

*Student
Transportation
Consulting
Services*

Transportation Efficiency
Study

Final Report

Arlington Public Schools

November, 2011



Solutions that work... together.

November 4, 2011

Mr. Clarence E. Stukes
Assistant Superintendent for Facilities & Operations
Arlington Public Schools
2770 South Taylor Street
Arlington, VA 22206

Dear Mr. Stukes:

Management Partnership Services, Inc. is pleased to submit this draft final report documenting the results of the Transportation Efficiency Study. It has been a distinct pleasure working with you and your dedicated staff in Transportation Services throughout this process. I would particularly like to note the high degree of openness and cooperation that the MPS team experienced from every member of Transportation Services. Their cheerful willingness to participate in all of the interviews, observations, and group sessions required for a successful study made our job easier and ensured a higher quality result. A particular acknowledgement is required for Mr. Greg Sutton and Ms. Kathryn Carter without whose time and willing participation we could not have completed our work.

We look forward to your thorough review of the enclosed report. We also look forward to our continued conversation regarding next steps, principally as it applies to the immediate actions required in support of implementation. In particular we will address the actions to be requested of the Arlington School Board during our formal presentation of project results to the School Board on November 15, 2011. In the meantime, please do not hesitate to contact me with any questions you may have.

Sincerely,



Thomas W. Platt
Project Manager

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Executive Summary

PROJECT BACKGROUND

Management Partnership Services, Inc. (MPS) was engaged by the Arlington Public Schools (APS) in May, 2011 to conduct an efficiency study of Transportation Services. Work began in early June with the analysis continuing through the summer and culminating with a preliminary results presentation in September, 2011. This report documents the results of the study and is intended to provide a catalyst for change and sustainable improvement to the efficiency and effectiveness of the APS Transportation Services.

The approach followed was to combine quantitative measures of performance with direct observation of APS operations and the experience of the MPS project team to complete an overall assessment of performance. MPS then utilized the baseline assessment to develop an action-oriented improvement plan that is designed to mitigate the risks facing Transportation Services and to position the organization to take advantage of the opportunities presented for controlling cost and improving service delivery to the APS community. An overall summary of results is provided here. Detailed report sections covering each specific aspect of the study follows with a separate report addendum providing additional analytical detail.

ASSESSMENT OF PERFORMANCE

MPS finds the APS transportation program to be providing a satisfactory level of service quality at an acceptable cost. However, this assessment is based on a number of factors prevalent at the time of the study. We find current performance to be the result of an evolutionary process that is out of sync with current realities. The organization structure and daily operations of Transportation Services have evolved over time as the school division has grown and service demands have increased. The current status is highly dependent on the knowledge and extended tenure of key staff, a dedicated corps of drivers, and outmoded manual processes. The current position of Transportation Services is tenuous, with a high potential risk for a service breakdown in the near future if steps are not taken to build upon successful past performance and position transportation for a future more in line with the changes faced by the school division as a whole.

Growth in population and service complexity arising from increased programmatic demands, area congestion, and demographic changes threaten to overwhelm the current organization. A study such as this is necessarily reflective of performance at a fixed point in time. MPS can only surmise as to the trend in performance but suspects strongly that the system has already been placed under great strain to maintain a reasonable level of service quality and efficiency. It is the assessment of MPS that, absent action, there will be a breakdown in service and that this would prove costly of time and resources to correct once it has occurred. It is also the assessment of MPS that definitive action taken now to mitigate identified shortcomings can avoid this breakdown and position Transportation Services for long term success well into the future.

ACTION PLAN

There are nine key recommendations resulting from this study. Each addresses a critical area of transportation performance although they are not equal in terms of priority or influence on overall efficiency and effectiveness. They are nevertheless all interrelated and interdependent. Taken together they form a comprehensive program for first arresting, and then reversing any potential decline in performance. The intent is to reposition Transportation Services on a revised organizational, technological, and philosophical foundation that is more in keeping with the revised demands placed upon it and best practices currently in use throughout the nation. The recommendations contained within the action plan are summarized as follows:

Executive Summary

Priority 1 Recommendations:

1. *Reorganize the management & administrative staffing of Transportation Services.*

The management and administrative organization structure is the single greatest obstacle standing in the way of transportation's ability to adapt to its changing circumstances. A focus on functional specialization is required, and can be accomplished without significantly increasing the overall staff count. None of the other recommendations can be effectively implemented until this is resolved. The organization will be overwhelmed by change if this issue is not addressed.

2. *Re-implement and integrate the bus routing software into the daily operations of Transportation Services.*

A major shift in the underlying philosophy of Transportation Services is required whereby data, information, and analysis become the focus of management attention. A fully functioning and integrated bus route management software is a foundational tool. The APS has failed to benefit from its prior investment in this technology. With proper attention, this can be reversed and the existing software utilized to enable further improvements to Department operations.

3. *Restructure current bus routes to reduce the number of buses in service.*

Transportation's operational infrastructure is at capacity. Recent additions to the bus fleet in the name of service delivery are starting to push the system to the breaking point. Opportunities exist to utilize technology and a new routing philosophy to reduce the number of buses required, relieving pressure on the system and controlling costs in such a way that a window of time is opened for implementing the balance of the action plan.

Priority 2 Recommendations:

4. *Implement a comprehensive Service Level Agreement for fleet management services.*

The arrangement for fleet services with Arlington County can be very advantageous by reducing the operational burden on Transportation Services, particularly during a period of significant change. The existing arrangement lacks structure and clarity. For the benefit of both parties, service levels and operational procedures must be clarified and documented such that Transportation Services receives the data and information required to properly oversee service delivery and support the new data-centric management philosophy.

5. *Revise field trip management processes.*

Transportation for field trips is an important aspect of the services provided by Transportation Services and a significant cost burden for the APS as a whole. Current internal departmental processes lack equity and accountability. Redesigning these will be an important aspect of the implementation plan and a necessary outgrowth of the management reorganization.

6. *Revise timekeeping & payroll processes for bus drivers.*

The manner in which bus drivers are compensated has a disproportionate impact on efficiency, and payroll processes have a disproportionate impact on the administrative burden of Transportation Services. Current processes are duplicative and fail to add management value. Simplifying timekeeping and reporting processes will support the overall redistribution of management effort and

Executive Summary

attention, and improve the utility and accuracy of payroll and compensation practices in Transportation Services.

Priority 3 Recommendations

7. *Consider minor enhancements and changes to School Board transportation policies.*

The current guiding documents in the form of policies, policy implementation procedures, and the bus driver handbook are generally excellent. Minor changes and enhancements will support implementation of the other Priority 3 recommendations, and provide a sound basis for continuous improvement within Transportation Services.

8. *Undertake a comprehensive school bell time analysis to identify solutions that maximize transportation efficiency.*

This study indicates a fundamental shortcoming in the design of the school division's bell time structure that prevents Transportation from maximizing the efficiency of bus routes and schedules. Transportation is not currently positioned to undertake this analysis, much less to manage the implementation of bell time changes but these are necessary long-term considerations for the school division.

9. *Refocus efforts on Transportation Demand Management.*

The APS is at the forefront in considering the positive impact that a broader focus on transportation beyond the traditional school bus can have on costs and effectiveness. Past efforts began to yield positive results, but momentum has waned. Transportation Services is a logical focal point for refocusing energy on this important initiative, and for integrating the benefits into a more efficient and effective system as a whole. Similar to the bell time recommendation, however, transportation is not currently positioned to undertake this responsibility and this must therefore be a longer term consideration for the APS.

Implementation of this action plan will not occur successfully overnight. Rather, the APS must be prepared for an implementation timeline that extends over a minimum of two years. The most important priority one initiatives will consume the majority of resources, and will result in a significant front-loading of time, attention, and focus. Collectively, these first three recommendations *can* be implemented in time for the start of the 2012-13 school year. However, immediate action will be required on the part of the School Board and senior administration. Failure to begin implementation by January, 2012 will jeopardize successful completion in time for the start of the 2012-2013 school year. Attempting implementation, particularly of the bus route restructuring, on a compressed time horizon will impart additional risk of failure for the plan as a whole.

In summary, MPS recommends that serious consideration be given to the adoption and implementation of this Action Plan. The plan will require an infusion of time and attention to ensure successful completion. With appropriate attention now, however, transportation service delivery at the Arlington County Schools can and should be a model to be emulated regionally and nationally. With near term action and the application of appropriate resources, this change can be effectively implemented in a reasonable time horizon.

Performance Assessment

PROJECT BACKGROUND

The Arlington Public Schools (APS) issued a Request for Proposals in December, 2010 to undertake an efficiency study of the APS Transportation Services. Management Partnership Services, Inc. (MPS) was selected in May, 2011 and engaged to complete the study. Work began in early June with the analysis continuing through the summer and culminating with a preliminary results presentation in September, 2011. This report documents the results of the study and is intended to provide a catalyst for change and sustainable improvement to the efficiency and effectiveness of the APS Transportation Services.

The approach followed was to combine quantitative measures of performance with direct observation of APS operations and the experience of the project team to complete an overall assessment of performance. Each of the elements identified in the RFP Scope of Services was investigated separately and placed in an appropriate context relative to the overall operation. Those areas that were deemed to be fundamentally sound were set aside and the primary focus placed on areas of particular concern. The objective was not simply to assess performance and identify problems, but rather to develop a contextual understanding of the risks and opportunities that Transportation Services faces in future years.

The findings and recommendations resulting from this study are therefore placed within the framework of an overall implementation plan. MPS utilized the baseline assessment to develop an initiative-specific action plan that is designed to mitigate the risks facing Transportation Services and to position the organization to take advantage of the opportunities presented for controlling cost and improving service delivery to the APS community. The balance of this report section focuses on the overall assessment of current performance. The section that follows builds upon this assessment to identify and discuss specific risks and opportunities in each of the areas covered by the scope of work. The report concludes with an action plan designed to be used as a starting point for implementation.

PERFORMANCE STATISTICS

We begin with a description of various quantitative performance indicators. MPS is a strong proponent for the use of performance measurement as a management tool. Student transportation operations in particular lend themselves to a robust, data-centric approach to management. That said there is distinction that must be drawn between performance *measurement* and performance *benchmarking*. Each of the measurements discussed here are utilized by MPS only as an *indicator* of performance. Part of our assessment compares the calculated results to comparable organizations with which MPS has worked. MPS never draws definitive conclusions from this comparison however, as local operating conditions and policy decisions must also be considered. When taken together as a cohesive whole, the indicators nevertheless provide a valuable perspective and a starting point from which to infuse the results of the project team's observations and experience in order to draw conclusions regarding performance.

SOURCE DATA FOR ANALYSIS

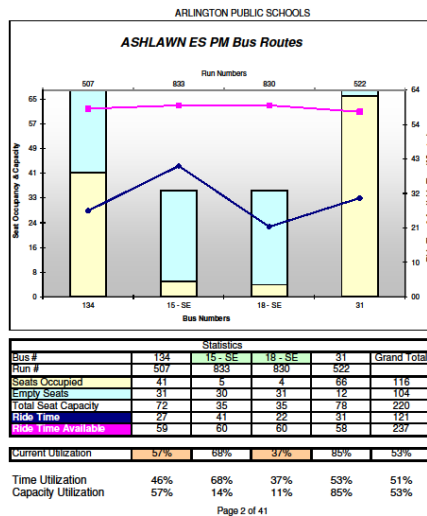
A quantitative approach requires accurate and complete data. Transportation does not currently utilize data systems or associated processes that would produce the data required for calculating the desired statistics. As a result, TransPar Group, Inc., an MPS partner in this project undertook a comprehensive one-day survey of bus operations on June 14, 2011. This survey was utilized to collect detailed data on every bus run in operation on that day. These data are used throughout this

Performance Assessment

assessment as representative of regular operations, and for the calculation of all performance statistics that follow.

This *RouteYield™* survey provided valuable insight into the operation that would have been otherwise inaccessible. Figure 1 provides a sample of the output from this survey. The entire results are provided as a companion to this report, and can be utilized immediately by Transportation Services management as a tool for improving the capacity and asset utilization of the bus fleet.

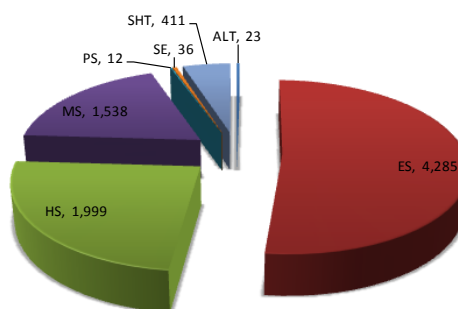
Figure 1 – Sample *RouteYield™* Output



EFFICIENCY & EFFECTIVENESS

Figure 2 illustrates the number of students transported on the date of data collection. This is broken out by the type of transportation service provided. The vast majority of demand is for the district's core home-to-school services at the elementary (ES), middle (MS), and high school (HS) levels. A much smaller component incorporates all other types including shuttles (SHT), pre-school (PS), alternative (ALT), and special education (SE) programs.

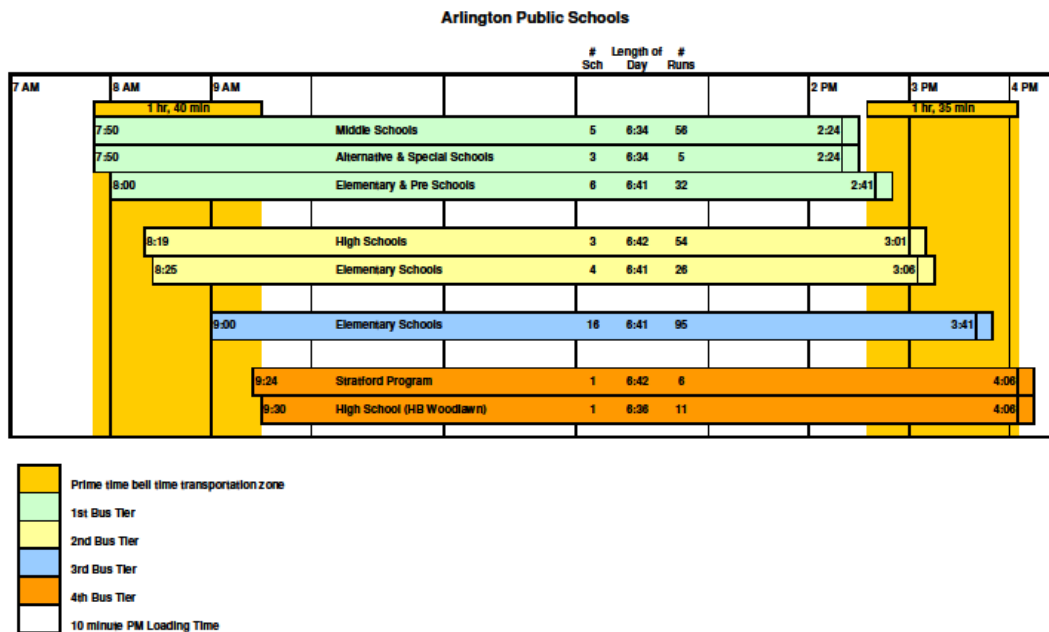
Figure 2 – Transported Students



Performance Assessment

Services are provided in a nominal three-tier bell time configuration, as illustrated in Figure 3. This structure is well suited to a compact urban environment as it facilitates the maximum possible utilization of fleet assets. In this structure each route bus completes multiple individual bus runs on a staggered schedule in both the morning and the afternoon.

Figure 3 – Bell Time Configuration



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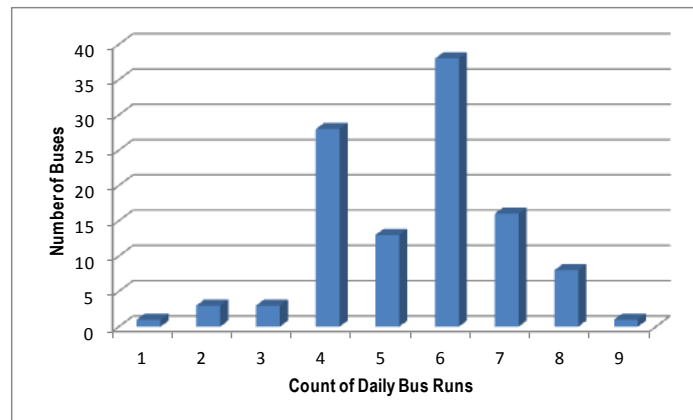
Current

GridBellTime (6.14.11).xlsx

While there are indeed four distinct time tiers in the APS configuration, the vast majority of bus runs are concentrated on the first three tiers. Even then, not all route buses are able to complete three runs in both the morning and the afternoon (for a total of six) as would be the case in pure three tier system. The system-wide average is 5.5 daily runs per bus, with the overall distribution illustrated in Figure 4. Nevertheless, the APS system is able to achieve one of the two primary objectives in bus routing. Any system that is able to fill each bus to capacity on each run (capacity utilization) and reuse each bus multiple times over the course of the service day (asset utilization) will achieve high levels of efficiency. APS achieves high levels of asset utilization due to the bell time structure, but this must be balanced against the often conflicting goal of simultaneously achieving high levels of capacity utilization.

Performance Assessment

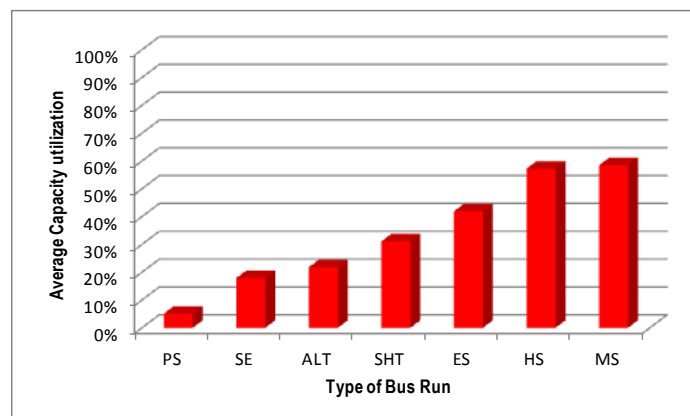
Figure 4 – Count of Daily Bus Runs by Bus



Achieving high levels of capacity utilization requires adequate time and density of students. Arlington County is certainly a dense population center, but this also brings high traffic volumes which slows the speed at which buses can travel. Time to complete bus runs is also restricted by the separation of tiers in the school bell schedule. The current APS configuration provides only about 30 minutes between each tier in which to complete bus runs. This, coupled with the complexity of traffic and slow travel speeds greatly constrains the system’s ability to achieve high levels of capacity utilization.

The system-wide average capacity utilization is just 45 percent on a planned basis. This compares with an expected range of 60-80 percent. The distribution by type of transportation is illustrated in Figure 5. Rated capacity utilization considers the manufacturer’s rated seating capacity of the bus, generally three per seat. Planned utilization considers the planning parameters of the school district, which generally reduces this to two per seat for middle and high school students. The APS result is much lower than expected, but this is mostly attributable to the time and traffic factors discussed above.

Figure 5 – Capacity Utilization by Type of Bus Run

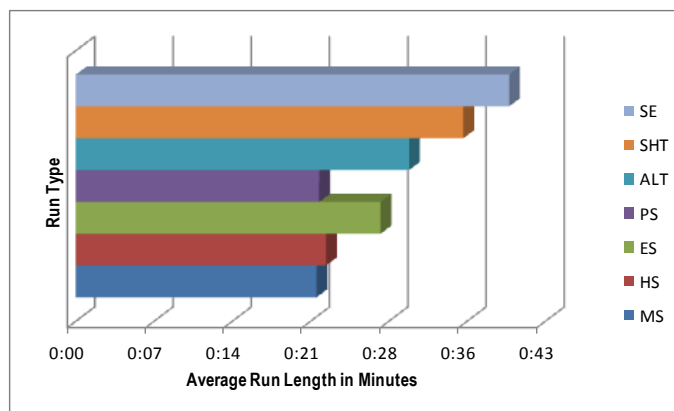


The relatively low level of capacity utilization and short time between tiers, while negatively impacting efficiency does have a positive impact on service quality. A less crowded bus provides a higher level of service to students. Another primary indicator of service quality is the length of student ride times. The data did not permit a calculation of average ride times, but the length of the bus run itself

Performance Assessment

provides a reasonable surrogate. The length of the run is reflective of the *maximum* possible ride time on the run, and the average can be approximated at roughly one-half the run length. Figure 6 illustrates the average run length by transportation type. As we recall that the vast majority of students are in the core home-to-school service to elementary, middle, and high schools we can surmise that average ride times for most students are well under 30 minutes, and are likely to be about 10-15 minutes.

Figure 6 – Bus Run Length by Type



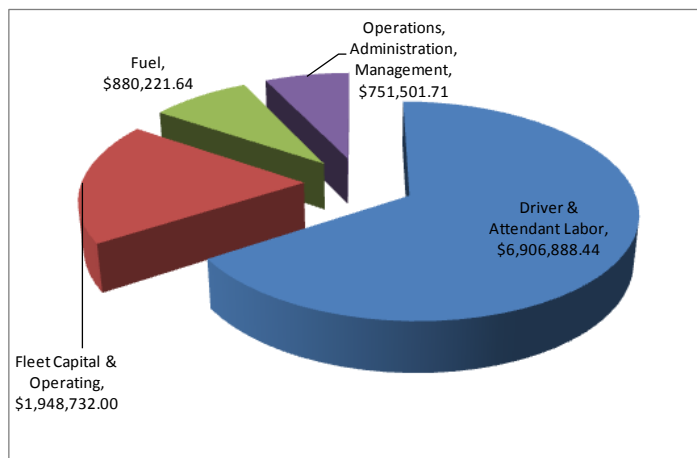
While efficiency is maximized by filling and reusing the bus, service levels for students are negatively impacted by long ride times and crowded buses. A balance must always be achieved between cost control (efficiency) and service quality (effectiveness). Transportation Services is responsible for the provision of safe and efficient services, but also for delivering students to school ready to learn. With its combination of short rides and open seats, these calculations are indicative of a high level of service quality.

That said, the survey process also captured data on the timeliness of service delivery as measured by on-time arrival at schools. The constraints on run times imposed by the current bell time structure discussed above places considerable pressure on the ability of Transportation to complete bus runs as designed and in the time allowed. Unexpected delays from traffic, road construction, and weather also increase the likelihood of service delays. On the date of the survey, 99 percent of all runs arrived on time to school in the morning which is a satisfactory result, but only 94.5 percent were on time in the afternoon. Given that this was a problem-free day as it relates to the uncontrollable factors noted above, this result is illustrative of a system under strain from a timeliness perspective, with any unplanned event likely to cause a system-wide problem.

The total cost of service delivery for the core home-to-school service is illustrated in Figure 7. The preponderance of cost in student transportation is always attributable to on-bus staffing (drivers and attendants). The capital and operating cost of the buses themselves is always the next most expensive category, typically followed by fuel and then all other costs. The breakdown illustrated for APS follows these norms. This clearly illustrates why the dual goals of filling and reusing the bus leads to the greatest level of efficiency – it minimizes the total number of buses required, and hence the on-bus staffing and fleet related costs.

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Figure 7 – Total Home-to-School Transportation Cost



Expenditures of \$10,487,343 are attributable to providing the core home-to-school service. Table 1 summarizes these expenditures and other key operating statistics for Transportation Services.

Table 1 – Cost & Operational Statistics

Statistic	Value
Route Buses	112
Daily Bus Runs	606
Avg. Students Transported	7,837
Cost per Student	\$1,338.27
Cost per Bus	\$94,480.57
Daily per Bus	\$524.89
Daily per Run	\$96.14

The annual cost per student is a primary indicator of cost efficiency, but is also extremely sensitive to local market conditions. Arlington is a high-cost area, so while the absolute value of \$1,338 is significantly higher than the national average, it is well in line with regional norms. This also considers the combined cost of regular and special needs students, with special needs skewing the average higher. With the cost of drivers and attendants representing nearly 66 percent of total cost, MPS investigated comparable wage scales for bus drivers in Fairfax County, Alexandria City, and Montgomery County to explore the relative efficiency of APS per bus costs. It was found that costs in Arlington are well in line with these neighboring jurisdictions. MPS also compared the annual cost per route bus, a more comprehensive indicator of overall cost performance, with regional jurisdictions with which we have worked in the past and find that APS cost is in line with expectations.

Performance Assessment

GENERAL ASSESSMENT

The results of the quantitative assessment described above was combined with the project team's observations of APS operations, interviews with APS staff, and our own extensive base of experience in student transportation. Overall MPS finds the APS transportation operation to be providing a satisfactory level of service quality at an acceptable cost. However, this assessment is conditional on the analysis of limited data from a single fixed point in time. We find this performance to be the result of an evolutionary process that is out of sync with current realities. The organization structure and daily operations of Transportation Services have evolved over time as the school division has grown and service demands have increased. The current status is highly dependent on a few key staff members of long tenure, a dedicated corps of drivers, and outmoded manual processes. We find the current status to be tenuous, with a high potential risk for a major service breakdown in the near future if steps are not taken to build upon past performance and position Transportation Services for the future.

Growth in population and service complexity arising from increased programmatic demands, area congestion, and demographic changes threaten to overwhelm the current organization. The nature of a study such as this is to be reflective of performance at a fixed point in time. We can only surmise as to the current trend in performance but suspect strongly that the system has already been placed under great strain to maintain a reasonable level of service quality and efficiency. It is the assessment of MPS that, absent action, there *will* be a major breakdown in service, and that this will prove costly of time and resources to correct once it has occurred. It is also the assessment of MPS that definitive action taken now to mitigate identified shortcomings can avoid this breakdown, and position Transportation Services for long term success well into the future.

The following section of this report delves into each of the areas identified in the RFP Scope of Services to provide a more thorough foundation for this overall assessment. MPS finds that there are both opportunities and risks facing Transportation Services. The sub-sections are organized under these main headings, with each discussing a single aspect of the scope of work and corresponding to a particular element of transportation operations. Each of these sub-sections incorporate specific recommendations related to each element. The final section of the report coalesces all of the recommendation in the context of an implementation agenda, timeline, and skeleton task plan.

Opportunities & Risks

INTRODUCTION

The APS Transportation service is at a crossroads. Current performance is satisfactory, but is too dependent on the experience and skills of key individuals together with outmoded systems and processes. The sustainability of the current operational configuration is highly questionable. The primary risk faced by the APS is for the current structure to be overwhelmed by change. In the experience of MPS, this often manifests first through disproportionate increases in cost as buses are added to the system to solve individual transportation issues instead of managing growth systemically. Once this becomes unsustainable, a major breakdown in service delivery often occurs. Once this point is reached, the recovery is difficult and costly in terms of time and resources. Mitigating this risk must be a priority. The APS is fortunate, however, in that the service failure has thus far been avoided. Taking action now will avoid major problems and forgo major resource expenditures in the future. The following section describes the specific risks faced by Transportation Services, and offers recommendations for actions to be taken to mitigate these risks.

Alleviating the potential for a service breakdown will also position Transportation Services to take advantage of opportunities to reduce the number of buses in service now and/or to control the increase in transportation demand in future years. It is the opinion of MPS that growth in student population and future programmatic enhancements need not result in more buses and higher transportation costs. Appropriate investments in systems and process changes are required. With this, Transportation Services will be well positioned to actively manage transportation demand and service delivery in order to control costs and maintain high levels of service quality in future years. The opportunities presented are detailed in context following the section on risk mitigation.

RISK MITIGATION

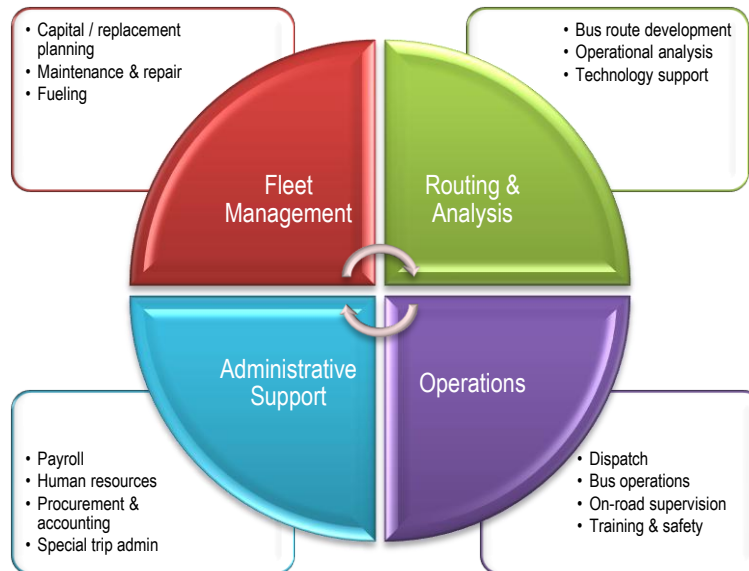
ORGANIZATION & STAFFING

The most remarkable finding resulting from this study is the degree to which the daily operations of Transportation Services are functional and successful given what MPS considers to be a confusing and inequitable division of responsibilities. The cost of management and administration accounts for approximately seven percent of total transportation costs, which is reasonable and falls within an expected range based on the experience of MPS. The manner in which these costs are distributed across multiple positions, with no clear definition of responsibility and no clear lines of accountability is, however, a major shortcoming. A preponderance of responsibility falls to the Operations Manager who is supported by a constellation of administrative staff and bus drivers. There is no documentation of operational processes or procedures, and routine tasks are distributed among too many individuals. The issue is not with the size of the organization or the staffing resources available in the aggregate, but rather with how these resources are deployed.

As illustrated in Figure 8, all student transportation organizations must be organized around four key functional areas. The size of the operation and the service delivery model (e.g., self-operated or outsourced) will determine the relative weight of responsibility in each area, but these four areas and the overarching management responsibility are always prevalent.

Opportunities & Risks

Figure 8 – Student Transportation Functional Responsibilities



The APS currently distributes these responsibilities across no fewer than 22 individual staff members who split their time on these functions and driving buses. As illustrated in Table 2, just over ten full time equivalent (FTE) employees are focused on the administration and management of transportation’s activities. This is an appropriate number of FTE employees. It is the manner in which the activities are distributed that raises the concern. Not only are there too many individuals involved for effectiveness, but the relative weight of responsibilities assigned is inequitable.

Table 2 – Current Management & Administrative Organization

Current Structure	Count	% Admin	% Sub	FTE Admin	FTE Drive
Director	1	100%	0%	1.00	0.00
Manager	1	100%	0%	1.00	0.00
Specialist	1	100%	0%	1.00	0.00
Office Staff	3	100%	0%	3.00	0.00
OJT	8	35%	65%	2.80	5.20
Swing Drivers	6	15%	85%	0.90	5.10
8/12 Drivers	2	25%	75%	0.50	1.50
<i>Total FTE</i>	22			10.20	11.80
<i>Total Positions</i>					22.00
<i>Sub-Driver %</i>					10.5%

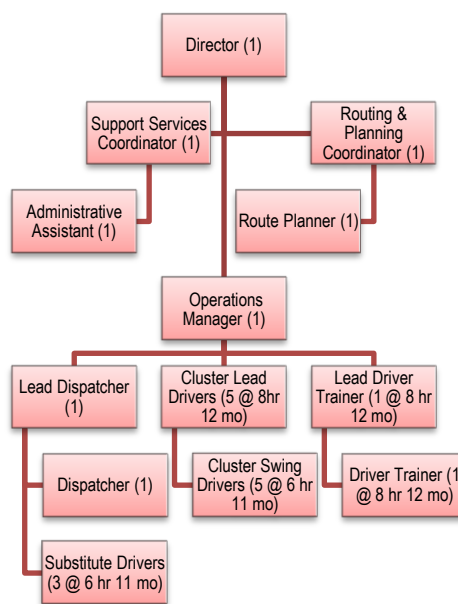
Everything works, but only because of the personalities involved together with the experience and tenure of many individual staff members. In the experience of MPS, this is the environment that can lead to major service breakdowns. When faced with the need to change and adapt to new circumstances, this organization structure will always be challenged to comply.

Opportunities & Risks

Recommendation 1 – Reorganize management and administrative staffing to provide for functional specialization without significantly increasing staff size

Developing a team of functional specialists is critical. Each of the functional areas described in Figure 8 requires a different skill set, and each requires a different level of resource assignment to be successful in the APS. Cross-training is also key, but secondary to the need for specialization. This will be increasingly important as the demands placed on the organization increase, and the transportation solutions required get more complicated. As such, all other recommendations of this study hinge on the reorganization of the management and administrative staff. The proposed organization structure is illustrated in Figure 9.

Figure 9 – Proposed Management & Administrative Organization Structure



This structure provides for the specialization required, is far more equitable in the division of responsibilities, provides for clear lines of accountability, and significantly lowers the total number of individuals involved while keeping the total number of management and administrative FTE essentially the same. Briefly, the overall responsibilities for each of the key staff would be as follows.

Director:

- Leadership of Transportation Services and budget management;
- Represents Transportation in all key APS and outside stakeholder relationships;
- Conduit to APS senior administration and provides knowledge, expertise, opinion, and information to same;
- Directs all APS “access to school” and “access to work” initiatives (bus, walk, bike, carpool, transit, etc.); and
- Supervises functional managers and coordinators (Operations, Routing & Planning, Support Services).

Opportunities & Risks

Operations Manager:

- Manages the day-to-day operations of Transportation Services and backup to the Director;
- Represents Transportation in all key customer relationships (parents, school administrators);
- Ensures safety, efficiency, and effectiveness of daily operations;
- Coordinates with Routing & Planning Coordinator regarding bus routes and schedules;
- Coordinates with Support Services Coordinator regarding fleet availability, payroll, and field trip assignments; and
- Supervises Lead Dispatcher, Lead Driver Trainer, and Cluster Lead Drivers.

Lead Dispatcher:

- Manages daily dispatch activities (route coverage, field trip assignments, on-road incident management and two-way communications);
- Backup to the Operations Manager; and
- Supervises and coordinates shifts with Dispatcher.

Cluster Lead Driver:

- Coordinates on-road activities for assigned route cluster;
- Evaluates effectiveness of bus operations;
- Represents Transportation at assigned school locations;
- Drives routes as a substitute, as required (tertiary substitute after Cluster Swing Driver and Permanent Substitute Driver); and
- Supervises assigned Cluster Swing Drivers and Route Drivers.

Lead Driver Trainer:

- Manages the initial and in-service training for all drivers;
- Coordinates implementation of department-wide safety programs;
- Evaluates safety of bus operations; and
- Supervises Driver Trainer.

Routing & Planning Coordinator:

- Manages the planning and analysis activities of Transportation Services;
- Provides information and data to the Operations Manager and Director, as required;
- Conducts analyses for the Director, as required;
- Coordinates the setup and use of Department systems and software applications with Information Services; and
- Supervises the route planner.

Support Services Coordinator:

- Manages and executes all support activities for Transportation Services, including: fleet management and maintenance; field trip scheduling and administration; payroll; human resources; purchasing and accounting; and general administrative activities; and
- Supervises one administrative assistant.

Table 3 illustrates how the distribution of staff in this organizational model would achieve the goals of specialization with a minimal increase in overall staff count.

Opportunities & Risks

Table 3 – Proposed Management & Administrative Organization Distribution

Revised Structure	Count	% Admin	% Sub	FTE Admin	FTE Drive
Director	1	100%	0%	1.00	0.00
Manager	1	100%	0%	1.00	0.00
Coordinator	2	100%	0%	2.00	0.00
Planner / Assist	2	100%	0%	2.00	0.00
Dispatcher / Lead	2	100%	0%	2.00	0.00
Lead Driver Trainer	1	100%	0%	1.00	0.00
Driver Trainer	1	25%	75%	0.25	0.75
Lead Drivers	5	25%	75%	1.25	3.75
Swing Drivers	5	0%	100%	0.00	5.00
Substitute Drivers	3	0%	100%	0.00	3.00
<i>Total FTE</i>	<i>23</i>			<i>10.50</i>	<i>12.50</i>
<i>Total Positions</i>					<i>23.00</i>
<i>Sub-Driver %</i>					<i>11.2%</i>

Table 4 provides the results of a net cost analysis that compares the salary and wage costs of the current organization with that of the proposed organization. In this analysis, a small net cost increase is realized. However, the net number of staff assigned also increase by one, with the distribution of effort shared between the administrative and substitute driving functions. This analysis and that in Figure 9 and Table 3 are provided to illustrate the potential change. Other structures achieving the same goals are also feasible.

Table 4 – Proposed Management & Administrative Organization Cost

Current Organization Structure	Count	% Admin	% Sub	FTE Admin	FTE Sub	Avg. Rate	Avg. Annual	Work Days	Work Hours	Annualized	Extended
Director	1	100%	0%	1.00	0.00		\$103,667.29	250	8	\$103,667.29	\$103,667.29
Manager	1	100%	0%	1.00	0.00		\$73,674.21	250	8	\$73,674.21	\$73,674.21
Specialist	1	100%	0%	1.00	0.00		\$66,825.14	250	8	\$66,825.14	\$66,825.14
Office Staff	3	100%	0%	3.00	0.00	\$20.77		250	8	\$41,542.86	\$124,628.57
OJT	8	35%	65%	2.80	5.20	\$25.47		250	8	\$50,938.57	\$142,628.00
Swing Drivers	6	15%	85%	0.90	5.10	\$23.80		229	8	\$43,605.53	\$39,244.97
8 Hr, 12 Month Drivers	2	25%	75%	0.50	1.50	\$22.26		250	8	\$44,510.00	\$22,255.00
Total FTE	22			10.20	11.80						\$572,923.19
Total Positions											
Sub-Driver % (112 routes)											10.5%

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Proposed Organization Structure	Count	% Admin	% Sub	FTE Admin	FTE Sub	Avg. Rate	Avg. Annual	Work Days	Work Hours	Annualized	Extended
Director	1	100%	0%	1.00	0.00		\$103,667.29	250	8	\$103,667.29	\$103,667.29
Manager	1	100%	0%	1.00	0.00		\$73,674.21	250	8	\$73,674.21	\$73,674.21
Coordinator	2	100%	0%	2.00	0.00		\$66,825.14	250	8	\$66,825.14	\$133,650.29
Lead Dispatcher	1	100%	0%	1.00	0.00	\$25.47		250	8	\$50,938.57	\$50,938.57
Office Staff	3	100%	0%	3.00	0.00	\$20.77		250	8	\$41,542.86	\$124,628.57
Lead Driver Trainer	1	100%	0%	1.00	0.00	\$25.47		250	8	\$50,938.57	\$50,938.57
Driver Trainer	1	25%	75%	0.25	0.75	\$23.80		229	8	\$43,605.53	\$10,901.38
Lead Drivers	5	25%	75%	1.25	3.75	\$25.47		229	8	\$46,659.73	\$58,324.66
Swing Drivers	5	0%	100%	0.00	5.00	\$23.80		229	6	\$32,704.14	\$-
Substitute Drivers	3	0%	100%	0.00	3.00	\$22.26		229	6	\$30,578.37	\$-
Total FTE	23			10.50	12.50						\$606,723.55
Total Positions					23.00						
Sub-Driver % (112 routes)						11.2%					

INFORMATION SYSTEMS

A primary tool for effective and efficient student transportation operations is a fully functional bus routing software package. This serves as the foundation for a data-centric approach to management which is a key characteristic of most high performing operations. There are a number of important supporting technologies that can build upon and leverage the information contained and used by routing software, but none of these can be of any particular use until the routing software itself has been fully and properly *implemented* and *integrated* into the operation.

Transportation Services has traditionally been managed using manual processes and with limited amounts of operational data. Recognizing its importance, the *EduLog* routing software by Education Logistics was selected via a competitive solicitation in spring, 2010. Implementation began immediately with basic training of users and a plan to convert current routes and schedules into the software as a first step toward full integration of the software's capabilities. This implementation plan has not been successful, and the *EduLog* software is not currently being actively utilized for any operational, analytical, or managerial purpose.

Effort continues to be expended on entering route data into the system, but this is wasteful of resources and of marginal if any benefit. It is the belief of MPS that there was an absence of clear direction before the decision to implement this software was reached, and insufficient knowledge and expertise regarding how to best setup and use the system. The objective was sound, but the execution flawed. Starting with the current organization and operations of Transportation Services as the baseline, it was unclear to staff how best to utilize the software to improve efficiency and effectiveness. Current efforts should be terminated and a complete reevaluation undertaken.

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Recommendation 2 – Conduct a complete *Edulog* system reimplementation

There are a relative handful of full-featured routing software packages on the market today, of which *Edulog* is one. MPS does not advocate for or recommend specific packages, but has been exposed to all of the major products. Each has advantages and disadvantages. None can be fully implemented and integrated without modifications to processes and procedures that best leverage the software's capabilities. MPS is of the opinion that all reasonable effort should be expended on making best use of a product already purchased before scarce resources are expended on a replacement.

Integrating the *Edulog* software into the APS transportation operation is far more complex than simply installing the software, training the users on its functionality, and converting data. Much forethought must go into defining coding conventions to support reporting and analysis, arranging for automated data transfer from related systems such as the Student Information System, and marrying operational processes to the capabilities of the system to best advantage. The initial implementation was not successful and has degraded in effectiveness ever since. It is the recommendation of MPS that a complete system reintegration process be designed and implemented that follows the following core sequential steps:

1. Determine the goals and objectives for system use.
2. Determine and establish system assignments and staffing, including training, to meet goals and objectives and that are consistent with the reorganization of Transportation Services.
3. Determine and establish system database layout and coding structures to support the goals and objectives.
4. Determine and establish all map boundaries and system settings to support the goals and objectives.
5. Establish a regular student data transfer process; ensure that it comports with coding and system goals/objectives.
6. Establish map tuning assignments and processes; plan to improve map utility for system startup and beyond.
7. Begin utilizing the system to develop bus stops, routes, and schedules, not to duplicate current routes.
8. Utilize system to begin a comprehensive performance measurement and reporting program to enhance a data-centric management of Transportation Services.

FLEET MANAGEMENT & MAINTENANCE

The management of the bus fleet is one of the four core functional areas and an essential support service to any effective and efficient student transportation operation. The current relationship whereby the Arlington County Equipment Bureau (ACEB) serves as the contract fleet manager for the APS vehicle fleet can be advantageous by allowing Transportation Services to focus on its core mission of providing safe, efficient, and effective student transportation. For this relationship to work, however, it is essential that both parties recognize the vendor-customer relationship that currently exists. The appropriate contractual and operational mechanisms must be provided to ensure that the

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customer (APS) is receiving the level of service it has contracted for from the vendor (ACEB), and that these services are provided at the agreed upon price.

Currently, fleet management and maintenance activities largely reflect the informal configuration of Transportation Services itself in their absence of documentation, formal procedures, or data on which to base decisions or monitor service delivery. This is not to say that poor service is being received or that costs are too high. Rather, it is not easy for Transportation Services to monitor this, nor does Transportation Services have adequate control over the services provided. The findings in key functional areas of fleet management are summarized as follows.

Budgeting, billing rates, and accounting processes

The annual budget for the APS fleet is prepared by the ACEB. APS does not currently participate in developing the budget. APS receives a single, non itemized invoice on an annual basis from the ACEB.

The rates charged are an all-inclusive annual lease for the ongoing maintenance, repair, and replacement of each fleet unit. The rate is based on the four year average of repair costs by vehicle classification, with an additional overlay of administrative costs. The maintenance budget is \$1,586,318 for FY 2011-1202 plus \$1,374,038 for the replacement of buses. This represents approximately 20 percent of total annual transportation costs and is, in the experience of MPS, generally in line with expectations.

The budgeted amount is difficult to interpret relative to APS reported expenditures, and is indicative of a broad problem with the class-based, all inclusive rates being used by the ACEB. The actual cost for each unit is not reported, and the APS does not have easy access to transaction-level detail that would allow closer monitoring of services and costs. A more industry-standard approach is to charge for services rendered using unit-based rates that are consistent with a private sector model. For example, the annual lease charge would be reflective of the expected capital cost of replacing a specific bus, less any expected salvage value. Then, as this unit is repaired and maintained each service would be charged at a burdened hourly labor rate plus the cost of parts used with an embedded administrative markup. A work order or invoice should accompany each completed repair such that the APS could track its costs and monitor service delivery in any way it chooses.

Fleet Replacement Planning

The regular replacement of buses works in conjunction with an effective preventive maintenance program to ensure a safe and reliable fleet while also controlling costs. Buses are purchased by the County and leased back to APS using rates based on the straight line depreciation of the asset over a 12 year life cycle less the anticipated salvage value. All replacement buses are specified to meet Virginia requirements.

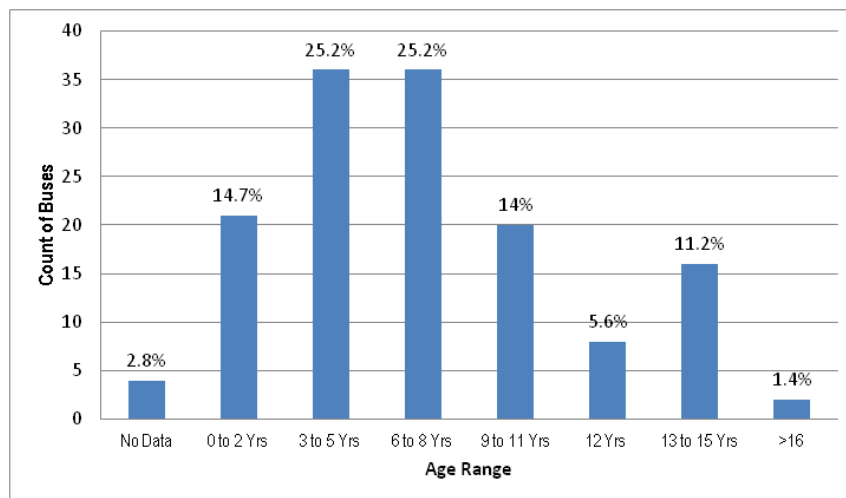
The primary responsibility for determining which units to replace and for developing the procurement specifications resides with the ACEB. Minimal input is currently provided by APS Transportation staff. Additional involvement by APS in determining specific vehicle characteristics would be useful.

The fleet comprises 143 vehicles with a capacity ranging from 35 to 78 seats. 121 (85 percent) are 12 years of age or newer. A total of 19 new buses have recently been ordered with 9 of those

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purchased as replacement units. The age distribution of the fleet is illustrated in Figure 10, and is indicative of a consistent fleet replacement program.

Figure 10 – Age of the Bus Fleet



Approximately 31 units are spare buses and are used to minimize service disruptions due to maintenance and repair requirements. Spare buses represent 21 percent of the total fleet. This is higher than an expected range of 10 to 15 percent. Interviews with APS staff indicate that a key factor influencing the need for a relatively high number of spares is the timeliness of maintenance and repair services.

Maintenance & Repair Program

An effective Preventive Maintenance (PM) program supports the safe operation of the vehicle, reduces downtime and late starts, prevents on-road breakdowns, and helps to control the overall cost of owning and operating the fleet. A multi-echelon schedule has been established that follows the Virginia Department of Education guidelines. Scheduling is primarily managed using a Deadline Vehicle Status (DVS) report which is sent to APS twice daily. This lists the buses that are due for PM service together with those in the shop for repair. The PM program itself provides an appropriate level of service to APS, although the scheduling and management process results in unnecessary delays.

PM services are performed on multiple shifts to minimize conflict with the operational requirements of APS. While the intent of the established process is sound, delays and disruption do occur primarily as a result of information availability and communication shortfalls. For example, the DVS sheet is faxed to APS at 6:00 AM listing the buses scheduled for PM service that day. ACEB expects these buses to be delivered to the shop after 10:30 AM such that the morning routes are not disturbed. Conflicts arise when on any given day the driver of a bus scheduled for PM may have already left for their morning route and has a scheduled field trip which immediately begins at the completion of their last run. Timing does not permit the driver to return to the lot to retrieve a spare bus. The issue is compounded further when the bus servicing the run or field trip has specific equipment needs such as undercarriage storage or special needs seating requirements. This results in a delay to the completion of required PM service and disruption to the work schedule in the ACEB shop.

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A structured workflow process for emergent repairs is an equally important component, and currently suffers from similar communication shortfalls. Drivers must accurately communicate defects and do so in a timely manner. In turn, the ACEB must communicate reasonable timelines for completion of repairs. A Vehicle Request for Service form is used on which drivers explain the defect in detail. Common problem areas are listed with a field available for the driver to manually enter an explanation of the problem. The On the Job Trainers (OJTs) are responsible for monitoring this process, but incomplete forms are sometimes forwarded to the ACEB without clarity or the information required to completely and accurately diagnose the problem or provide the needed repair. This induces a loss of productivity in the ACEB. Although the extent of the issue cannot currently be quantified, it is illustrative of the larger issue whereby levels of service and responsibilities of the customer (APS) and vendor (ACEB) are not clearly defined or executed.

Customer Service Meetings

The ACEB implemented monthly customer service meetings with APS staff including the Transportation Director and the Safety and Training Specialist to discuss service related issues or safety concerns. The Shop Foreman serves as the primary point of contact for the ACEB with the Bureau Chief and Manager also in regular attendance. The Transportation Director is responsible for presenting an agenda for discussion and for the resolution of issues. Interviews with staff from both departments indicate that these regular meetings are viewed as valuable and result in positive outcomes or changes as needed. As such, this process is an excellent example of the type of action that can make the current customer-vendor relationship valuable for both parties.

Recommendation 3 – Establish a comprehensive Service Level Agreement (SLA) to govern the delivery of fleet management services

A comprehensive SLA document will establish a critical foundation for the quality and cost of services to be delivered by the ACEB and will be beneficial to both parties. Together with supporting procedures, the SLA should fully describe what services are to be provided and how they will be delivered. Specific elements that should be negotiated and documented in the SLA include:

- Budgeting, billing rates, and accounting processes:
 - ✓ A revised costing mechanism that is unit-based and vehicle-specific, including: a burdened hourly labor rate; actual parts cost plus markup; fuel cost per gallon plus markup;
 - ✓ Charge for services on the basis of actual work performed for each vehicle;
 - ✓ Regular reporting of repair and maintenance details to facilitate management oversight and expense tracking, including line item detail on monthly invoices and
 - ✓ Extensive involvement of both parties in the annual budget development process.
- Fleet replacement planning:
 - ✓ Ensure the annual replacement planning process is fully collaborative between the parties such that:

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- APS takes a lead role by clearly describing the type and size of vehicles required based on its route planning process;
 - APS understands the difference in both initial and ongoing maintenance costs for each type of vehicle, and that this is considered in determining fleet composition; and
 - The number and type of spare buses required is evaluated in conjunction with the replacement planning process.
- Maintenance and repair programs:
 - ✓ Modify the current PM scheduling and notification process, including:
 - The timing of “service due” notifications and the manner in which this information is communicated;
 - Defining oversight responsibilities and consequences for non-compliance; and
 - Establishment of service standards such as turn-around time and minimum fleet availability.
 - ✓ Modify the current defect reporting and repair management process, including:
 - Specific training for drivers and APS supervisors on proper reporting of defects;
 - Refine the work order service-writing process to provide for greater face-to-face contact with drivers in order to provide technicians with greater clarity and to promote efficient use of productive mechanical time; and
 - Improved reporting on repair status and vehicle availability.
- Customer service:
 - ✓ Improve the use of data reporting for clarity, oversight, and transparency; and
 - ✓ Leverage and expand the use of regular monthly customer service meetings to begin the process of implementing this recommendation.

FIELD TRIP MANAGEMENT

The APS School Board, under the direction of Policy Implementation Procedures (PIP), provides generally excellent overall guidance on how field trips are allocated, the scheduling process, and the process for the PTA or other organizations to sponsor additional trips. Within Transportation Services, however, the actual management of trips is not well defined or documented. The assignment of trips to drivers and the subsequent accounting is conducted in the absence of documented policies. Informal operational practices have been developed over a period of time, and now form the basis for how trips are assigned and costs managed.

The primary responsibility resides with Transportation’s Administrative Assistant for field trips. In addition to trip management, additional duties include general office functions such as answering and

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routing phone calls, providing general assistance, and operational dispatch in the event that no other staff is present in the office. The amount of time dedicated to these other functions varies both on a daily and seasonal basis. There are currently no other office personnel who are trained or assigned as back-up, although a bus driver is in the process of being trained and will be assigned to provide miscellaneous assistance. With this, at least 40 hours per week is dedicated to trip scheduling and assignment.

The function is supported by the *Transportation Operations Manager* (T.O.M.) software. Requestors are able to enter the date and time requirements for trips directly into the system for verification and assignment by the administrative assistant. While trips are to be scheduled at least 30 days in advance, late requests are generally granted provided that drivers are available. Once a request is received and reviewed, it is assigned to a driver who is provided with a “trip ticket” listing the date, time, destination, contact, directions, and other information. The primary criteria for the assignment of trips are:

- Home to school assignments are not normally impacted;
- Trips are normally scheduled to fit within the instructional day;
- Seniority may be considered but driver reliability and availability is the prime consideration;
- Trips are offered first to the drivers who service the home to school routes of the requesting school, and
- Swing drivers or drivers with a lighter schedule receive priority assignment to reduce overtime.

While the process for the assignment of trips meets the needs of schools, interviews with staff and drivers indicates that trip assignment practices do not ensure that trips are assigned fairly while also respecting the need for efficient operations.

For the 2010/11 school year, approximately 3,260 extra-curricular and athletic trips were provided, which is a large number and resulted in significant overall costs to the APS. Driver pay for trips is based on the drivers' current pay rate for the number of hours worked. This includes both driving time and the time drivers are on standby duty. No overtime is paid until a driver exceeds forty hours in any given work week. This is a fairly recent change in the way drivers are compensated and was implemented to reduce the overall cost of providing extra trip transportation. No meal allowance is paid and overnight trips are contracted to charter companies.

The trip ticket is used to record both mileage and the number of hours worked and is returned to the administrative assistant for processing at the conclusion of the trip. The cost of trips are charged either to a school's allocated trip account, or billed directly to the group or activity that requested the service. All trips are usually billed within the week that the trip occurred. The T.O.M. software system is used to generate the invoices and also used to track outstanding receivables. An email notification is received from the APS Finance Department as trip reimbursements are received.

Driver time is billed at the current trip rate of \$34.31 per hour with the addition of a mileage rate of \$2.71 for bus related costs. While the PIP establishes that the rate for extra trips is to follow the “same formula used in costing bus transportation provided for agencies of Arlington County”, interviews indicate no clear understanding of how the rate was determined, nor any clear basis in

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actual cost. All funds budgeted for field trips reside in Transportation's budget and are Transportation's responsibility for monitoring. The combination of volume, equity in the assignment of trips, and overall cost makes this a significant managerial responsibility for Transportation Services that is not currently receiving proper oversight or attention.

Recommendation 4 – Document the field trip assignment process and develop cost monitoring procedures

This recommendation should be implemented in the context of the organization structure changes in Recommendation 1. The new Support Services Coordinator should be vested with the overall responsibility for management of this important function and significant transportation cost. New and revised procedures should be developed to complement and expand upon the existing School Board PIP, with a particular focus on ensuring equity and accountability. Specifically, this effort should focus on:

- Developing revised trip assignment procedures to promote operational efficiency and equity among the corps of bus drivers;
- Establishing a clear process and responsibility for the monitoring of field trip costs and billings to ensure that all costs are recovered and/or equitably allocated;
- Developing a trip costing formula that accurately reflects all related costs including driver labor, vehicle operations, fuel, and administration.

PAYROLL & TIMEKEEPING

Accurate tracking of driver hours facilitates precise compensation calculations, budget development, and cost control. Given the variability inherent in driver work time resulting from route changes, unexpected traffic delays, field trip time, and other factors it typically results in a major administrative burden as well. The current process is supported by software but also relies on several manual and duplicative processes. Drivers are required to use a timecard "punch clock" system as well as complete a daily manual time sheet. Neither of these systems is utilized to calculate baseline driver compensation which is instead based on a fixed number of daily guaranteed hours (typically six). The time sheet information is reviewed on a daily basis, but only exceptions resulting in hours paid over the guaranteed minimum are entered into the APS Oracle payroll system. Missed work days are entered into Oracle as well as a duplicative spreadsheet. Most of this process is duplicative and unnecessary, particularly given Transportation's approach to driver compensation which is largely consistent with best practices.

The timekeeping and payroll recordation process consumes the daily routine of approximately 0.5 FTE employees. It is the supposition of MPS that most up to date payroll software systems can provide a fully automated and integrated process for the reporting of time and the generation of employee pay, minimizing the number of staff required and enabling a greater focus on the core function of Transportation Services. This is particularly true of given the current method of driver compensation which is based on a fixed number of daily work hours. Changes that only capture extra hours worked and/or that leverage other technologies such as GPS to facilitate pay based on actual hours worked can be considered, but are not necessary. Transportation simply expends too much effort on capturing unnecessary data of marginal utility all in the name of ensuring accountability.

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The hours worked functions together with the wage rate to define how much drivers are paid and in large part the relative efficiency of the transportation operation as a whole. The current mechanism whereby drivers are guaranteed a minimum number of daily hours is a common mechanism, and largely effective as long as route lengths are closely matched to the minimum hours. It is considered by MPS to be an effective mechanism that minimizes complexity and administrative burden.

To better understand how APS wage rates for drivers compare to other similar organizations within the region, publicly available data were compared. Based on this analysis it is clear that APS driver wages are comparable to others in the region. Table 5 summarizes these results.

Table 5 – Driver Wage Rate Comparison

Employee Group	Classification	Grade	Average
<i>Arlington Public Schools</i>			
Bus Driver – 208 Days and Extended Year	D	09	\$22.26
Bus Driver SPED	D	10	\$23.80
Bus Driver OJT	D	11	\$25.47
Bus Attendant	D	04	\$16.41
Swing/Lead Driver	D	10	\$23.80
<i>Alexandria City Public Schools</i>			
Bus Driver		16	\$21.91
Bus Driver Trainer		18	\$23.24
Bus Driver Leader		21	\$25.40
<i>Fairfax County Public Schools</i>			
Bus Driver I		16	\$20.81
Bus Driver II		18	\$21.65
Bus Driver Floater		21	\$22.52
<i>Montgomery County Public Schools</i>			
Bus Driver		11	\$19.63
Bus Driver with Longevity		11	\$19.98

Transportation Services benefits from a low attrition rate of only one or two drivers per year with over 50 percent of drivers having at least ten years of service. This is a further indication of the competitiveness of the current pay rate and benefit package.

Recommendation 5 – Implement revised timekeeping and payroll processes

This recommendation should be implemented in the context of the organization structure and information system changes recommended earlier, and should consist of the following elements:

1. Determine the desired outcomes for timekeeping and payroll accountability;
2. Design revised processes that capitalize on the current “exception based” approach to payroll and that also maintain appropriate levels of accountability; and

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3. Evaluate whether permissions can be granted to improve Oracle system access for reporting and data management in Transportation.

INFRASTRUCTURE

The location and design of a transportation operations facility has a direct impact on the effectiveness of service delivery. A strategically located site with access to maintenance and fuel, administrative and dispatch office space, and driver facilities such as a meeting space and restrooms is immensely valuable as a hub for a distributed workforce. This is particularly true when the organization relies on manual processes and lacks advanced communications technologies to keep contact with and track the activities of its workforce.

The APS Transportation facility is located on a common campus with other support services agencies of the school division and the County. The facility has adequate office space and parking, has immediate access to fuel and maintenance services, and is reasonably centrally located within the service area. Although the location and capabilities of the complex are very good and conducive to effective operations, it has reached capacity and cannot absorb significant growth.

The parking area has a capacity of 138 buses with another 10 spaces available at the Equipment Bureau resulting in 148 available spaces available to park the 143 active and spare buses in the current fleet. The administrative space is similarly crowded. In response to the constraints of the current site and to compensate for expected future growth, APS is considering the possibility of establishing alternative parking locations utilizing existing school sites. Although APS has multiple sites within the County where buses might be parked, it is the assessment of MPS that a significant operational risk would be incurred by pursuing this strategy absent significant changes to the underlying organization and operation of Transportation Services and investments in additional technologies such as GPS tracking of buses.

While a satellite parking strategy would solve the parking constraints faced by a growing demand for Transportation Services, the current organization does not have the capacity or processes in place to manage this strategy effectively. The current facility infrastructure is adequate for the short-term needs of Transportation Services. The recommendations of this study related to how Transportation Services is structured and managed should be given first priority for implementation before any significant change to the physical organization of Transportation Services is considered. Specifically, improvements to route planning technology and processes, the coordination of school bell times, and enhancements to Transportation Demand Management initiatives hold a high potential to lessen the burden on the current location by reducing or at least slowing the growth in the number of buses required. Should these initiatives prove to be inadequate over the long term, they will at least provide a window of time whereby Transportation Services can plan for improvements to communication protocols, management processes, and technology use whereby satellite operating facilities and parking locations can become a viable management strategy for the future.

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OPPORTUNITIES

BUS ROUTES & SCHEDULES

MPS' partner in this project, TransPar Group, Inc. coordinated with the APS Transportation team to perform a comprehensive bus survey on Tuesday, June 14. This day was selected in concert with the school division to be representative of a typical school day. One exception was noted in that the Stratford School, a special needs school, was scheduled for an early release on that day. Six buses performed their afternoon services at approximately 1:00 PM, whereas other days that service would be performed at approximately 4:10 PM. This exception does not impact the overall findings.

Per the five APS "cluster sheets" provided by APS Transportation, 112 buses were scheduled for daily service on that day. Surveys were submitted for 110 morning and 107 afternoon buses. The survey details indicated those buses had fulfilled the obligations of the originally scheduled 112. The forms were completed promptly and with a good degree of accuracy. There were 297 morning bus runs and 309 afternoon bus runs including any regularly scheduled "late" buses departing schools prior to 4:45 PM.

The data showed that the APS buses are scheduled to be, and were, very busy each morning and afternoon. There are minimal idle periods. Based upon APS' practice of seating three per seat for elementary schools and two per seat for all others, and as indicated in the Performance Assessment section of this report, the survey found an abundance of empty seats.

All transportation service delivery is constrained by the school bell time schedule, and APS is no exception. The condensed bell schedule includes a first tier at 7:50/8:00 followed by a second at 8:19/8:25, and a third at 9:00. One high school and Stratford SE start at 9:20. Thus, APS is operating under a nominal three tier system with a small subsequent fourth tier. Ideally each APS bus would serve one school within each tier (three individual bus runs), and then a few would perform a fourth tier. Of the 110 buses in operation that morning, it was found that:

- 7 buses performed 4 morning runs;
- 66 buses performed 3 morning runs;
- 36 buses performed 2 morning runs; and
- 1 bus performed 1 morning run.

Overall, the buses were challenged to serve the condensed bell schedule. Note that the bell time windows of 7:50/8:19/9:00 and 8:00/8:25/9:00 cause the live time for each to be limited to 20-25 minutes if each bus is to perform three runs. The bell spacing is simply too tight to allow the most efficient bus routing and service. The buses are running out of time, not out of seats. The average live time and rider counts for the non-special needs buses are illustrated in Table 6.

Table 6 – Regular Education Average Bus Run Times & Capacity Utilization

School Level	AM Ride Tim	AM Riders	AM Occupancy	PM Ride Tim	PM Riders	PM Occupancy
Elementary	27	34	46%	26	38	51%
Middle	24	32	64%	22	33	66%
High	24	30	60%	22	31	62%

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The morning data indicated that three buses arrived at a school more than 10 minutes after the starting instructional bell, representing a 99 percent on-time performance result. The afternoon bus service is tighter than the morning as the afternoon buses require time to load at the schools before beginning their bus runs. APS' afternoon service schedule is very busy with little or no slack, and service challenges result. The data indicated that 17 buses arrived at an afternoon school more than 10 minutes after the release bell representing 5.5 percent of the afternoon bus runs. Generally, buses are expected to be at the school before the afternoon release bell. APS is experiencing many late buses in the afternoon such that pupils are left waiting at the bus ramps.

There are many difficulties in servicing such a tight bell schedule in a timely fashion. Regardless, we note several schools where the data indicate there are more buses serving that school than necessitated by the actual time and seat availability. Table 7 recaps those schools where three or more buses were serving the school for which those buses were not consuming at least 60 percent of the available time and not using 60 percent or more available seats.

Table 7 – Targets for Improving Routing Efficiency

School	Tier	AM Bell	PM Bell	AM Run Targets	PM Run Targets
Jefferson MS	1	7:50	2:34	7	3
Claremont Immersion ES	1	8:00	2:41	3	3
Yorktown HS	2	8:19	3:01	6	5
Traditional ES	2	8:25	3:06	5	6
Drew Model ES	3	9:00	3:41	3	3
Henry ES	3	9:00	3:41	3	3
Key Immersion ES	3	9:00	3:41	8	8
HB Woodlawn HS	4	9:20	4:06	4	8
Totals				39	39

TransPar experience is such that when three or more of these “60/60” buses exist in both the morning and afternoon, that the school division may have a real opportunity to move the riders from at least one bus into the other buses serving that school. If the need for a bus run can be thus taken out, then the challenge becomes eliminating more runs such that an entire bus can be removed from service. Since the “60/60” list contains at least two schools in each bell time tier, there may be ample opportunity to consolidate runs at these schools, and reroute several buses such that two or three daily buses could be removed from service.

Recommendation 6 – Conduct a comprehensive restructuring of all bus routes.

Based on the analysis of survey data discussed in this section, MPS believes there is an opportunity to reduce the number of route buses in service by three without making any changes to the school division's current bell time structure. This is necessarily a mid-term recommendation that should await Transportation's capacity to utilize the *Edulog* system for complex analysis and route planning, as recommended earlier. This recommendation should also be placed in an appropriate context relative to any programmatic changes, Transportation Demand Management initiatives, and bell time changes under consideration.

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Recommendation 7 – Consider extending the spacing between current school bell times by 10 minutes.

By its very nature, this is a long-term recommendation that should await Transportation's capacity to adequately analyze and plan for the change, and that must be justified by a rigorous follow-up analysis. As indicated by the analysis discussed in this section, the APS bell time schedule restricts transportation efficiency. Extending the spacing between the bell times by 10 minutes would, in the estimation of MPS, allow for the elimination of at least one bus run at most of the 20 schools with five or more bus runs by making more effective use of available capacity on the remaining runs. A reasonable goal in this initiative would be to eliminate 15 bus runs across the three bell time tiers, and remove 5 buses from service. In addition, there is a current bus tardiness issue in the afternoon. Altering the bell schedule or refining routes to assure on-time delivery would address also this issue. This recommendation should, however, also be placed in an appropriate context relative to programmatic changes and other Transportation Demand Management initiatives discussed elsewhere in this report.

MULTI-MODAL ALTERNATIVES

In the experience of MPS, the APS is already at the forefront among its peers around the country in its efforts to promote alternative means of transportation to the traditional school bus. The school division has made excellent strides through its collaboration with the County and the Safe Routes to School national initiative, together with its Transportation Demand Management (TDM) policy and program. Efforts to date provide excellent examples for peer organizations to emulate:

- The walk and bike to school maps published on the APS website provide an enhanced visual tool for parents and students to use in determining safe routes to school as an alternative to the school bus.
- The existence and content of the Transportation Demand Management policy is noteworthy, and a unique addition to the transportation policy framework for school districts.
- The Safe Routes to School program from the mid-2000's made many improvements to the physical infrastructure of the County to enable alternative means of accessing school, and is an excellent example of how this approach can successfully improve overall transportation efficiency and effectiveness.

Two concerns are noted by MPS. The first is that these noteworthy efforts appear to have lost significant momentum in recent years, with little further progress noted in the past three to four years. A reverse trend is reportedly becoming apparent, with more parents choosing to transport their student to school by car, increasing traffic congestion in and around school locations and undermining the good work completed in prior years.

The second concern leads to the primary finding of this study in this area. The TDM program is designed with a distinct lack of centralized coordination. The TDM policy statement establishes responsibility for design and implementation of TDM initiatives at the school principal level. In the judgment of MPS this is too distributed, and is a particular problem given that this is clearly a non-core function for a school principal. Equally problematic and related to this is that there is no explicit recognition of mission. The question should be posed, is Transportation Services simply the "busing

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department”, or is the mission broader than this. Arlington is well suited geographically and demographically to benefit from a coordinated transportation demand management program were these concerns to be resolved.

Recommendation 8 – Make Transportation Services responsible for implementation of the Transportation Demand Management program.

The premise behind this recommendation is a belief that the mission of Transportation Services should be to ensure “access to education”, not simply the provision of busing services. This philosophy is consistent with the goals and objectives of the APS Transportation Demand Management program. Successful implementation would facilitate many of the other goals and objectives contained throughout this report as well, most specifically by controlling the growth in the number of buses required in order to make best use of existing infrastructure and to reduce the overall cost of services provided. This is, nevertheless, a long-term recommendation that should await Transportation’s capacity to execute this expanded responsibility.

Specific goals and objectives must be identified. First of these is a change in the sense of mission required of Transportation Services. This would require a comprehensive change of attitude that includes consideration and management of:

- Traditional transportation alternatives (bus, transit, walk, bike);
- Integrated analysis and decision-making with student/program placement, facility planning, and compensation/commuting alternatives for staff;
- Education and advocacy of alternative transportation modes as an assigned responsibility for Transportation.

Specifically, implementation of this recommendation would require the following:

- Establish a specific assignment of the role for TDM/ “Access to Education” advocacy. Consideration should be for this to reside in Transportation Services with the Director of Transportation.
- The TDM program should consider all “access to school” issues for students and staff.
- The TDM policy statement should be revised to mandate integrated analysis and decision-making, including:
 - ✓ New facility planning and renovations to improve access alternatives;
 - ✓ Programmatic decisions to consider implications for access to school costs (time, expense, modes, implications for the student and the community); and
 - ✓ Student placement decisions to consider the same as noted above.

TRANSPORTATION POLICIES

Transportation Services operates under the direction of a clean, comprehensive, and hierarchical set of enabling documentation including School Board policies, related Policy Implementation Procedures, and a Driver and Attendant Handbook. Considered together as a comprehensive set of operational policies and procedures, these documents address most of the core areas expected

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including: eligibility for transportation, allowable walk-to-stop distances, responsibilities, data management, stop placement, student behavior, and designation of hazardous walking conditions. The documentation fails to address some core areas including: allowable student ride times, a decision appeals process, alternate service addresses, inclement weather, and the management of accidents and incidents. The Driver Handbook in particular is a comprehensive and complete tool for governing bus operations and safety.

Specific findings regarding the policy and procedure documentation include the following:

- Section 50 Goals (Policy) – includes an introductory section on Transportation, with much of the information duplicated in later sections;
- Section 50-1.1 Transportation Demand Management (Policy and Procedure) – is innovative and appropriate relative to the overall goals outlined in 50 (see further discussion in Multi-Modal Alternatives section of this report);
- Section 50-5 Transportation (Policy) – Expands on “Goals” policy and is generally appropriate, though wordy. This makes it difficult when looking for specific aspects (e.g., eligibility distance for ES students); this section includes an innovative description of priorities for allocation of limited resources to specific services.
- Section 50-5.1 Pupil Transportation (Procedure) – Specific findings in this section include:
 - ✓ References that emergency contact information for students on field trips will be carried on the bus; it is not clear that this actually does happen;
 - ✓ Permits students to catch the bus at any designated stop, which given the absence of data in Transportation generally raises significant concerns regarding student safety when riding the bus;
 - ✓ Permits walking students to catch the bus at an established stop on a space available basis; this may be particularly problematic in an environment where capacity utilization becomes an important objective for cost control reasons.
 - ✓ Includes a statement that “students who are admitted to county-wide programs after the second week of school must use established stops” whose meaning is unclear.
 - ✓ Appropriately and definitively states that transportation is not provided to students who transfer out of their home school, unless they utilize a stop designated for the school of attendance.
 - ✓ Extensive information is provided on eligibility for and financial management of extra trips, the impact of which is discussed further in the Field trip Management section of this report.
 - ✓ Includes a section designating “Other Programs” whose meaning is unclear.
- Driver handbook – provides comprehensive and detailed sections on responsibilities, operations, emergencies, accidents/incidents, special needs, training, and forms.

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Recommendation 9 – Make minor changes and enhancements to the policy documentation in support of the other study recommendations.

The changes recommended include a general review to eliminate duplication of language and improve the organization of the documents for the sake of clarity. Enhancements recommended to support the other initiatives resulting from this study include:

- Make the Transportation Director responsible for encouraging other modes of transportation in accordance with the TDM policy (see further discussion in the Multi-Modal Alternatives section of this report);
- Make school buildings specifically responsible for the accuracy and timeliness of student data used for planning in the *Edulog* routing software (see further discussion in the Information Systems section of this report);
- Designate the routing software as the tool by which distances are determined and routes are generated (see further discussion in the Information Systems section of this report);
- Require students go to assigned stops only (see further discussion in the Bus Routes and Schedules section of this report);
- Make students designate a primary mode of transport (e.g., walk to school, bike to school, public transit) in accordance with goals of TDM, and to ensure that school bus routes are planned based on actual expected ridership (see further discussion in the Bus Routes and Schedules, Infrastructure, and Multi-Modal Alternatives sections of this report);
- Establish ride time policy in support of overall efficiency improvements (see further discussion in the Bus Routes and Schedules section of this report); and
- Establish bell time management policy to enable Transportation analysis and recommendation of alternatives in support of overall efficiency improvements (see further discussion in the Bus Routes and Schedules section of this report).

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IMPLEMENTATION PRIORITIES

The recommendations provided in the preceding sections are of differing levels of relative importance to the long-term success of Transportation Services. They must also be implemented in a logical sequence. They are, however, all interrelated and integral to the overall plan for mitigating risks and taking advantage of opportunities currently facing Transportation Services. There are a total of nine major recommendations. They are summarized here, organized by priority with a brief description of rationale for the placement of each.

Priority 1 Recommendations:

1. *Management & administrative reorganization* – The single greatest obstacle standing in the way of Transportation’s ability to adapt to its changing circumstances and to provide efficient and effective service is its management and administrative organization structure. None of the other recommendations can be effectively implemented until this is resolved, and the organization will be overwhelmed by change if this issue is not addressed.
2. *Reimplementation of the routing software* – A major shift in the underlying philosophy of Transportation Services whereby data, information, and analysis becomes the focus of management attention is a prerequisite to successfully navigating the challenges currently facing and likely to face Transportation Services in the future. Fully integrated bus route management software is necessary to facilitate this change. A properly functioning system is also a requirement to support the restructuring of current bus routes.
3. *Restructure current bus routes* – Transportation’s operational infrastructure is at capacity. Recent additions to the bus fleet in the name of service delivery are starting to push the system to the breaking point. Opportunities exist to utilize technology and a new routing philosophy to reduce the number of buses required, relieving pressure on the system and controlling costs in such a way that a window of time is opened for implementing the balance of the action plan.

Priority 2 Recommendations:

4. *Implement a comprehensive Service Level Agreement for fleet management services* – The arrangement for fleet services with Arlington County can be a boon for this action plan by removing a major functional responsibility, greatly reducing the operational burden on Transportation Services during a period of significant change. For the benefit of both parties, the arrangement must be formalized and documented. Service levels and appropriate operational procedures must be determined, and the APS must receive the data and information required to properly oversee service delivery and support the new data-centric management philosophy.
5. *Revise timekeeping & payroll processes* – The manner in which bus drivers are compensated has a disproportionate impact on efficiency, and payroll processes have a disproportionate impact on the administrative burden of Transportation Services. Changes are a necessary outgrowth of the reorganization and the action plan as a whole.
6. *Revise field trip processes* – While this is a non-core function of Transportation Services, transportation for field trips is an important aspect of the services provided and a significant

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cost burden for the APS as a whole. Redesigning processes and procedures to improve accountability and control costs is an important aspect of the implementation plan and a necessary outgrowth of the administrative reorganization.

Priority 3 Recommendations

7. *Transportation policy changes* – The reorganization of staff and the management philosophy of Transportation Services together with changes to the underlying routing architecture are critical to first arresting the decline, and then improving the overall level of service effectiveness and efficiency. Minor changes and enhancements to the policy infrastructure of Transportation Services will provide the foundation for the other priority 3 recommendations.
8. *Bell time change analysis* – This study indicates a fundamental shortcoming in the design of the school division's bell time structure that will serve as a constraint to future efficiency and effectiveness unless addressed. Transportation is not currently positioned to undertake an analysis, much less to manage the implementation of bell time changes, but these are necessary long-term considerations for the school division.
9. *Refocus on Transportation Demand Management* – The APS is at the forefront in considering the positive impact of a broader focus beyond traditional school bus services. Past efforts began to yield positive results, but momentum has waned. Transportation Services is a logical focal point for refocusing energy on this important initiative, and for integrating the benefits into a more efficient and effective system as a whole. Similar to the bell time recommendation however, Transportation Services is not currently positioned to undertake this responsibility and this must therefore be a longer term consideration for the APS.

IMPLEMENTATION PLAN

TIMELINE

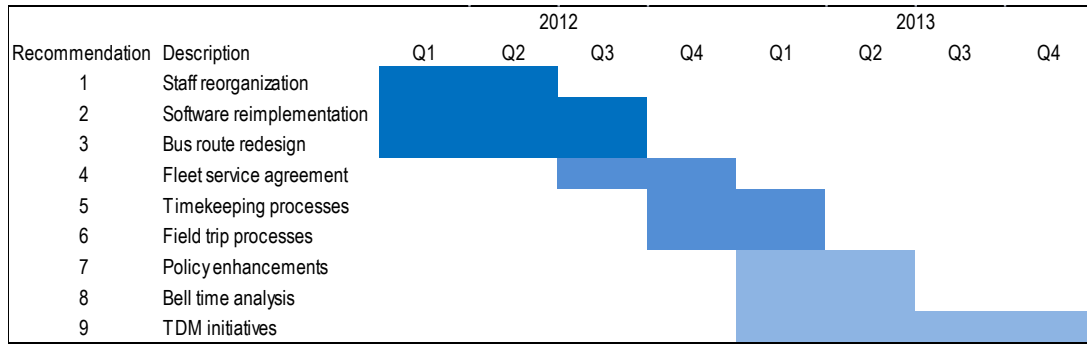
Implementation of this action plan will not occur successfully overnight. Rather, the APS must be prepared for an implementation timeline that extends over a minimum period of two years. The major priority one initiatives will consume the majority of resources, and will result in a significant front-loading of time, attention, and focus. Collectively, these *can be* implemented in time for the start of the 2012-13 school year. However, immediate action will be required on the part of the School Board and senior administration. Failure to begin implementation by January, 2012 will jeopardize successful completion in time for the start of school. Attempting implementation, particularly of the bus route restructuring on a shorter horizon will impart additional risks for failure of the plan as a whole.

The priority two and three recommendations are largely dependent on the successful completion of priority one. They can also be implemented on a more relaxed timeline. However, they are all integral to the ultimate success of the action plan and pressure must be maintained on a rational and achievable timeline to ensure that the entire plan is completed within the window of opportunity for

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change that a study such as this opens. Figure 11 provides a visual summary of the proposed timeline for implementation of all nine recommendations in the action plan.

Figure 11 – Action Plan Implementation Timeline



RESOURCES

As illustrated throughout this report, MPS estimates that there will be no major investments required to implement the action plan. There is a small proposed increase to overall staffing, but no immediate investment in technology, infrastructure, or buses. Rather the focus of the plan is on reorganization and leveraging existing infrastructure, investments, and relationships. This is not to say that there will be no cost. Taken together, the plan requires a large infusion of time and attention together with the potential need for outside resources to provide technical assistance and training. It is difficult to quantify this, however, until a decision to proceed is reached and detailed implementation planning begins.

EXPECTATIONS

The overall goal for this action plan is to mitigate the significant risk for a major transportation service breakdown in the near term, and to concurrently position Transportation Services for long term success and continuous improvement. The expectation is that this can be accomplished without major investments, and that the future efficiency and effectiveness of transportation service delivery can be ensured. The risk associated with a failure to act now is that costs will increase out of proportion with the school division budget as buses are added to the system to solve individual transportation needs absent a systemic framework. The past experience of the project team indicates that a failure to address the fundamental problems not only results in higher costs but also in a steady degradation to service quality and, ultimately, a systemic failure that requires a far more intensive and painful effort to rectify.

In summary, MPS recommends that serious consideration be given to the adoption and implementation of this Action Plan. With appropriate attention now, transportation service delivery at the Arlington Public Schools can and should be a model to be emulated regionally and nationally. With near term action, this change can be effectually implemented with a minimum of disruption and cost to the school division.