the efficiency plan goes from 17 daily buses to 12 daily buses in service which eliminates 5 buses. The runs eliminated are shown without schools assigned. However, individual stops may have been moved between runs to achieve greater efficiency.

RT	SJB		1ST TIER		2ND TIER		3RD TIER				4TH TIER		EXTRA		
	SJB		EI HS		EI MS		RCK ELEM		CONN ELEM		JFK ELEM		TP ELEM		EXTRA
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
Bells	9:42	3:42	7:10	1:47	7:54	2:32	9:12	3:12	9:12	3:12	9:42	3:42	9:42	3:42	
ZEI001	SJB	SJB	X	X	X	X	X	X	X	X	X	X	X	X	
ZEI002	SJB	SJB	X	X	X	X	X	X	X	X	X	X	X	X	
ZEI003	SJB	SJB	X	X	X	X	X	X	X	X	X	X	X	X	
ZEI004	X	X	X	X	X	X	X	X	X	X	X	X	X	X	LATE 5
ZEI005	X	X	HS	HS	MS	MS	RCK	RCK	CONN	CONN	X	X	X	X	
ZEI006	X	X	HS	HS	MS	MS	X	X	X	X	JFK	JFK	TP	TP	
ZEI007	X	X	X	X	X	X	X	X	X	X	X	X	X	X	LATE 16
ZEI009	X	X	HS	HS	MS	MS	X	X	X	X	JFK	JFK	TP	TP	
ZEI010	X	X	HS	HS	MS	MS	X	X	X	X	JFK	JFK	TP	TP	
ZEI011	X	X	HS	HS	MS	MS	X	X	X	X	JFK	JFK	TP	TP	
ZEI012	X	X	HS	HS	MS	MS	RCK	RCK	CONN	CONN	X	X	X	X	
ZEI013	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
ZEI014	X	X	HS	HS	MS	MS	RCK	RCK	CONN	CONN	X	X	X	X	
ZEI015	X	X	HS	HS	MS	MS	RCK	RCK	CONN	CONN	X	X	X	X	
ZEI016	X	X	HS	HS	MS	MS	RCK	RCK	CONN	CONN	X	X	X	X	
ZEI017	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
ZEI018	X	X	HS	HS	MS	MS	X	X	X	X	JFK	JFK	TP	TP	
ZEI019	X	X	HS	HS	MS	MS	X	X	X	X	JFK	JFK	TP	TP	
ZEI021	X	X	HS	HS	MS	MS	X	X	X	X	JFK	JFK	TP	TP	
ZEI022	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
TOTAL	3	3	12	12	12	12	5	5	5	5	7	7	7	7	2

Eliminating 5 buses from service generates a net savings that can be expected by the district of \$421,143 annually.

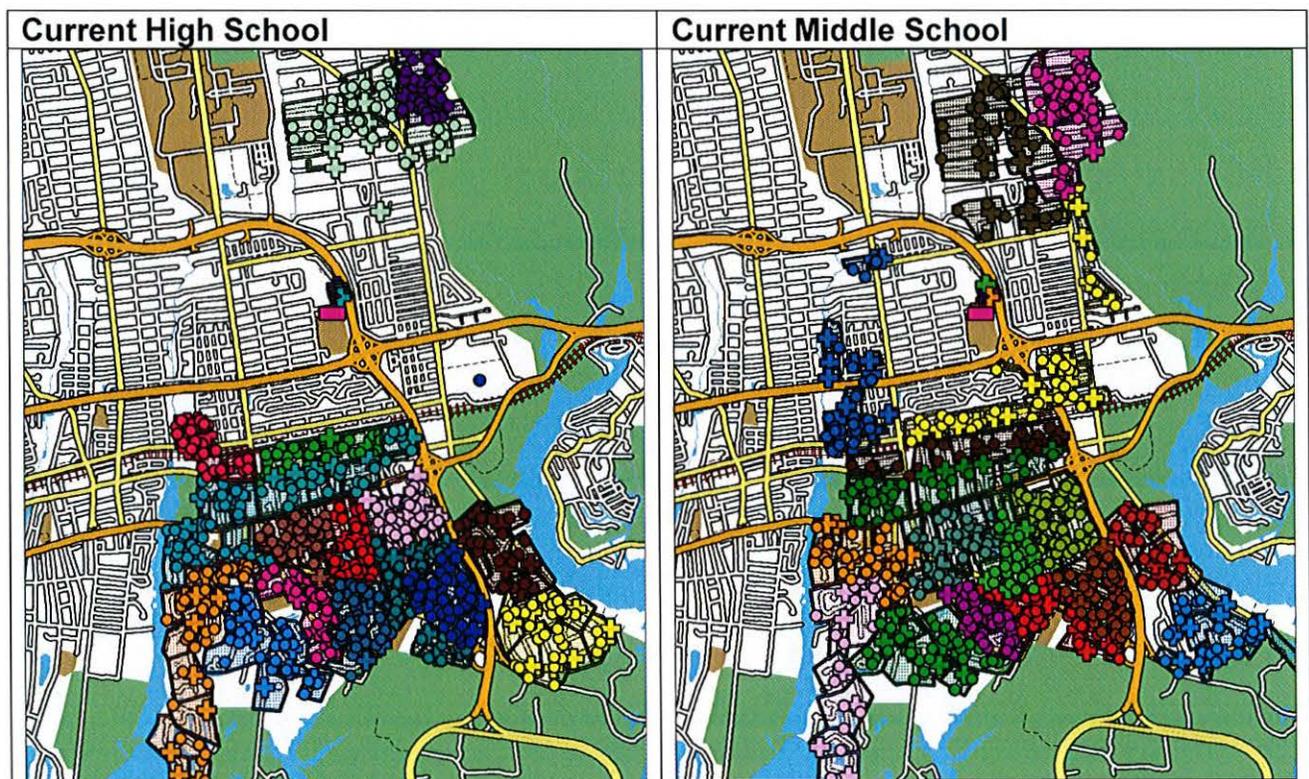
Option 2: Combined Service Route Changes

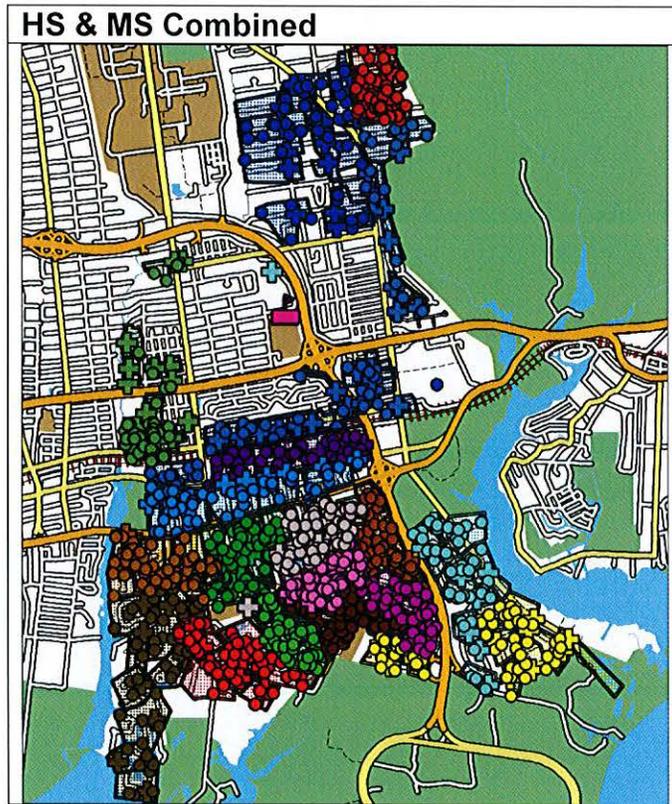
Transfinder's Professional Services Team has created routes that combined schools on runs utilizing the efficiency process. This option combined Middle School and High School, RCK and Connetquot, and JFK and Timber Point to create as few as two tiers of service. Combining the schools placed an additional bus in service for the regular runs. It could also add two additional buses for late runs depending on their schedule. The two tier option provides the most flexibility in choosing which tiers are first and last and bell schedules. Consolidation into two tiers should also shorten the daily routes and potentially reduce expenditures in the district contracts by reducing the buses time in service from 7 hours to 6 hours per day.

All of the runs displayed are morning runs. The afternoon runs are identical in all but a few instances where the route of the bus is reversed to shorten ride time. The combined runs are slightly longer than current runs in some cases. If the district chose to move the remaining two tiers closer together, each remaining run could be reduced by \$5,103.

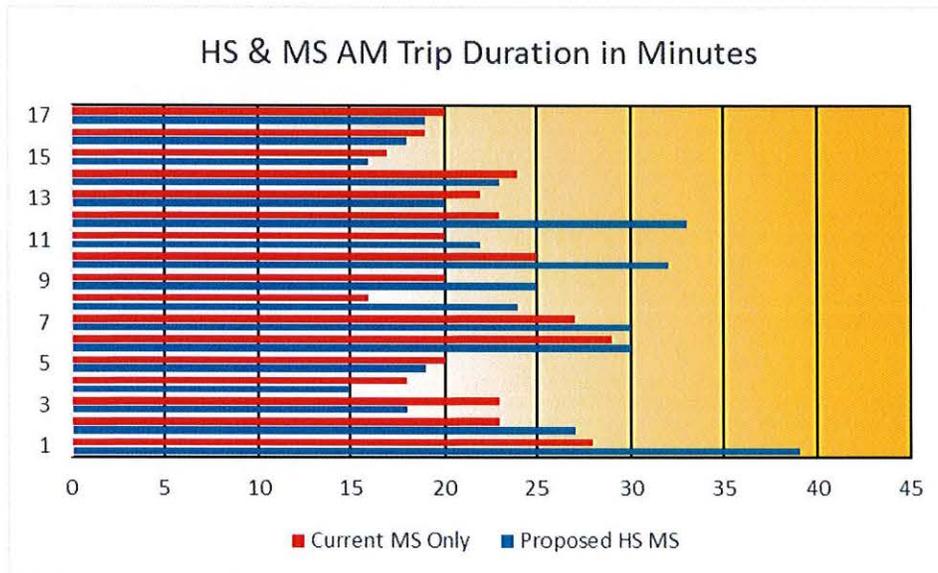
Combined Tiers HS/MS

This option utilized the current Middle School stops and added the High School students. The stops were then recombined to balance ridership loads. East Islip staff then reviewed the runs and verified travel paths. One additional run was created which added a bus to the fleet to handle rider loads.

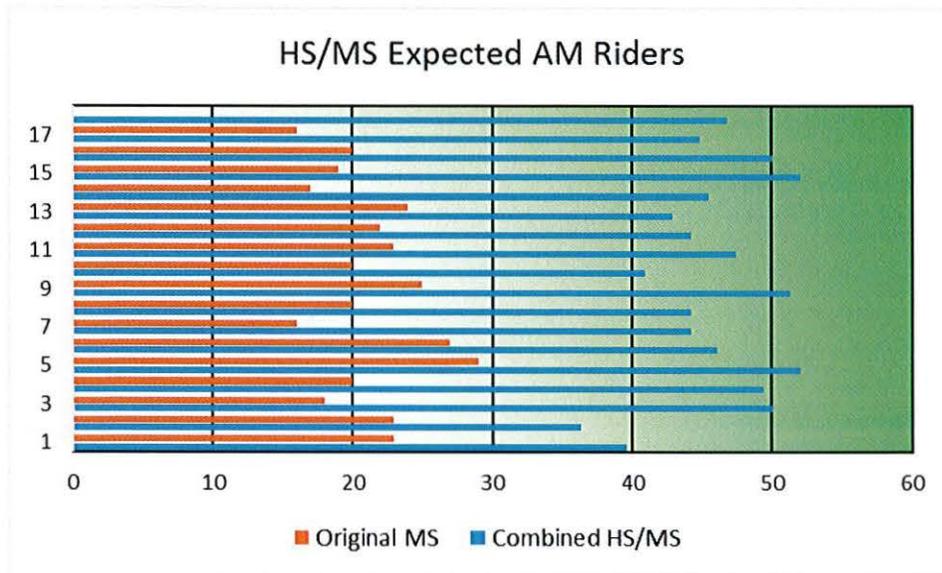




The duration times shown in this chart include the “dead head” times from the bus terminal to the first stop.

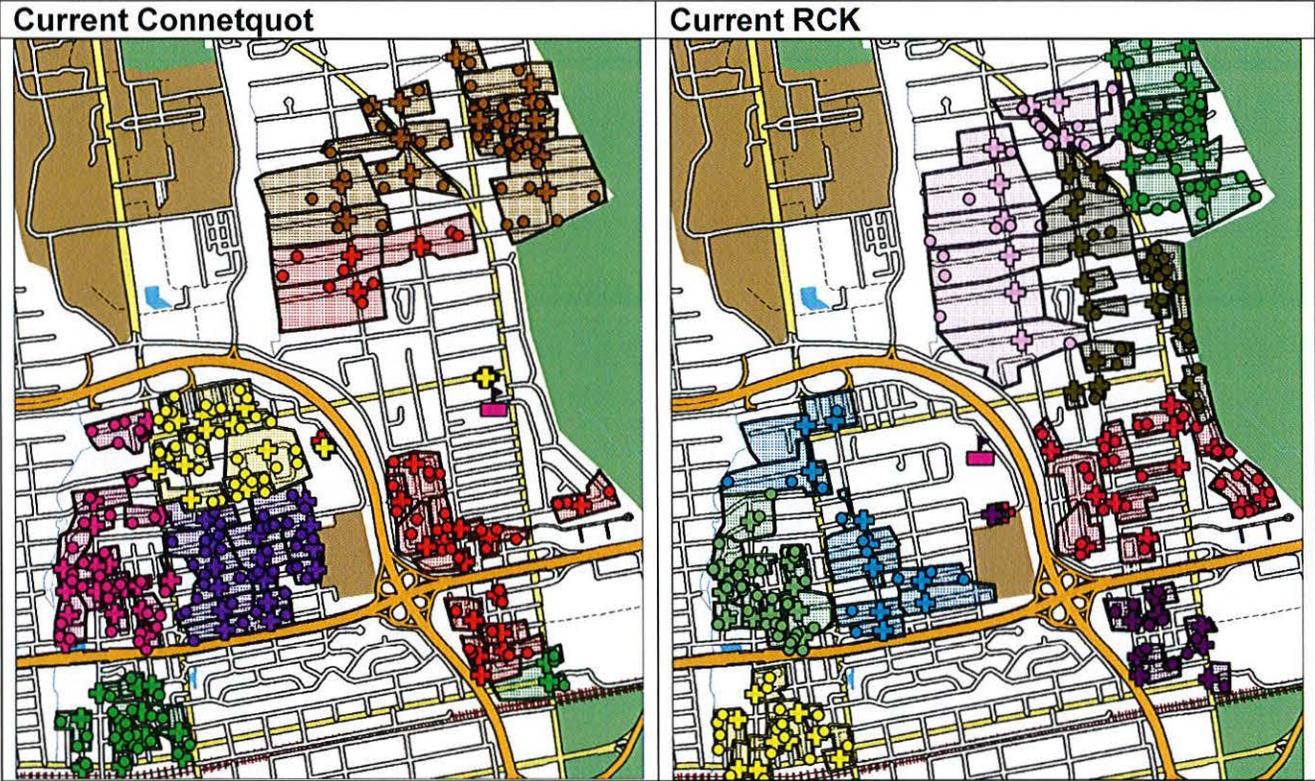


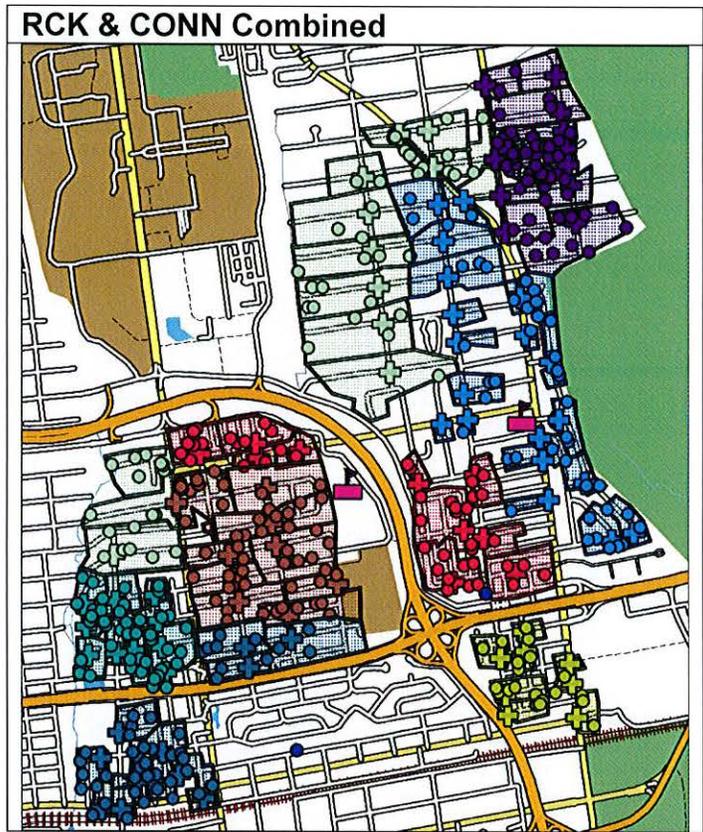
Riders on this chart shows only current Middle School riders since combining service does not show an exact run to run analogy.



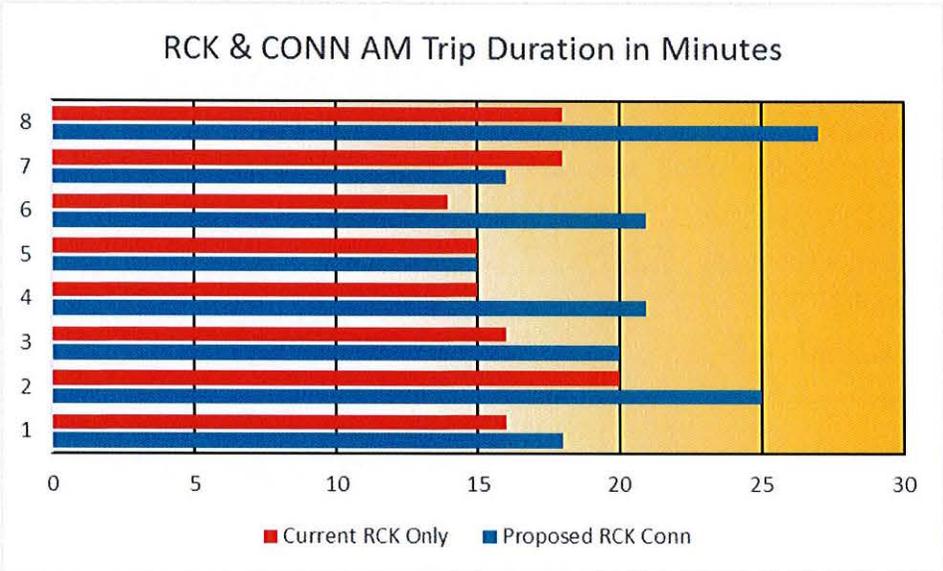
Elementary Combined

Combining Elementary was implemented in the same fashion as the secondary combination. North schools and separately South schools were combined. The stops were then recombined to balance rider loads.

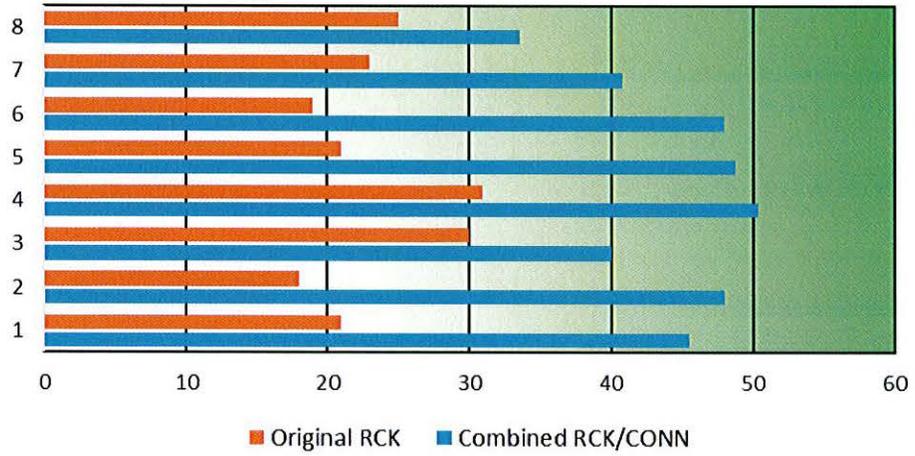




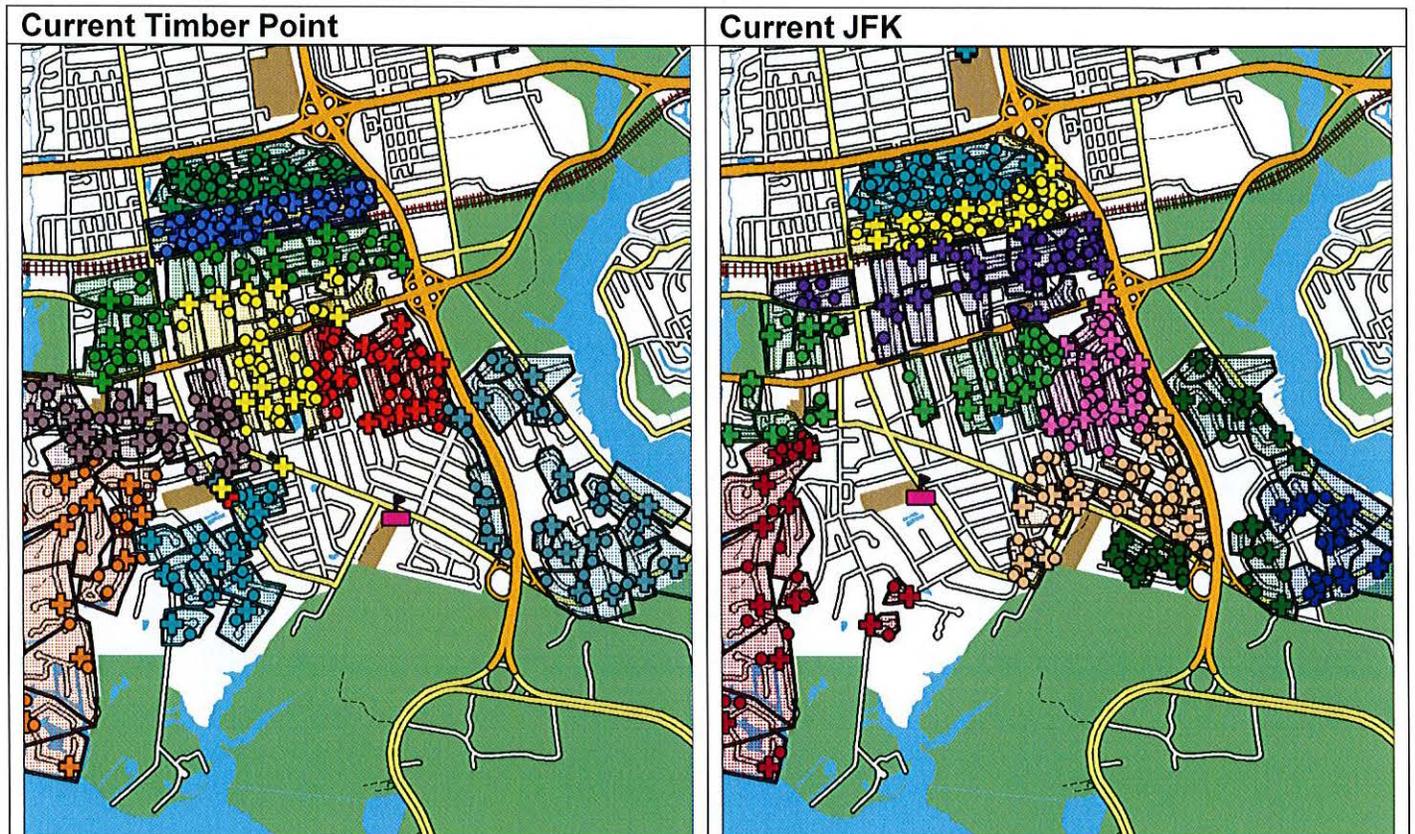
The duration times shown in this chart include the “dead head” times between trips.

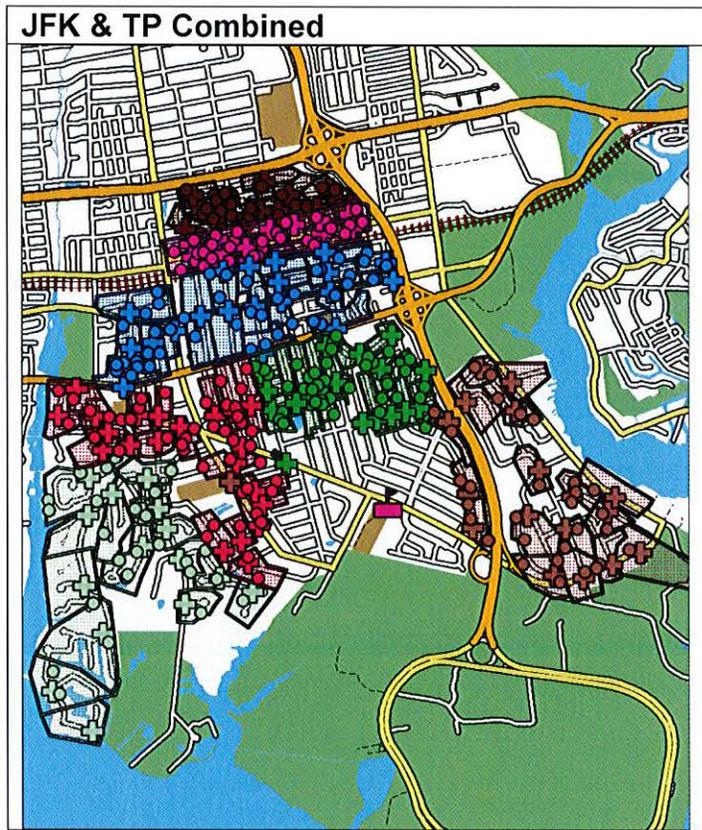


RCK/CONN Expected AM Riders

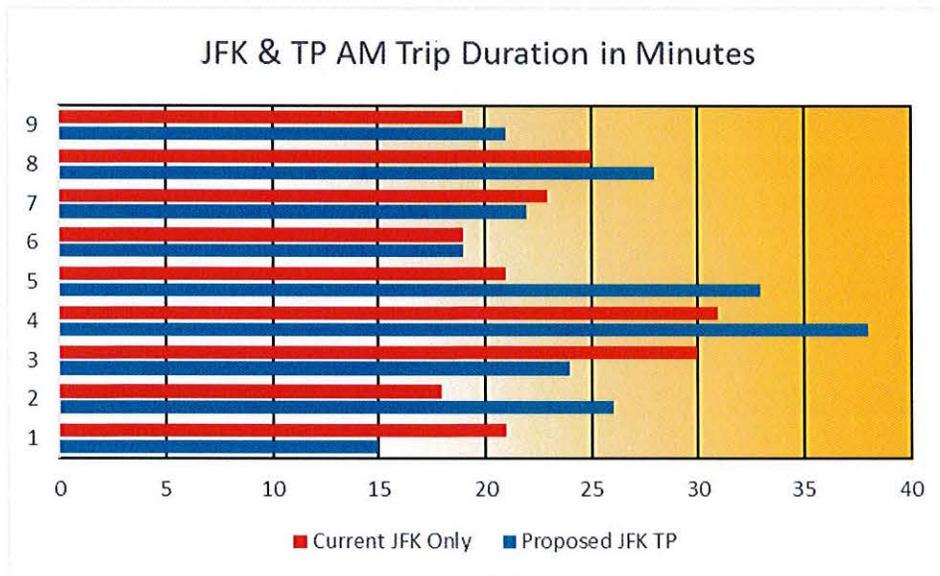


Combining JFK and Timber Point added an additional run due to student rider loads.

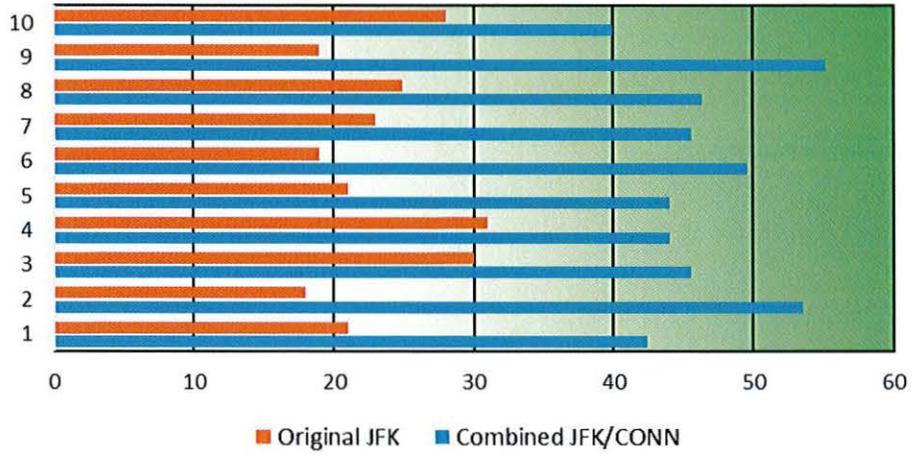




The duration times shown in this chart include the “dead head” times between trips.



JFK/TP Expected AM Riders



The following chart shows that all of the current buses are utilized to combine schools. In addition, one additional bus shown as NEW will be needed due to seat space limitations. There are two late runs (in yellow) that could create additional bus needs depending on their timing.

RT			1ST TIER		2ND TIER				EXTRA
	SJB		EI HS/MS		RCK/CONN ELEM		JFK/TP ELEM		
	AM	PM	AM	PM	AM	PM	AM	PM	
Bells	9:42	3:42	7:10	1:47	8:37	2:37	8:37	2:37	
ZEI001	SJB	SJB	X	X	X	X	X	X	
ZEI002	SJB	SJB	X	X	X	X	X	X	
ZEI003	SJB	SJB	X	X	X	X	X	X	
ZEI004	X	X	HS/MS	HS/MS	RCK/CONN	RCK/CONN	X	X	LATE 5
ZEI005	X	X	HS/MS	HS/MS	RCK/CONN	RCK/CONN	X	X	
ZEI006	X	X	HS/MS	HS/MS	X	X	JFK/TP	JFK/TP	
ZEI007	X	X	HS/MS	HS/MS	RCK/CONN	RCK/CONN	X	X	LATE 16
ZEI009	X	X	HS/MS	HS/MS	X	X	JFK/TP	JFK/TP	
ZEI010	X	X	HS/MS	HS/MS	X	X	JFK/TP	JFK/TP	
ZEI011	X	X	HS/MS	HS/MS	X	X	JFK/TP	JFK/TP	
ZEI012	X	X	HS/MS	HS/MS	RCK/CONN	RCK/CONN	X	X	
ZEI013	X	X	HS/MS	HS/MS	RCK/CONN	RCK/CONN	X	X	
ZEI014	X	X	HS/MS	HS/MS	RCK/CONN	RCK/CONN	X	X	
ZEI015	X	X	HS/MS	HS/MS	RCK/CONN	RCK/CONN	X	X	
ZEI016	X	X	HS/MS	HS/MS	RCK/CONN	RCK/CONN	X	X	
ZEI017	X	X	HS/MS	HS/MS	X	X	JFK/TP	JFK/TP	
ZEI018	X	X	HS/MS	HS/MS	X	X	JFK/TP	JFK/TP	
ZEI019	X	X	HS/MS	HS/MS	X	X	JFK/TP	JFK/TP	
ZEI021	X	X	HS/MS	HS/MS	X	X	JFK/TP	JFK/TP	
ZEI022	X	X	HS/MS	HS/MS	X	X	JFK/TP	JFK/TP	
NEW	X	X	HS/MS	HS/MS	X	X	JFK/TP	JFK/TP	
TOTAL	3	3	18	18	8	8	10	10	2

This option is expected to increase yearly contract expenses by \$79,125 for one additional bus. If the district kept the remaining two tiers of service close together, the overall expenditures could be reduced by \$5,103 for each of the other 17 buses by moving the buses from a 7-hour billing structure to a 6-hour structure for a cost avoidance of \$86,751. The yearly net to the district is expected to be -\$7,626. If the 2 late runs create additional service, those costs will be added to the initial savings.

Option 3: Combining Consolidated School Runs and Efficiency Runs

Option 3 would allow the district to consider 3 tiers of service. Either the Elementary or the Secondary could have 2 tiers utilizing the efficiency runs shown in Option 1. The remaining group would have one tier utilizing the combination runs from Option 2.

Three tiers of service, if properly spaced, could allow the two late runs to operate without conflicting with regular service. If the last tiers of service were the efficiency tiers, Transportation could operate with only one additional bus.

The following example places High School last which follows current research in high school student achievement which shows that high school students perform better with later school start times. Organizations such as American Psychology Association, Centers for Disease Control, National Sleep Foundation, and the American Academy of Pediatrics have recommended later start times for high school students.

Some of the huge amount of literature on the subject:

- The National Center for Health Research – Diana Zuckerman, PhD
- The Review of Economics and Statistics – “How the Time of Day Affects Productivity – Evidence from School Schedules” – Nolan G Page, PhD
- American Academy of Pediatrics – “Let Them Sleep” – 8/25/14
- American Academy of Pediatrics – Position Paper – “Adolescent Sleep Working Group, Committee on Adolescence, Council on School Health” 8/14
- Start School Later, Inc.
- PubMed.gov – “Later School Start Time is Associated with Improved Sleep and Daytime Functioning in Adolescents”
- PubMed.gov – “High School Start Time and the Impact on High School Students”
- University of Minnesota – “Examining the Impact of Later High School Start Times on Health and Academic Performance of High School Students” 2/14
- Medical News Today – “Is It Time to Start School Later?” Julie Boergers, PhD, Bradley Hasbro Children’s Research Center - 2/16/14

The timing of the consolidation runs may cause the current bell times to be adjusted slightly. This option also has 6 elementary runs that operate by themselves which should reduce overall expenditures by \$5,103 per bus due to changing the bus billing structure from 7 hours to 6 hours per day.

RT	SJB		First Tier				2nd Tier		3rd Tier		EXTRA
			RCK/CONN ELEM		JFK/TP ELEM		EI MS		EI HS		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
Bells	9:42	3:42	7:10	1:10	7:10	1:10	7:54	2:32	8:35	3:12	
ZEI001	SJB	SJB	X	X	X	X	X	X	X	X	
ZEI002	SJB	SJB	X	X	X	X	X	X	X	X	
ZEI003	SJB	SJB	X	X	X	X	X	X	X	X	
ZEI004	X	X	RCK/CONN	RCK/CONN	X	X	X	X	X	X	
ZEI005	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI006	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI007	X	X	RCK/CONN	RCK/CONN	X	X	X	X	X	X	
ZEI009	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI010	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI011	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI012	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI013	X	X	RCK/CONN	RCK/CONN	X	X	X	X	X	X	
ZEI014	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI015	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI016	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI017	X	X	X	X	JFK/TP	JFK/TP	X	X	X	X	
ZEI018	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI019	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI021	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI022	X	X	X	X	JFK/TP	JFK/TP	X	X	X	X	LATE
NEW	X	X	X	X	JFK/TP	JFK/TP	X	X	X	X	LATE
TOTAL	3	3	8	8	10	10	12	12	12	12	0

This option is expected to add \$79,125 to the transportation budget for a new bus while 6 current runs moving from a 7-hour to a 6-hour billing schedule should reduce expenditures by a total of \$30,618. The net increase for this option is expected to be \$48,507. There would not be an issue of potentially adding service for late runs in this option.

Option 4: Combining Consolidated School Runs and Current Runs

This option utilizes current runs for either Elementary or Secondary and consolidated runs shown in Option 2 for the other tier. The consolidation tier places one additional bus in service which could be run with one of the late runs to avoid some additional costs. Option 4 allows the district to again consider 3 tiers of service. The timing of the consolidation runs may cause the current bell times to be adjusted slightly.

RT	SJB		First Tier				2nd Tier		3rd Tier		EXTRA
	AM	PM	RCK/CONN ELEM		JFK/TP ELEM		EI MS		EI HS		
			AM	PM	AM	PM	AM	PM	AM	PM	
Bells	9:42	3:42	7:10	1:10	7:10	1:10	7:54	2:32	8:35	3:12	
ZEI001	SJB	SJB	X	X	X	X	X	X	X	X	
ZEI002	SJB	SJB	X	X	X	X	X	X	X	X	
ZEI003	SJB	SJB	X	X	X	X	X	X	X	X	
ZEI004	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	LATE
ZEI005	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI006	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI007	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI009	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI010	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI011	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI012	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI013	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI014	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI015	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI016	X	X	RCK/CONN	RCK/CONN	X	X	MS	MS	HS	HS	
ZEI017	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI018	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI019	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI021	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
ZEI022	X	X	X	X	JFK/TP	JFK/TP	MS	MS	HS	HS	
NEW	X	X	X	X	JFK/TP	JFK/TP	X	X	X	X	LATE
TOTAL	3	3	8	8	10	10	17	17	17	17	1

This option should add \$79,125 for an additional bus in daily service plus the cost of a single late run to the annual budget.

Student Projections

The projections are basic and not intended to make exact predictions but rather to show the trends in the district when looking at grade level enrollments. The cohort survival method chosen equally distributes grade changes based on the previous 5-years history.

	Grades 1	2	3	4	5	6	7	8	9	10	11	12	Totals
2010-11	286	330	342	327	313	394	343	381	409	407	412	366	4310
2011-12	290	290	334	340	329	304	398	348	403	369	394	400	4199
2012-13	255	284	286	337	337	323	306	399	333	376	360	381	3977
2013-14	279	267	287	283	343	339	320	312	352	321	355	376	3834
2014-15	265	279	267	291	288	342	340	326	294	357	308	361	3718
2015-16	268	267	279	267	293	284	342	332	296	283	351	289	3551
2016-17	259	272	264	290	269	295	292	341	320	287	285	350	3524
2017-18	252	261	271	269	293	268	298	291	321	315	281	280	3401
2018-19	248	255	260	276	271	292	272	295	270	313	312	273	3337
2019-20	241	251	253	267	279	271	297	270	277	263	310	307	3287
2020-21	236	244	250	259	269	278	275	295	250	270	259	305	3190
2021-22	230	238	243	256	261	269	282	273	276	243	267	253	3091

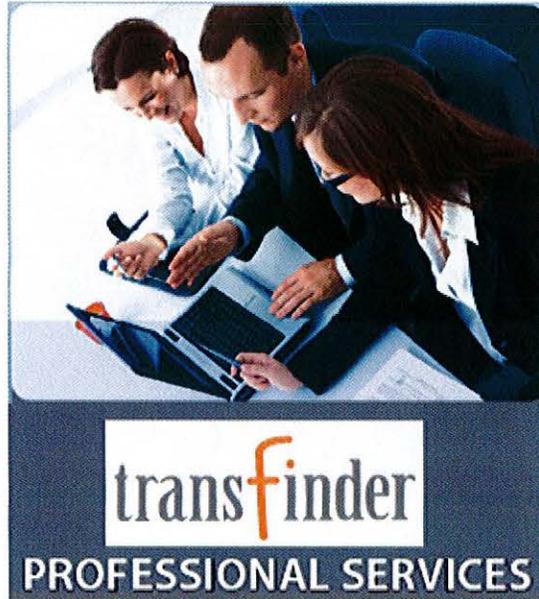
These projections were utilized to validate the general structure of the new potential routes. It is understood that student mobility may cause certain areas to have more or less eligible students each year. However, as the following chart demonstrates, the overall number of students at the elementary levels are expected to slightly decline over the next 5 years which should allow the potential routes to remain relatively stable over that time.

New York Non-Allowable Pupil Decimal

There were no options that reduced the walk zones for ineligible students under New York school transportation funding guidelines. Therefore, there is not a change in the Non-allowable pupil decimal ratio in any option.

Transfinder was able to capture virtually all bus stops the district currently uses. There were a few stops at secondary level that were consolidated due to very close proximity to each other in the proposed routes.

The following page outlines some of the Professional Services offered by Transfinder that may be helpful to your district.



Professional & Implementation Services Management Team



Dan Roberts, Director, Professional Services, is responsible for developing and expanding the company's professional services for school districts throughout North America. He leads the company's in-house staff as well as taps into a network of industry experts to provide comprehensive services for the efficient management of student transportation operations. From routing and logistics services to demographic analyses, management training, transportation consolidation, and benchmarking studies, Roberts enables districts to meet new challenges arising from budget shortfalls or growth demands.

Dan is a former Executive Director for Long-range Planning and Business Systems for Round Rock Independent School District in Texas, is recognized for his pioneering efforts in developing computerized routing systems for school districts. He also is called upon by national and state organizations to establish standards and conduct independent management audits of district transportation operations in order to help districts incorporate best practices into their transportation operations. Dan is the author of "Best Practices in Student Transportation" and teaches college courses in pupil transportation management.



Terrell "T" Doolen, Implementation Services Manager, is responsible for customized advice, training, and support for clients at their sites on specific projects, including advanced training sessions, project management, accelerated implementation services, or route reduction and efficiency planning. Prior to assuming this role in professional services, Doolen also oversaw the technical support staff at Transfinder for three years. He has over ten years of

experience in customer service and technical support, and was influential in reshaping and improving the customer service that Transfinder provides. Prior to joining Transfinder, Doolen worked at Yahoo, Inc. in California. He holds a B.S. in secondary education from the University of Illinois at Urbana-Champaign.

Other Transfinder Professional Services available:

We provide implementation services for the full suite of our solutions, including our fleet maintenance, field trip, and AVL software for seamless GPS integration with our routing system.

1. New Route Creation Based on Changing Attendance Patterns

Demographic shifts and student matriculation changes often result in the opening of a new school or the consolidation or closing of schools. This dramatically affects a district's routing and scheduling landscape. We review your new data to assess the impact on your transportation needs; create new routes and bus runs; and designate appropriate bus stops to accommodate change, and reduce mileage and ride times.

2. Route Analysis for Greater Efficiencies & Cost Savings

Increasing routing and scheduling efficiencies has a cumulative and positive impact on your transportation budget. We analyze your data, current routes, and bus runs, and recommend incremental changes that yield significant savings. These may include adjusting bell time windows; student ride times; bus capacity based on actual ridership; walk-to-stop distances and routing parameters, and non-required services.

3. Continuous Routing Services

Our Professional Services staff is available throughout the country to provide routing services, which include (1) yearly route updates to improve efficiencies; (2) continuous route updates as needed; and (3) a subscription service that allows you to call upon our expertise as needed. We offer cost-effective solutions for unexpected changes in budget or personnel that ensure consistency in your operation.

DEMOGRAPHIC ANALYSIS FOR BOUNDARY PLANNING

When your district experiences growth or consolidation, we help you evaluate your student population demographically and geographically based on available local knowledge and historical data. We also will plot and plan for future growth over the next five years. By analyzing your existing or changing school placements, we will then enable your Administrators and Board Members to make policy shifts that have positive effects on the community now and in the future.

MANAGEMENT TRAINING

Several of our Professional Services staff have managed transportation departments and can provide management training for directors throughout the country. We assess your day-to-day operational challenges and provide customized management training to ensure your success.

TRANSPORTATION CONSOLIDATION STUDIES

Economic challenges are causing school districts to evaluate consolidating services, including transportation. Our Professional Services staff has worked with school districts in several states on opportunities for consolidation that ensure local control, while leveraging centralized routing and scheduling expertise. Our studies enable participating school districts to achieve economies of scale through careful analysis, collaborations, and agreements.