Audit Report Number 2007-06

# City of Richmond
# Audit of Richmond Public Schools
# Final Release-June 2007

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# Executive Summary

The Honorable Members of City Council
Richmond City Audit Committee
City of Richmond, Virginia 23219

The City Auditor's Office has completed an audit of Richmond Public Schools (RPS) which was requested by the City Council. The audit was conducted in accordance with Generally Accepted Government Auditing Standards. The objective of the audit was to answer the following questions:

1. Is RPS receiving appropriate funding from local government to meet its needs?
2. Is RPS expending funds in an efficient and effective manner?

The audit identified the following areas where there is a potential opportunity to save a substantial amount of public resources.

| Category | Recurring? | Savings Opportunities | | Investment ** |
|---|---|---|---|---|
| | | Low | High | Opportunities |
| Instructional staffing (non-teachers) | Y | $3,400,000 | $5,300,000 | |
| Clerical staffing | Y | $1,000,000 | $1,000,000 | |
| Cash management | Y | $130,000 | $130,000 | |
| Technology-new computers | Y | | | $2,000,000 |
| Technology-State mandates | Y | | | $336,000 |
| Technology - Help Desk staffing | Y | | | $573,000 |
| Technology - telephone upgrade | Y | $453,000 | $453,000 | |
| Energy Management-contract changes | Y | $11,000 | $11,000 | |
| Energy conservation activity | Y | $597,000 | $896,000 | |
| Custodial outsourcing | Y | $4,300,000 | $4,300,000 | |
| Vehicle replacements | * | $3,800,000 | $3,800,000 | |
| Deadhead miles | Y | $1,400,000 | $1,400,000 | |
| Bus route reduction (per RPS staff) | Y | $1,600,000 | $2,500,000 | |
| Total (Annual) | | **$ 16,691,000** | **$ 19,790,000** | **$ 2,909,000** |

* Larger at first but once RPS is caught up, the replacement policy should be smaller
** Many investment opportunities could not be quantified

It should be noted that the potential improvement opportunities identified in this audit will not result in savings immediately. The School Division must be given adequate time to study and implement the recommendations. In addition, the improvements noted in this report are just the beginning for improving cost-effectiveness of the school system in Richmond. Continued evaluation and improved management processes are necessary to establish accountability of public resources entrusted to RPS. This audit did not attempt to evaluate the quality of education or the curriculum. Therefore, observations included in this report are not considered indicative of the type and quality of education provided by RPS. Only broad measures of educational achievements were evaluated for the report.

## *Scope Limitation*

During this audit, the RPS staff could have been more cooperative in providing requested information necessary for the audit. Despite the School Superintendent's and Chairman of the School Board's efforts to help the City Auditor's Office complete this audit, RPS managing staff was reluctant in providing needed information in a timely manner and was not very forthcoming during the interviews. The City Auditor had to complete the audit only with the available information. Therefore, the City Auditor does not have assurance of the completeness of information provided. These circumstances may have precluded identification of all incidents of material control weaknesses and potential misuse of public resources. In the future, the City must contractually or otherwise bind the School Division to provide the City Auditor's Office full access to the records and information accountable for managing resources.

## *Synopsis:*

There were many observations and findings during this audit which can be summarized into the following two main points:

- RPS has done a commendable job in improving educational quality over the past six years. The current School Superintendent has provided effective leadership in the educational/instructional area for the achievements.

- RPS' management of resources needs significant improvement. For the most part, the Division could make additional efforts to effectively gather and use operational data for making meaningful decisions and taking appropriate actions. In addition, RPS could implement a process for ongoing evaluation and analysis of operations for providing the most cost-effective services without compromising quality.

The above points are elaborated as follows:

## *School Division-wide Observations*

- Overall, the Division was not able to effectively track and use information for management purposes. There was no evidence of adequate measurement and analysis of performance at RPS. Without appropriate performance and workload measures, effectiveness of operations may have suffered. This appears to be one of the major causes for higher per pupil costs incurred by RPS. RPS spent about 40% more in non-instruction costs compared to its peers. RPS has recently established a balanced scorecard initiative to help link strategic objectives and to create goals. However, the process is new and its effectiveness is not known.

- RPS' record keeping needs significant improvement. Inconsistencies were noted in data provided by RPS and staff was unable to reconcile the discrepancies.

- The City Auditor's Office could not verify the status of overall internal controls at RPS due to lack of available information. However, there were several indications suggesting a need for improvement in controls in various areas. The inefficiencies and control weaknesses identified during this audit either were not identified previously by the RPS Internal Audit function or the School Administration did not address those issues. The City Auditor's Office was not provided access to information related to RPS Internal Audit's methodology, risk assessment process and listing of all audit reports. Therefore, the effectiveness of RPS' Internal Audit function is not evident.

## *Instruction*

- Many studies have established that poverty has an adverse impact on student performance. RPS is facing significant challenges in managing student performance as a large portion of the student population comes from economically disadvantaged families. RPS has made significant progress in improving student performance and educational standards of the school system. This is evident from an analysis of the Standards of Learning (SOL) scores and dramatic improvements in the number of schools achieving full state accreditation. In the past six years, the number of schools receiving accreditation increased from 9% to 86%. The School Superintendent, who oversees educational programs, must be commended for her efforts.

- Higher compensation to teaching staff may have attributed to lower turnover than the teacher turnover experienced by RPS' peer group. City Auditors found that RPS experienced a turnover rate in teaching staff of 4.6%, which is significantly lower than 11.6% average turnover rate experienced by its peer group. Stability in teaching staff may have contributed to RPS' accomplishments in the instructional areas.

- Standards of Quality (SOQ) measures issued by the Virginia Department of Education have been used in other school reviews to determine the adequacy of staffing. City Audit analysis identified the possibility of overstaffing of non-teaching staff in the instruction area compared to the SOQ. There is an opportunity to save personnel costs ranging from $3.4 million to $5.3 million by addressing overstaffing issues. The majority of these costs are attributable to overstaffing in Assistant Principal positions, whose duties include several administrative tasks, which can be delegated to administrative staff.

## *Administration, Attendance and Health*

- RPS has 648 administrative and clerical positions. The City Auditor's Office selected 84 clerical positions to compare with SOQ guidelines. This test revealed overstaffing of 21 (25%) in the selected positions. The savings from addressing this excess staffing was estimated to be approximately $1 million. If the same ratio holds for the entire population of 648 positions, a significant number of positions could also be considered excessive. Some of this excess staff can be assigned administrative and clerical duties currently performed by Principals and Assistant Principals to generate the savings described earlier in this section. RPS will need to conduct a detailed study of administrative and clerical positions to determine excess staffing.

- RPS is in compliance with the Virginia Code requirements and generally strives to meet Best Practices in the Health Services area.

- RPS has the highest nutrition cost per pupil compared to its peers. Currently, the Nutrition Program incurs substantial losses. The newly hired Nutrition Services Director is in the process of revamping the program using Best Practices in the area and the results of a recent study performed by a consultant on RPS' Nutrition Program. It appears that offering innovative types of food serving configurations and increasing student participation could help this program to break-even as intended.

- Unlike a popular and prudent practice of investing idle cash of a government unit in an interest bearing bank account, RPS invests idle cash in a non-interest bearing bank account. City Auditors identified the possibility of generating additional revenue of $130,000 by choosing a proper investment option.

- Procurement is an operational area highly vulnerable to the risk of fraud, waste, and abuse. City Auditors were denied access to detailed procurement records. Therefore, it was not possible for City Auditors to test this area for material weaknesses that may exist. A limited review indicated the existence of opportunities to strengthen the procurement policy exists. In addition, it is possible for RPS to improve the efficiency and effectiveness of the procurement process by analyzing its procurement patterns and using contracts for frequently acquired materials and services.

- A survey by City Auditors indicated that about half of the teachers believe that the use of technology at RPS is inadequate. Of the total technology related expenditures, RPS spends only 26% in classrooms. Henrico County Schools, a Best Practice case, spends 51% of total technology related expenditures in the classroom. Audit identified that RPS spends more per pupil on technology costs but the pupil receives significantly less benefits.

- RPS does not have a structured plan or funding to replace older computers. Similarly, the funding source for future enhancements to the technology infrastructure is not determinable. There is an opportunity to make more investment in the technology area for needed improvements. This is critical because in today's technology oriented business environment the students who get proper education in using technology may have a better chance to be successful in the future then those who do not. RPS' passive approach regarding computer replacement hinders progress towards closing the digital divide among Richmond students.

## *Operations and Maintenance*

- RPS has acquired several specialized software products for various areas such as operations and maintenance, and transportation. Typically, an organization can utilize this type of software to manage its operations effectively. However, RPS is using only a fraction of the capabilities the software offers. It appears that either the information in the system database is incomplete or RPS personnel are not able to retrieve the information. In either case, the information cannot be used for properly managing the function effectively and efficiently. Not using a management tool acquired for managing a function results in wasted resources. In addition, productivity may not be measured and efficiencies may not be evaluated fully and reliably for management purposes.

- Each tangible asset has a life-cycle at the end of which the asset must be replaced to maintain cost-effectiveness of its use. The length of the life-cycle can be prolonged by systematic and continuous investment in proper maintenance of the asset. The lack of using this prudent practice may be expensive. RPS appears to have deferred maintenance on their already old assets. The division does not have a preventive maintenance program. This may have accumulated a significant backlog of maintenance work and reduced the usefulness of its' assets. In the FY 2008 capital budget, the School Board approved about $38 million to address maintenance issues, which is evidence of deferred maintenance.

- The staffing in Building Services appears to be consistent with the industry standards.

- The Division is unable to identify all maintenance and repair needs and priorities due to unavailability of information. In addition, lack of established performance measures does not allow evaluation of various functions in achieving assigned tasks.

- RPS spends approximately $6 million on electricity costs. With a consultant's help, the City Auditor's Office identified several improvements. For example, a strategy to modernize existing outdated fixtures to newer, energy efficient fixtures could generate cost savings of $597,000 to $896,000.

- The City Auditors identified substantial ($4.3 million) savings that may result from outsourcing custodial services. Other School divisions have adopted this method to generate similar benefits.

## *Security*

- Security is one of the critical issues in RPS as it has the highest number of serious and fighting incidents compared to other similar schools. Forty-three percent of teachers are of the opinion that the security in their schools is inadequate for the learning environment to feel safe. This audit recommends hiring a security consultant specializing in educational institution security to propose a comprehensive school security plan for RPS.

## *Transportation*

- Pupil transportation is another area where substantial savings are possible. For a school division, driving buses empty is an inherent nature of the transportation function. However, with proper management, these miles can be reduced to save transportation costs. During FY 2005, the school buses operated empty 40% of the times or 1.6 million miles, which is approximately 15% more than the average mileage driven by empty buses in adjoining school divisions. Properly managing these miles could potentially save RPS approximately $1.4 million. In addition, managing and consolidating bus routes could save several million dollars in transportation costs.

- RPS needs to improve the utilization of bus capacity. The current use of bus capacity is below the targeted goal. Consolidation of bus routes and schedule changes will have a positive impact.

- As the buses get older, maintenance costs increase and resale value decreases. During an optimal period of the bus' life-cycle, it is more beneficial to replace buses. Any replacement beyond this period will cost more resulting in wasted resources. RPS does not have a structured bus replacement program or funding plan. As a result, buses are replaced long after the optimum replacement period. Departure from this prudent management practice has resulted in substantial additional maintenance costs. City Auditors identified that the opportunity still exists to replace 62 buses using savings in the FY 2008 maintenance budget (RPS' General Fund Transportation budget). This ultimately will eliminate the need for $3.8 million already included in RPS' Capital Improvement Program budget.

- If RPS replaces the older buses in a timely manner, it may not have to keep such a large number of spare buses, which provides an opportunity for reduction in fleet size.

The School Division did not concur with four recommendations related to the use of technology. Subsequent discussions during a joint meeting with City and School Departments of Information Technology indicated the possibility of implementing recommendations upon additional work. In addition, the need for a better understanding of E-rate funding was recognized. These issues will be addressed in detail during phase II of the next school audit. The City Auditor's Office wishes to thank the School Superintendent for making an effort to help the City Auditors during this audit.

A written response from the School Board has been included as "Attachment C" to this report.

Umesh Dalal, City Auditor

June 30, 2007

## *Comprehensive List of Recommendations*

Page

## *Introduction*

The City Auditor's Office completed an audit of the Richmond Public School (RPS) system at the request of the City Council after the School Board agreed on the need for an audit. The audit results included in this report are being submitted to the City Council and the School Board simultaneously.

## *Impetus of the Audit*

During the FY2006-07 budget amendment process, there was significant discussion over RPS' budget requests. It appears that there is a significant public interest in RPS. The Richmond City Council took two steps to evaluate this critical issue for the Richmond taxpayers:

## *The City Council asked the City Auditor to evaluate school funding and efficiencies*

1. The Council requested the City Auditor's Office to evaluate the efficiency of RPS operations and determine the appropriateness of funding provided and evaluate efficiency of RPS operations.
2. Separately, the Council passed Ordinance #2006-82-155 that required the School Superintendent and the City's Chief Administrative Officer to jointly prepare a plan for consolidation of certain functions for cost savings and improved efficiencies. Further, the Ordinance required that the City Auditor's Office review the consolidation plan and offer recommendations.

This report addresses the first step. A review of the consolidation plan referred to above will be completed when the plan is compiled.

## *Background*

An elected School Board governs the Richmond Public School System. As of May 2006, Richmond Public Schools reported having 61 schools (31 elementary schools, 9 middle schools, 5 comprehensive high schools, and 16 specialty high schools) and a student population of approximately 23,000. Richmond Public Schools employed approximately 3,570 FTEs as of July 2006. RPS is a Component Unit within the City's reporting structure because it is financially accountable to the City.

## *Objectives*

Based on the City Council request, the following audit objectives were developed:

1. Is RPS receiving appropriate funding from local government to meet its needs?
2. Is RPS expending funds in an efficient and effective manner?

This audit did not review RPS' educational service delivery methods, quality of education, or management missions and philosophy related to instruction or academic achievement goals.

We conducted our audit in accordance with Generally Accepted Government Auditing Standards issued by the Comptroller General of the United States.

## *Methodology*

We conducted our audit in accordance with Generally Accepted Government Auditing Standards issued by the Comptroller General of the United States. The City Auditor's office believes that the audit provides a reasonable basis for conclusions regarding the internal control structure and recommendations.

Auditors performed the following procedures to complete this audit:

- Interviewed RPS staff and management
- Reviewed and evaluated the RPS policies and procedures
- Surveyed other city, county or regional school districts
- Reviewed previous RPS audits and studies
- Reviewed RPS financial and operational information
- Conducted other audit procedures as deemed necessary

Financial data was also accumulated from Tables within the Virginia Department of Education (DOE) Superintendent's Annual Reports for FY2005. Prior year data was accumulated, as needed.

***Peer group for benchmarking purposes was suggested by RPS management and accepted by the City Auditor***

The School Board of Richmond Public Schools is responsible for maintaining the School financial records. It is also responsible for establishing and maintaining a system of internal accounting control. In fulfilling this responsibility, the School Board is required to assess the expected benefits and related costs of control procedures.

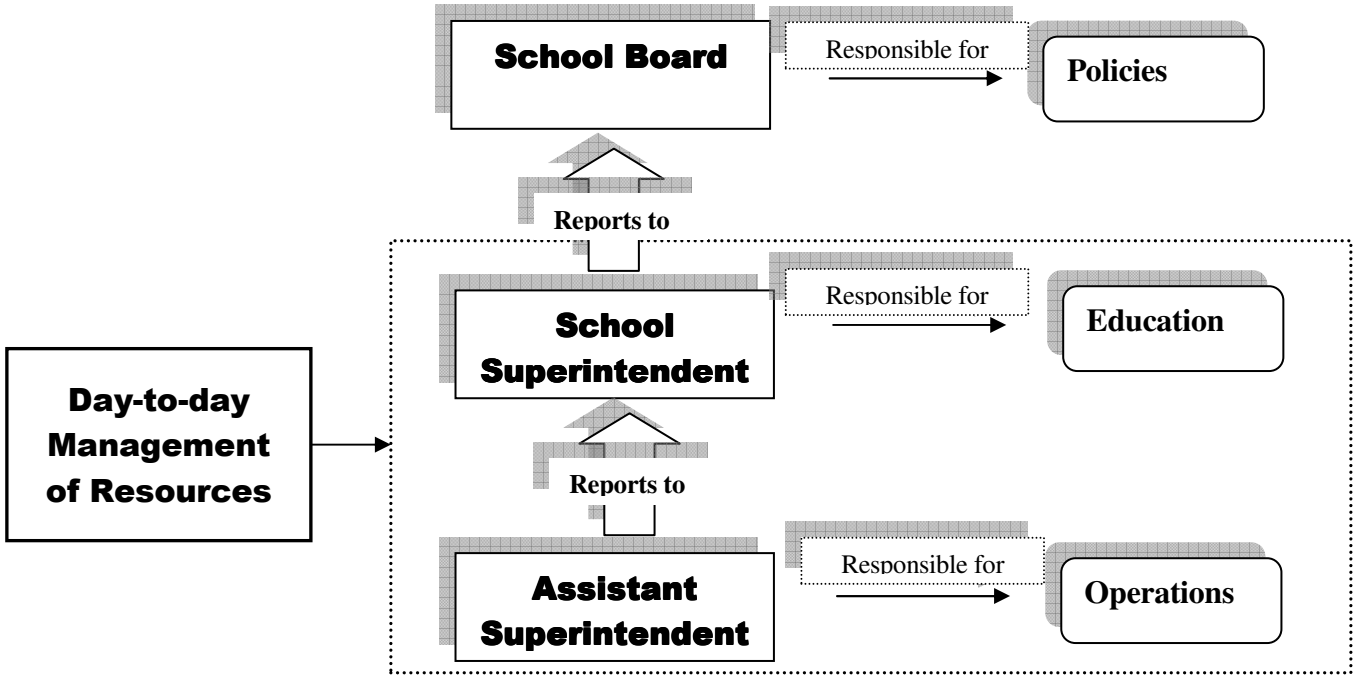
At the beginning of this audit considerable discussion revolved around finding adequate comparable school divisions. RPS administration proposed and the City Auditor's Office agreed to use the following school divisions for comparison purposes.

- Hampton City Public Schools
- Newport News City Public Schools
- Norfolk City Public Schools

Therefore, throughout the analysis, the Auditor's Office used the information, when available, pertaining to the above school divisions for benchmarking purposes. In addition, other school divisions, which appeared to perform better than RPS, were compared in order to find possibilities for improvement in RPS' current procedures. Finally, certain local school divisions were included, as necessary.

### *Who Manages the Schools?*

The School Board is the governing body and is responsible for approving policies to manage schools. The Superintendent of RPS is responsible for the operations and service delivery of the entire organization. The Superintendent focuses on improving educational service delivery and delegates the management of RPS operations to the Assistant School Superintendent. This relationship is depicted in the following diagram:

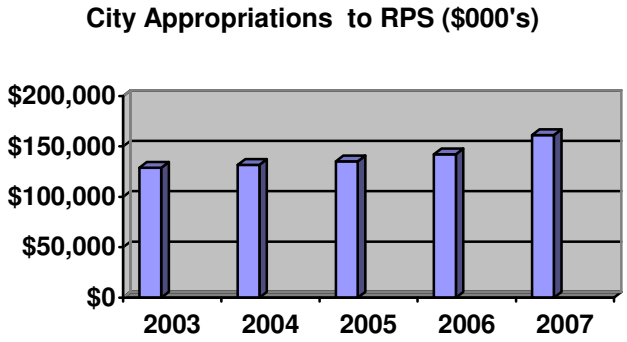



Although, the School Superintendent focuses her efforts on education, she is ultimately responsible to the School Board for managing the division effectively and efficiently.

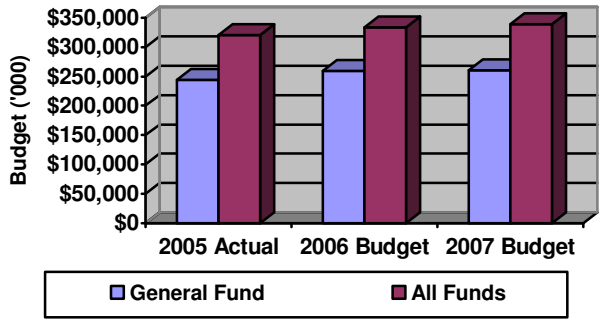
## *Budget*

On May 30, 2006, Richmond City Council approved an ordinance to appropriate $161,295,463 for the operation of the Richmond City Public Schools for FY2007. The following chart shows the history of the City's appropriation to RPS:

***City budget appropriations to RPS has consistently increased over years***

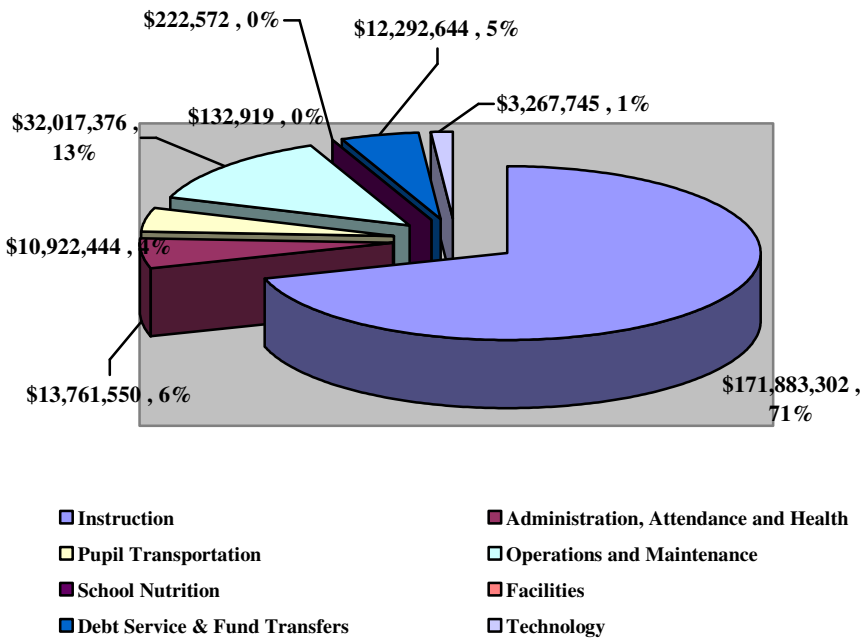



The chart below shows RPS' financial data for a three-year period, which includes the General Fund and all other funds.




***Source: RPS Adopted Budget, 2006-2007 School Year, May 31, 2006***

The following chart shows the percentage of funds dedicated to the different State Function Codes during FY2005. As the chart depicts, RPS allocated approximately 71% of its General Fund to instruction:



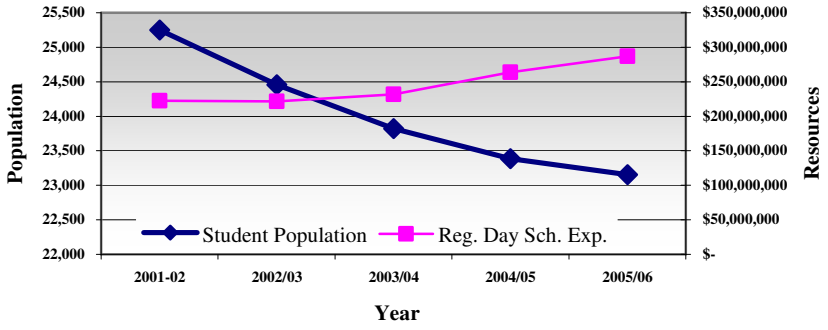

*Source: RPS Approved Budget for FY2006-2007*

## *What is the Prime Issue?*

Trend analysis of regular day school operations costs and student population revealed the following:

## *RPS spends more resources to educate fewer pupils*

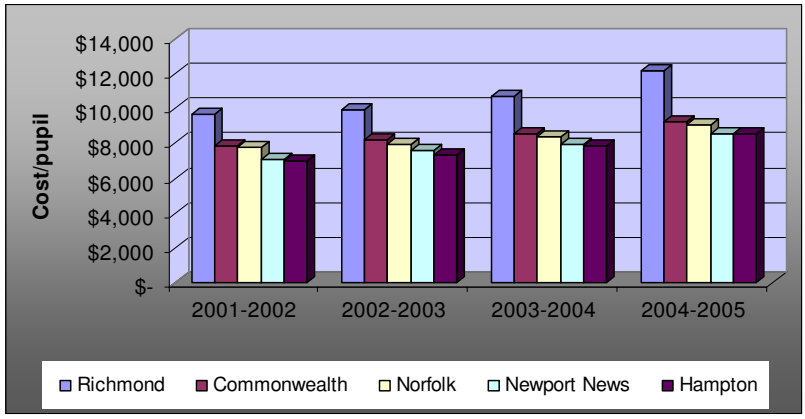
**Trends of Student Population and Resources Compared**




*Source: Student population – DOE Table 15; Resources data-DOE Table 13 (2005/06 represents forecast by RPS)*

***The cost per pupil for RPS was the highest amongst its peer school divisions***

The above graph clearly indicates that RPS spent more resources to educate fewer pupils. City Auditors found that RPS has used almost 33% more resources in FY2005 to educate each student compared to the Commonwealth of Virginia's average (RPS $12,201/ pupil, Commonwealth of Virginia average $9,202/pupil). This means that RPS spent over $70 million ($2,999 x 23,384 students) more than the average amount spent by other Virginia school divisions for day school operations. RPS had the highest cost per pupil compared to its peers (the school divisions considered comparable by RPS) as depicted in the following graph:




***Source: DOE***

***The RPS per-pupil costs grew at the highest rate compared to its peer school divisions***

It should be noted that per pupil costs in the peer group were consistent with that of the Commonwealth's average. However, RPS' costs were noticeably higher than comparable schools. In addition, RPS' per-pupil cost grew 26% compared to a 20% increase in its peer group**. The higher cost per pupil is one of the concerns expressed by the Richmond City Council.**

***RPS incurs significantly higher instruction costs but spends an even higher percentage in other costs compared to its peers.***

The data in the table below compares RPS to its peer cluster, using key information obtained from the DOE Annual Superintendent's Report by State Function Code for the 2004-2005 period.

| Category | Amount/Pupil | Rank (4=Highest amount spent) |
|---|---|---|
| Instruction | $8,215 | 4th of 4 |
| Operations and Maintenance | $1,437 | 4th of 4 |
| Attendance and Health | $274 | 4th of 4 |
| Administration | $342 | 2nd of 4 |
| Transportation | $436 | 3rd of 4 |

***Source: DOE (amount per pupil is calculated using the end-of-year Average Daily Membership)***

The above table indicates that RPS spent the highest amount per pupil in three out of the five broad categories.

In addition, the following observations were made:

| | RPS (A) | Peer Group * (B) | (A) / (B) % |
|---|---|---|---|
| **Instruction Costs** | $8,215 | $6,319 | 130% |
| **Other Costs** | $2,489 | $1,793 | 139% |

***Source: Table 13, DOE: Disbursements of Regular Day School Expenditures***
***Average of *Hampton, Norfolk and Newport News School divisions.***

The analysis above shows that although RPS incurs significantly higher instruction costs, it also spends a higher percentage in other costs compared to its peers.

***Additional spending is justified only if it results in more benefits***

One must exercise care when interpreting the above data. Spending more on instruction could be viewed as excessive if the outcome of the efforts do not improve due to additional spending. However, if improvements showing educational achievements could be demonstrated, the additional spending that directly relate to classroom instruction would be justified. Similarly, overspending in the non-instruction area is only justified if there is a demonstrated, superior service provided by RPS compared to its peers.

## *Challenges and Perceptions*

There may be several reasons why RPS spends 33% more than the Commonwealth average. The explanation for this discrepancy includes costs supported by facts and a perception that is not supported by any tangible evidence.

***Factors Impacting Costs***

***Several factors explain the reasons for overspending at RPS***

- RPS' student population is declining gradually. During the past five years the number of students declined from 25,249 to 23,153, an 8% drop. Since RPS costs to operate the division did not decline correspondingly, the cost per pupil increased. RPS operates a larger number of facilities compared to its peers to educate the same number of or fewer students. The operations and maintenance costs for a larger number of

facilities lead to additional costs. Issues related to Facilities were not addressed in this audit because at the time of the audit the City Administration was working with RPS to consolidate facilities.)

- Many of RPS' facilities are older than the facilities used by its peers. Older facilities may require additional operations and maintenance costs.
- As discussed in this report, the overall management of the School Division needs improvement. Several opportunities for cost containment and efficiency improvements were identified in the past. These opportunities were not pursued to the fullest extent to achieve the benefits.
- Higher crime in Richmond could make school operations more costly compared to other school divisions.

## *Impact of Poverty on School Costs*

***The Perception not Supported by Facts***

RPS' management perceives that significant poverty in the student population drives the operational costs higher.

The RPS' representatives are of the opinion that poverty levels contribute to higher school costs. RPS' argument supporting this perception is that RPS has a higher number of pupils on the free or reduced meal plan. However, the cost of free or reduced lunch is mostly paid by the Federal government. Also, this cost is not included when computing day school costs. The following information is included for the benefit of the readers that subscribe to RPS' point of view:

One measure of poverty includes the percentage of students

qualifying for free and reduced lunch because they live in low-income households. The Richmond area may be facing higher than average poverty levels among public school students as depicted in the following table:

| School Division | % of Free/ Reduced Priced Lunch Eligibility |
|---|---|
| Richmond | 70% |
| Norfolk | 58% |
| Newport News | 50% |
| Hampton City | 43% |
| State Average | 33% |

***Source: Department of Education, SY 2005-2006, as of October 31, 2005, revised May 9, 2006***

***Statistical data indicate that poverty and per-pupil spending are not related variables***

The City Auditors' studies of correlation between per-pupil spending and free and reduced lunch (a measure of poverty) in all city schools in Virginia revealed no correlation. The test was repeated for schools with high free and reduced lunch participation, which also indicated no significant correlation. This means that statistically per-pupil spending in Virginia schools and the poverty level are not related variables. The appropriateness of this methodology was confirmed with Professors from Virginia Commonwealth University (VCU) and the University of Richmond.

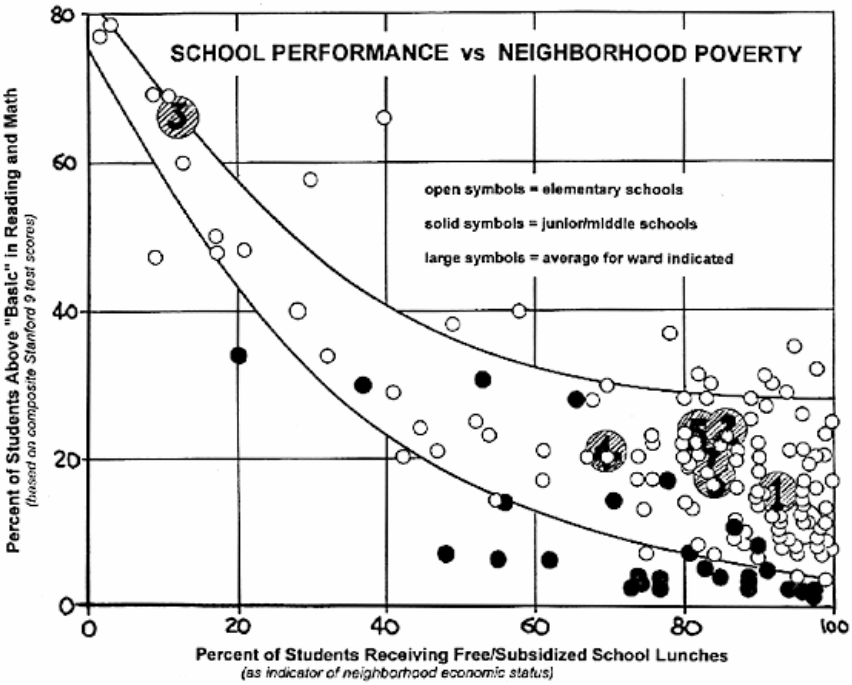
There is, however, an adverse impact of poverty on *student performance*. This issue is discussed in audit observations on instruction costs to highlight RPS' accomplishments in the

instructional area. The impact of the other perceptions and factors previously identified are discussed throughout this report.

## *Impact of Poverty on Student Performance*

### *Instruction*

It has been established by various studies nationwide that the poverty level has an adverse impact on students' academic performance. For example, according to an article published by the National Association to Restore Pride in America's Capital, Inc. (NARPAC) a study of schools in Washington DC indicated that the percentage of students above "Basic" in reading and math decreased as the percentage of students receiving free/subsidized school lunches increased (see the graph below).



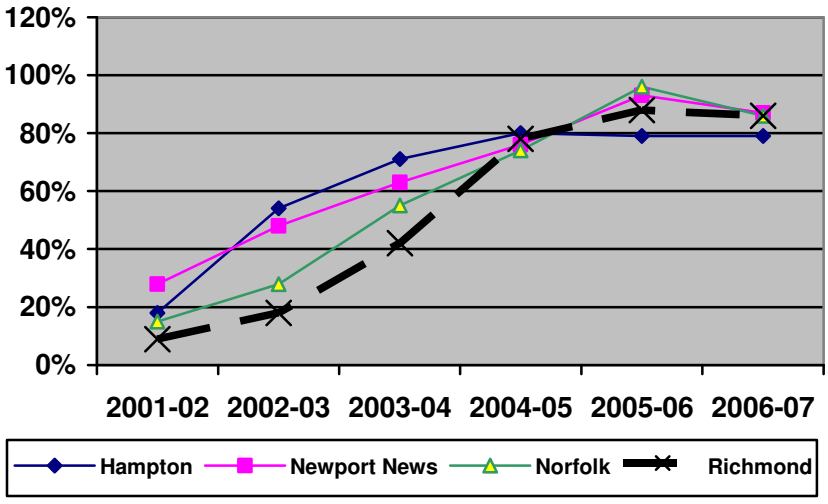

As pointed out before in this report, approximately 70% of RPS students are eligible for the free or reduced lunch program. Therefore, based on the results of studies performed elsewhere

***RPS has done a commendable job in improving academic performance despite significant challenges***

(such as the NARPAC study), it may be reasonable to expect performance issues with these students. This creates a unique challenge for RPS to motivate the overall student population to achieve higher Standards of Learning scores (Virginia standardized measure for education).

The accomplishments of RPS in this area are significant. State accreditation is granted to the schools that meet certain requirements. The data below indicates that the current administration has been effective in meeting state requirements in most of its schools. As the graph indicates, RPS under-performed compared to other school divisions from FY2002 through FY2004. However, RPS' performance has become consistent with these schools in recent years.

**RPS Accreditation Status Compared With Peers**




***Source: DOE- Yearly status is based upon prior year achievement results***

***RPS' performance exceeds federal minimum requirements and overall Commonwealth school divisions' performance***

For a school or school division to make Adequate Yearly Progress (AYP) under the Federal Education Law, it must meet or exceed separate requirements and objectives. These requirements include objectives for participation in reading and mathematics. Achievements in these subjects and attendance (elementary and middle schools) or graduation (high schools) are also included in the requirements. A minimum of 95 percent of students overall must participate in reading and mathematics testing.

The AYP rate (78%) for RPS in 2006 exceeded the federal minimum requirements (69%), the Commonwealth's overall AYP rate for school divisions (64%), and was equal to the Commonwealth's overall AYP rate for schools (78%). This appears to be a significant achievement considering the challenges RPS is facing related to student performance.

**In conclusion, RPS must be commended for making progress in providing higher performing schools for City pupils compared to its past history.**

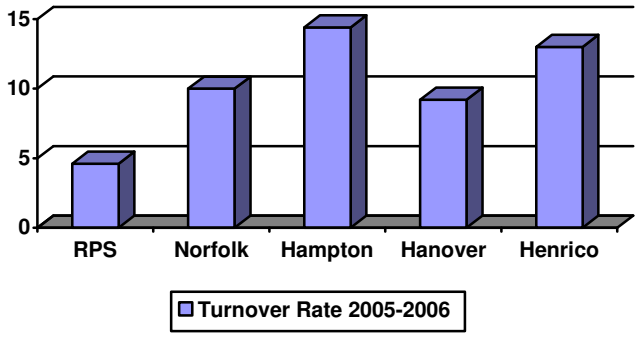
***Other Factors: Is teacher retention a significant issue for RPS?***

Keeping teacher turnover manageable is always a challenge for any school division. In addition to adverse impact on education, teacher turnover has significant fiscal impact resulting from additional costs of termination, recruitment, and training.

The National Education Association (NEA) reports that 20% of new hires leave the classroom in three years and close to

50% leave the profession in five years. Based on a report issued in August 2005 by the Alliance for Excellence in Education, Washington DC, the percentage of teachers in Virginia leaving the classroom or transferring to other schools was 15.6%. RPS has managed the teacher turnover issue well by limiting it to 4.6%. City Auditors obtained turnover data from each locality in order to compare RPS turnover with selected localities, as shown below:

***It appears that favorable compensation at RPS has helped achieve lower teacher turnover and provided stability in the teaching staff***




Lower turnover may have offered stability in the teaching staff and helped RPS' educational achievements. One of the reasons for the favorable turnover rate may be higher compensation paid by RPS compared to the other school divisions in the vicinity as follows:

| School Division | 2005 Avg. Salary $ (A) | 2005 Per Capita Income $ (B) | Salary to Income Ratio (A)/(B) |
|---|---|---|---|
| Hanover | 41,679 | 30,874 | 1.35 |
| Chesterfield | 44,379 | 29,480 | 1.51 |
| Henrico | 45,136 | 29,979 | 1.51 |
| **Richmond** | **46,469** | **26,284** | **1.77** |
| Norfolk | 43,021 | 20,903 | 2.06 |
| Newport News | 44,778 | 21,212 | 2.11 |

***Source: 2005 Secondary Education Average Salary, DOE***

In FY 2005, RPS paid the highest salary to its teachers compared to its peers. However, when salaries paid by other school divisions compared in relation to per capita income in the respective communities, compensation paid by RPS was in the middle of the range of relative compensation paid by the other schools.

It is important to note the benefits of having competitive salaries. While it is not guaranteed that a district that pays a higher salary will have a better school, it can gain an advantage in teacher recruitment and retention.

## *Recommendation:*

1. ***Continue providing favorable compensation at current levels to maintain competitive advantage in teacher recruitment and retention.***

## *Adequacy of Staffing*

The Constitution of Virginia requires that the Board of Education determine and prescribe standards for the public schools of Virginia, subject to revision only by the General Assembly. These Standards are known as the Standards of Quality (SOQ). Relative to staffing, the SOQ provides guidance for minimum staffing levels in order to ensure quality education. While the SOQ ensures minimum staffing levels, it can also be used and has been used to determine excess staffing. For instance, according to RPS staff, Carver Elementary School has an approximate enrollment of 479 pupils. At the elementary level, the SOQ has determined that a school of this size be staffed with only one principal and no assistant principal.

However, RPS has indicated that this school has two assistant principal positions, which are generally full-time positions (one of the positions is an 11-month position).

Upon City Auditors' request, RPS performed a base-level staffing analysis for each school relative to teacher and non-teacher instructional positions and compared this information with SOQ guidelines for staffing levels. City Auditors verified this analysis and evaluated variances (the difference between the actual staffing and the required staffing pursuant to the SOQ) computed by RPS. The following table depicts excess staffing computed by RPS and City Auditors:

| Description | Excess Per RPS | Excess Per Audit |
|---|---|---|
| **Elementary Schools:** | | |
| Teachers | * | * |
| Principals/Asst. Principals | 26 | 34.5 |
| Counselors | 7.5 | 9.75 |
| **Secondary Schools:** | | |
| Teachers | ** | ** |
| Principals/Asst. Principals | 15 | 8.5 |
| Counselors | 12 | 16 |
| Total variance (rounded) | 61 | 69 |

**** RPS determined that it was short-staffed by 9 teacher positions in order to meet SOQ guidelines and has already started recruiting for these positions.***
***** RPS determined that it was overstaffed in comparison to the SOQ. However, City Auditors excluded teachers from this analysis in order to focus on non-teacher instructional positions.***

***RPS has an opportunity to save several million dollars by addressing excess staffing of non-teaching staff in the instructional area***

The above information indicates that there is room for reduction of particular instructional staffing, unless there are extenuating circumstances. It appears that RPS may have an opportunity to reduce staffing and generate savings ranging from approximately $4.7 million to $5.3 million. If reduction is made in just Assistant Principal positions to evaluate and remove the excess staffing, the total savings will range between $3.4 million to $3.5 million. These amounts are calculated using the current average salary for each category. Relative to the position of Assistant Principal, above, this function helps to ensure that the philosophy, policies and goals of the School Board are carried out. While the position entails duties delegated by the Principal relating to educational programs, there are many administrative components to the job function. It is also important that RPS conduct a study of the

appropriateness of its existing administrative positions. This study may result in the reassignment of duties to existing positions to the schools, thus, maximizing savings.

## *Recommendations:*

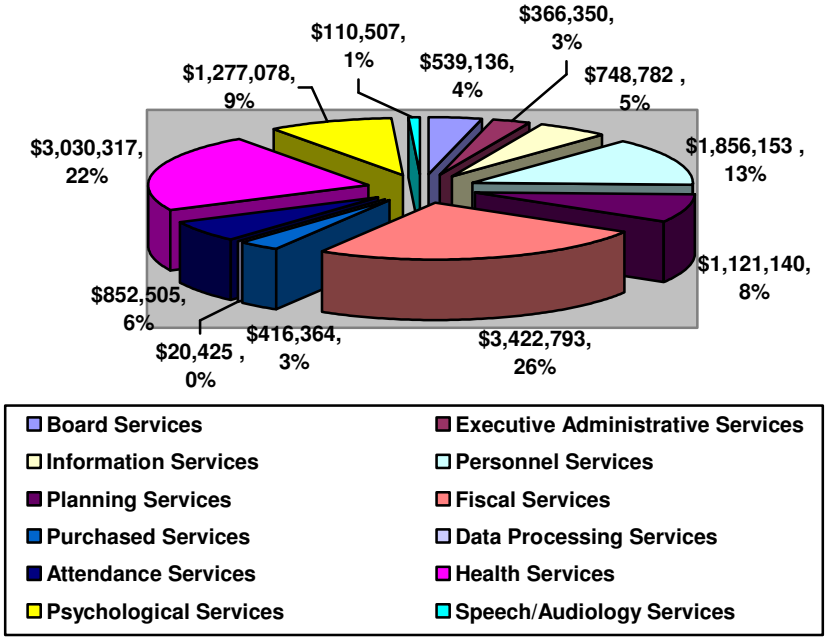
2. ***Require that RPS management justify the reasons for current staffing levels, including a review of the administrative duties of both the Principals and Assistant Principals.***
3. ***In order to evaluate the possibilities for delegating administrative functions currently performed by the Principals and Assistant Principals, conduct a study of the appropriateness of administrative staffing throughout RPS and reassign duties to existing administrative personnel.***
4. ***Eliminate staffing that is considered excessive for instructional purposes.***

# *Administration, Attendance and Health*

## *Definition*

The State Function Code, "Administration, Attendance and Health," represents activities concerned with establishing and administering policy for operating the School Board, and overall general administration for activities whose primary purpose is the promotion and improvement of attendance at school. This encompasses many different departments within the organizational structure.

The following chart depicts RPS' spending under the State Function code for FY2005, as reported in RPS' Approved Budget Document, May 31, 2006:



## *Right to Audit*

For the school year 2006-2007, the City of Richmond subsidized RPS by approximately $161 million, which represents approximately 62% of its total operating budget. During the budget process, several City Council members requested and the School Board agreed to conduct a management audit of RPS.

During the audit, the City Auditor's Office had significant difficulties in obtaining pertinent information. Despite efforts of the School Board Chairman's involvement and participation by the School Superintendent, the School staff remained reluctant in sharing requested information. Thus, overall staff cooperation was marginal at best. The City Auditor had to conduct the audit only with the available information and does not have assurance on the completeness of information. These circumstances may have precluded identification of all incidents of material control weaknesses and potential misuse of public resources.

According to an opinion issued by the City Attorney's Office, the City Auditor has an ability to audit independent legal entities supported by the City funding, including the Richmond Public Schools. In addition, the City Auditor is authorized by the City Charter to issue a "subpoena" to ensure access to records.

In the future, however, it may be more productive if the City Auditor's Office has full access to RPS' records, information and personnel either through an agreement or through authority given in an ordinance.

### *Recommendation:*

5. ***Grant the City Auditor's Office full access to the School Division's records, information and personnel during future projects.***

***Role of School Internal Audit***

During this review, numerous internal control deficiencies and inefficient uses of public resources were identified. It appeared that these conditions existed for an extended period. It is not known if these discrepancies were the result of the School Division's Internal Audit not identifying them or the School Division's management not correcting them. Either of these situations make the effectiveness of the School Internal Audit program questionable. The School's Director of Internal Audit refused to share any information related to their audit methodology, procedures for evaluation of overall audit risk in the division, and audit coverage during the year.

***Typically, Internal Audit function acts as a mechanism to evaluate organizational accountability***

***The effectiveness of the School Internal Audit program must be evaluated***

Internal Audit is the only independent function in RPS that can objectively evaluate the operations and provide candid feedback to the School Board. The Board can use this information to hold the School Administration accountable for the use of public resources. Lack of an effective internal auditing department could defeat its purpose.

### *Recommendations:*

6. ***Require RPS Internal Audit to conduct their work in accordance with Generally Accepted Government Auditing standards, which would include receiving a peer review every three years.***
7. ***Determine if the RPS Internal Audit function is effective in:***
   - ***identifying internal control deficiencies,***
   - ***detecting non-compliance with laws, regulations, and policies;***
   - ***identifying fraudulent and illegal acts, and***
   - ***evaluating efficiencies and effectiveness of RPS operations.***

## *Staffing Analysis*

In order to review administrative, service and support positions, City Auditors went beyond the state function code reporting structure and used the DOE reports to review particular administrative, service and support positions throughout the organization. The analysis included administrative, technical/clerical, support, and other professional positions.

Comparison with the peer group revealed that RPS had a relatively higher number of administrative, service and support positions for FY2005 as depicted in the following table:

| School Division | Current Positions (A) | Enrollment (B) | Recomputed Positions* | Variance |
|---|---|---|---|---|
| Richmond | 1,331 | 24,564 | 1,331 | 0 |
| Hampton | 1,145 | 22,679 | 1,240 | 91 |
| Newport News | 1,726 | 32,715 | 1,296 | 35 |
| Norfolk | 1,507 | 35,292 | 1,049 | 282 |
| | | | | |

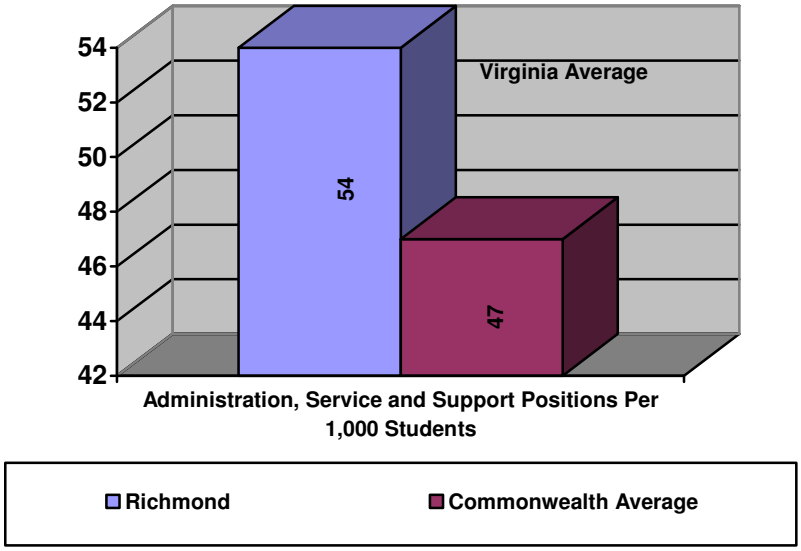
*Number of positions needed if RPS achieves efficiencies of other school divisions. Calculated as (A) / (B) x RPS' enrollment

***Source: Data was extracted from Tables 17 and 18 of the 2005 DOE Annual Report***

***RPS appears to have excess staffing in administrative, clerical and support positions***

The above table shows that the other school districts are more efficient in using the administrative positions. If RPS could achieve their efficiencies by adjusting the number of positions in this category in the proportion of the positions employed by the other school divisions, it has an opportunity to reduce between 35 and 282.

The following chart puts into perspective how administrative, service and support staffing per 1,000 students in RPS compares with the Commonwealth of Virginia school division average:




***Source: Data was extracted from Tables 17 and 18 of the DOE Annual Report***

The chart shows that RPS had a higher level of positions than the average school division.

The components of the above excess staffing are addressed throughout the report as the positions relate to the specific departmental analysis.

## *Clerical Staffing*

In order to isolate some of the more administrative-type positions, City Auditors requested that RPS analyze its clerical staff physically located at the schools against the Standards of Quality requirements. The Standards of Quality (SOQ) requires all Virginia public schools to have clerical staff based upon certain formulas and enrollment figures. According to RPS' calculations, the current staff exceeded the required staffing by 23

positions. The City Auditor's Office recalculated the positions and found that RPS staffing exceeded the required staffing by 21 positions. These results are depicted in the following table:

| Description | Excess Per RPS | Excess Per Audit |
|---|---|---|
| Elementary Schools | (2) | 2.5 |
| Secondary Schools | 25 | 18.5 |
| Total variance | 23 | 21 |

This means that RPS has 21 (25%) positions out of 84 reviewed in excess of the required positions in its elementary and secondary schools. **The annual financial impact of the excess staff is approximately $1 million.** As shown in the above chart, the analysis for just one job function resulted in large savings opportunities. RPS had a total of 648 administrative positions during FY2005. Therefore, a comprehensive study of all administrative positions could identify significantly more savings.

The Joint Legislative Audit and Review Committee (JLARC) [1] performed a study in 2004 to access the Commonwealth's local districts for efficiencies. JLARC reported that the use of technology and pooled clerical staffing was one approach to improving effectiveness and efficiency.

Further, it was recommended during the Commonwealth's

[1] Report of the Joint Legislative Audit and Review Commission, "Best Practices for the Support Services of School Divisions," *House Document No. 6*, 2004

Efficiency Review of the Richmond Public School System that a detailed personnel audit be performed to evaluate staffing. RPS has not implemented the recommendation made by the Commonwealth. Therefore, the impact of the potential savings across the entire organization is not known. RPS' Internal Audit Division performed a review of the overall administrative positions by job titles during 2006, known as a job position control audit or position count. However, the review was limited and may not have provided sufficient analysis to warrant a proper conclusion.

## *Recommendations:*

8. ***Require RPS management to justify the reasons for the current staffing levels. Eliminate staffing that is considered excessive for administration purposes.***
9. ***Evaluate alternatives that could improve administrative staff efficiency.***

***Health Services***

The Code of Virginia section 22.1-253.13:2 (Subsection O) encourages each school board to employ or contract with the local health departments for at least one nurse per 1,000 students.

***RPS is in compliance with Virginia Code requirements and generally strives to meet Best Practices***

According to guidelines for Support Services of School Divisions issued by JLARC in 2004, the use of a full-time nurse in every school is a Best Practice. According to the review, although it is costly to implement, the school divisions argued that the benefits outweighed the costs.

City Auditors identified that RPS is in compliance with Virginia Code requirements and generally strives to meet Best Practices for health services. Based on these observations, it appears that staffing in this area is adequate. City Auditors did not perform any other analysis in Health Services as the relevant records included confidential medical information on students.

## *Nutrition Services*

### *Program Goals*

The Nutrition Program strives to provide nutritious meals to all pupils without regard to family income. Likewise, the Program also strives to provide quality meals served in a pleasant atmosphere, practice sound fiscal management, and encourage community involvement in support of the Program.

### *Staffing*

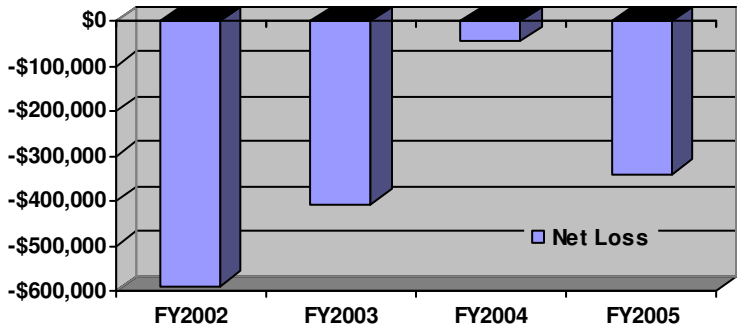
At RPS, the Nutrition Services Director reports to the Assistant Superintendent for Finance and Operations. The Director supervises six accountants/technicians and four supervisors. Forty-two service managers report to the supervisors. In addition, RPS employs approximately 112 food service assistants, four cooks and 111 food service substitutes.

### *The Nutrition Program incurred a substantial deficit and is not self-supporting as intended*

**Management of the Program**

The challenges in managing the Nutrition Program are not unique to RPS. Even though the Nutrition Fund is supposed to be self-supporting, many school divisions require a subsidy from the General Fund to maintain the fund at a break-even status. The following chart shows RPS' historical results of operations for the

Nutrition Services Fund:




As the chart shows, RPS has not been able to manage the Program at a break-even status (where revenues equal expenses). In fact, during FY2005, an additional $919,896 was transferred from the General Fund to the Nutrition Services Fund to help subsidize the Program. Therefore, although there was a net loss recorded of approximately $339,000, *the amount of expenditures over the actual Program revenues was approximately $1.3 million.* Representatives of School Management could not explain the reasons for the apparent improvement of the financial performance operations during FY2004. They could only speculate that the publicized outsourcing activity may have helped improve staff productivity and Program activities. This occurrence indicates that RPS is capable of managing the Nutrition Program at or near a breakeven point. For this purpose, staff productivity may have to be monitored and managed appropriately.

During FY2005, RPS outsourced the management of the Program

to address the Program's unsuccessful financial position. After one year of the contract, RPS did not see an improvement in the financial management of the Program and the contract with its vendor was severed.

***Peer Comparisons***

It is important to review costs on a per-pupil basis to compare RPS to its peers. The following information was calculated using the FY2005 actual operation costs posted on the localities' web sites and accumulating comparable FY2005 enrollment figures from the DOE, Table 13 of the Superintendent's Annual Report for Virginia:

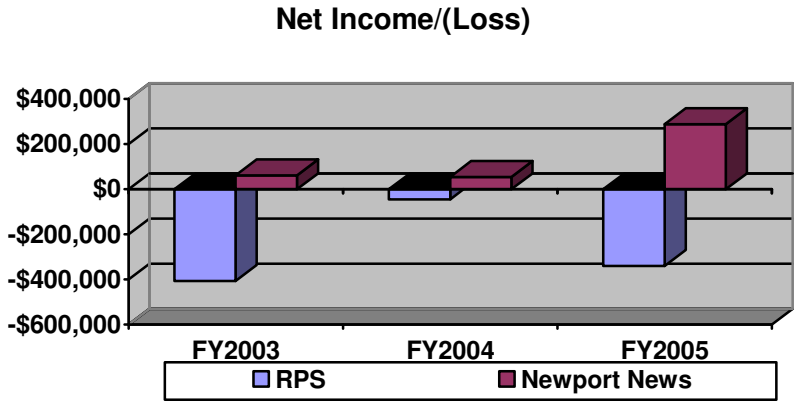
| Division | Nutrition Costs Per Pupil |
|---|---|
| RPS | $470 |
| Hampton | $380 |
| Norfolk | $377 |
| Newport News | $349 |

***After adjusting for additional losses due to privatization, RPS cost per pupil for Nutrition Program is still the highest among its peers***

As the table above shows, RPS' costs per pupil were significantly higher than its peers. Part of this excess could be attributed to excess costs incurred due to privatization of the Nutrition Services function. After making adjustment for the excess, RPS still has the highest nutrition cost per pupil.

The following graph compares RPS' financial performance with the Newport News Public Schools' financial performance in the management of the Nutrition Program. The relevant data was not

available from the school divisions in Norfolk and Hampton for comparison purposes.




***Notes:***

1. ***Financial data was taken from budget documents.***
2. ***Newport News management indicated that it received federal reimbursements for Hurricane Isabel during FY2005, which helped the fund stay profitable.***

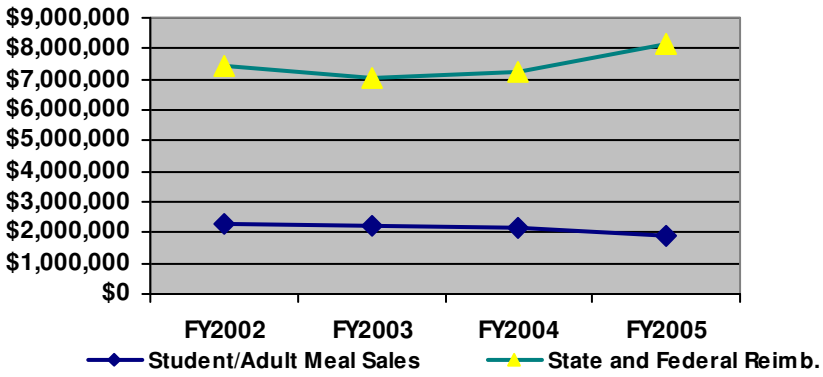
## *Relevant Issues*

Based on the above information, it appears that Newport News has been more successful in managing its Nutrition Program. Subsequent discussions in this section analyze the relevant issues pertaining to RPS' Program.

The level of net revenues or loss depends upon:

- The number of students who eat breakfast and lunch
- The level of efficiency of operations
- The number of staff employed

The Program is meant to be self-supporting and is not supposed to rely on the General Fund. The following chart shows certain components of RPS' revenue stream over the last four years.




As the chart above shows, unlike state and federal reimbursements, student and adult meal sales were relatively flat throughout the four-year period.

The federal government reimburses for all breakfast and lunch programs, but reimburses at a higher rate for free and reduced-priced meals. Subsequently, the more eligible students the school district can identify, the more federal revenue the school division will receive. The table below shows the current federal reimbursement rates:

| Activity | Federal Reimbursement Rate / Meal |
|---|---|
| Full priced breakfast | $.24 |
| Reduced priced breakfast | $1.26 |
| Free breakfast | $1.56 |
| Full priced lunch | $.25 |
| Reduced priced lunch | $2.02 |
| Free lunch | $2.42 |

Of the 56 RPS schools registered with the Department of Education as of September 2006, 37 schools had over 70% participation rate for lunch. RPS participation rates compares to its peer group as follows:

***RPS needs to increase student participation rates for its Nutrition Program to break even***

| | Breakfast Participation Rates September 2006 | Lunch Participation Rates September 2006 |
|---|---|---|
| RPS | 34.42% | 66.36% |
| Newport News | 25.15% | 72.63% |
| Norfolk | 24.30% | 64.28% |
| Hampton | 27.80% | 59.97% |

It should be noted that about 70% of the students at RPS are eligible for free or reduced price meals. However, only 34% of all students participated in the breakfast program and 66% participated in the lunch program during September 2006. There appears to be room for improving student participation in this Program. Based on audit analysis, it appears that an increase in the participation rate by 4% to match the lunch participation rate of the student population eligible for the subsidized meal program would increase program revenue by over $400,000. This additional revenue would help reduce the loss and help RPS in achieving its objective of making the Nutrition Program self supporting. RPS has indicated that it has a 10% goal for increased participation. If RPS is successful in achieving this goal, the Nutrition Program may become profitable.

City Auditors were informed that monthly promotions to improve participation are in progress. RPS also joined a monthly program that provides promotional items each month, such as posters and prizes. In addition, they are contemplating menu changes to allow more branded items familiar to the students.

One of the most important steps to increase participation rates is to make the environment more appealing. Likewise, creative strategies such as Java Bars and food courts are options that should be seriously considered.

Certain Virginia school divisions, such as Norfolk, Newport News, and Alexandria have taken steps to increase participation. The Newport News Nutrition Services Director indicated that existing food lines were kept at the high schools, but new food courts were established with self-serve themes, such as a nacho-bar. Made-to-order deli lines were also introduced with limited capital improvement funds. The director indicated that the impact of the new strategies increased certain high schools' participation levels by as much as 30%. As stated earlier, the Newport News School Division runs a more profitable Nutrition Program.

There are other vendors in this field that could offer assistance to the RPS program. For instance, Preferred Meal Systems is a concept that utilizes completely packaged meals for elementary students using the vendor's heating system. The food costs tend to be higher, but the labor resources are drastically reduced. Certain RPS nutrition staff was provided information on this system and feel that it may be an option for the future.

It appears that there may be an opportunity to use a combination of the above options to make this program more efficient and improve its financial performance without compromising the Program's core mission of providing nutritious food to the students.

### *Recommendation:*

***10. Establish a plan of action to increase participation, especially for the free and reduced-price meal programs. Include targets and action steps to meet the plan objectives.***

### *Performance*

Schools use either a conventional or a convenience system. A conventional system involves using more raw ingredients in the preparation of meals, while a convenience system includes more fast foods and foods that are pre-cooked. Therefore, the school system serving meals using the convenience system is expected to have higher Meals per Labor Hour (MPLH). RPS primarily uses the convenience system to serve meals to students. JLARC and the DOE recommend MPLH within the range of 14 to 20.

When RPS' productivity was evaluated based on MPLH, the following results were obtained:

| School Type | MPLH FY2005 | MPLH FY2006 | MPLH FY2007* |
|---|---|---|---|
| Elementary School | 16.00 | 16.10 | 15.50 |
| Middle School | 13.60 | 14.00 | 14.66 |
| High School | 12.60 | 10.60 | 11.40 |
| Average MPLH | 15.11 | 15.06 | 14.86 |

***As of October 2006***

Since RPS is using the convenience system of serving meals, one would expect them to have MPLH close to the high end of the recommended range. However, the above results show that other than for elementary schools, RPS either barely met or was below the minimum recommended MPLH. This indicates that there is an opportunity to improve management of labor productivity in this area. Increased productivity will likely lead to reduction in labor costs.

## *Recommendation:*

***11. Require the Nutrition Services Director to evaluate each school's labor productivity and address the causes for low productivity in high schools and middle schools.***

### *What measures has RPS taken?*

In July 2005, RPS contracted with inTEAM Associates to perform an analysis of the Nutrition Services Program. To date,

***RPS management had hired a consultant to make recommendations for improvements and is in the process of making desired changes***

RPS has fully implemented 17 of the 42 recommendations made by the consultant. Seventeen recommendations were partially implemented or were in process of being implemented. Eight of the recommendations were not implemented. The inTEAM report was a valuable tool for management. The inTEAM members are experienced in the industry and offered many suggestions for improvements. RPS needs to continue to implement the recommendations issued by inTEAM.

Additionally, RPS hired a new Director for the Program in September 2005. Recently, she implemented the preparation of monthly profit and loss statements with training for the local managers to ensure that each school can be accountable for its financial activities.

### *Recommendation:*

***12. Require the Nutrition Services Director to report the implementation status of and the benefits derived from the consultant's recommendations.***

### *Finance Issues*
### *Cash Management*

RPS maintains its cash disbursement account for accounts payables through a regular business checking account at a local bank. Currently, the cash held overnight in the RPS disbursement account is not earning interest. An inquiry revealed that this bank offers an interest bearing checking account that yields interest at a

negotiable rate close to 2%. Furthermore, the City of Richmond's Finance Department utilizes interest bearing accounts for City agencies and other school accounts, including a Local Government Investment Pool account, which currently yields 5.28%.

***RPS can generate additional revenue of $130,000 by adopting a widely used method of investing idle cash in interest bearing bank accounts***

Based on information provided by RPS and the City of Richmond's Finance personnel, City Auditors estimated that if RPS utilized the option adopted by the City for overnight investments of idle cash it could earn annual interest earnings of approximately $130,000. The reason for not using an interest bearing checking account either in the bank where the existing account is located or in the account where the City invests its overnight cash balance is not clear.

### *Recommendation:*

***13. Require RPS finance administration to use an interest earning bank account for investing the cash balance currently held in its regular business checking account.***

### *Procurement*

***There is an opportunity to strengthen RPS' procurement policy***

City Auditors were denied access to an electronic file of the history of RPS' disbursements in order to analyze spending trends. Therefore, City Auditors used the available procurement data in an effort to analyze the activity of the unit. The audit analysis was limited to electronically reviewing the nature of the purchase order (PO's) activity, interviewing staff and comparing RPS' procurement policy, accordingly.

In order to evaluate the adequacy of the procurement policy, City Auditors compared RPS' key procurement guidelines to the Virginia Public Procurement Act as follows:

| Dollar Value | RPS Requirement | Virginia Public Procurement Act |
|---|---|---|
| **Less than $5,000** | Discretionary—left to discretion of buyer (If competition sought, three telephone quotes) | Minimum of one written or telephone (oral) quote. Other sources may also be solicited |
| **Over $5,000-50,000** | | Four minimum written quotes |
| $5,000-10,000 | Three Telephone Bids or written quotes (if desired) | Four minimum written unsealed proposals (RFP's) |
| $10,000-$20,000 | Three unsealed or sealed written bids | Four minimum written unsealed proposals (best value acquisition) |
| $20,000-50,000 | Four unsealed or sealed written bids | Formal Sealed Bids required |
| Over $50,000 | Formal Sealed Bids required | |

City Auditors observed that RPS' policy was more relaxed than the State's Procurement Act.

The table below depicts the nature of the RPS purchasing activity:

| PO Amount Range | Number of RPS PO's in FY 2006 | Overall % of PO's Issued | Dollar Amount of PO's | Overall % of Dollar Amt for PO's Issued |
|---|---|---|---|---|
| Under $5,000 | 4,501 | 76% | $6,262,161 | 8% |
| $5,000-$10,000 | 694 | 12% | $4,576,517 | 6% |
| $10,000-20,000 | 391 | 7% | $5,662,726 | 8% |
| $20,000-50,000 | 203 | 3% | $6,086,311 | 8% |
| $50,000-above | 133 | 2% | $53,934,924 | 70% |
| **Total** | **5,922** | **100%** | **$76,522,639** | **100%** |

The table above shows that 88% of all transactions were for purchases under $10,000. Essentially, this is 88% of the efforts with low economic values. However, due to the high level of

transactions, the risk of fraud and/or misappropriation is greater. As shown in RPS' Policy guidelines in the first table, RPS does not require staff to obtain quotes in written format within this range. Thus, there is no assurance that three quotes are actually obtained properly. In addition, City Auditors did not have an opportunity to evaluate if the existing internal controls were adequate to ensure compliance with RPS policy and accountability over the expenditures.

The role of the Procurement Department is to ensure that there is accountability in government purchasing transactions. Procurement needs to be proactive to ensure compliance and to provide oversight in order to prevent potential misappropriation and noncompliance with RPS' Policy. Internal controls need to be in place for this purpose. The more relaxed the policy and the greater the magnitude of potential individual purchases, the greater the risk of exposure.

***Effectiveness***

Also, the procurement process should enable an organization to acquire needed materials and services at best prices without compromising quality. The following discussion analyzes several such possibilities:

***RPS has an opportunity to improve procurement effectiveness to generate savings by consolidating purchases and soliciting bids***

"Blanket Purchase Orders" are a tool to expedite smaller purchases and reduce the paperwork to help employee productivity. This tool, however, is not effective if an organization uses it to procure large dollar value purchases in any given year. This is because blanket purchase orders are not

negotiated for volume discount. City Auditors found that RPS is using blanket purchase orders for purchases that may be more beneficially consolidated and negotiated as contract purchases. The following table depicts the examples of procurements on blanket purchase orders:

| | Vendor | Number of PO's | Total dollar amount of PO's |
|---|---|---|---|
| Trade: Plumbing | | | |
| | Vendor #1 | 3 | $15,000 |
| | Vendor #2 | 6 | $26,371 |
| | Vendor #3 | 5 | $25,000 |
| | Vendor #4 | 5 | $22,000 |
| Sub-Total | | 19 | $88,371 |
| Trade: HVAC | | | |
| | Vendor #1 | 10 | $43,836 |
| | Vendor #2 | 4 | $20,000 |
| Sub-Total | | 14 | $63,836 |
| Total | | 33 | $152,207 |

The table above shows the effects of the lack of proper monitoring of purchasing activities. The Operations and Maintenance Unit was able to procure 29 of 33 purchase orders using "blanket purchase orders" issued for $5,000 each.

City Auditors observed that accumulated purchases for each of the vendors above were significant enough for the year to warrant competitive bidding. However, the procurement activity did **not**

solicit bids. Although RPS does utilize state contracts for some of its facility maintenance needs, the information above shows that there is a lack of oversight and proper strategic planning. In order to become more proactive, Procurement should be able to help the divisions identify, upfront, their annual procurement needs. Procurement should then be able to evaluate the needs and provide for the most efficient and cost-effective manner to procure the goods, while maintaining compliance with regulations guiding the activity.

Additionally, while blanket purchase orders are often used for repeat, miscellaneous supply items from a single vendor, they should also be used to help obtain better prices through volume discount commitments at the same time. The supervisor of the facilities maintenance unit, who utilized the above procurement activity, confirmed that as a matter of practice, he generally does not negotiate volume discounts with vendors.

There are many opportunities in the Procurement area for enhanced operations, many of which are beyond the scope of this audit but should be evaluated in the future.

## *Recommendations:*

14. ***Implement proactive purchasing strategies, including upfront planning for the identification of procurement needs and on-going communication with the divisions in order to add value.***

15. ***Using the Code of Virginia as a guide, strengthen RPS procurement policies to ensure the most economical means of procurement with adequate controls.***

16. ***Establish monitoring controls to periodically review smaller dollar purchase activity (especially blanket purchase orders).***

# *Technology*

## *Background*

In a school division, technology uses can be classified in the following broad categories:

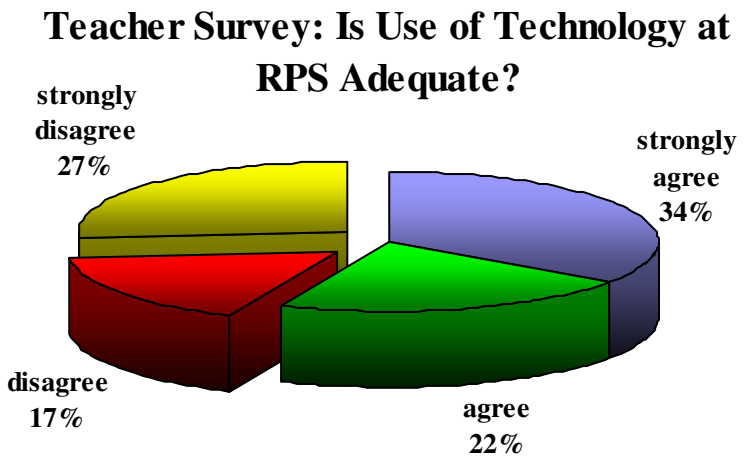
- Classroom instruction
- Administration of schools
- Providing infrastructure and administrative support for class room instruction

For RPS to successfully implement technology, the Department of Information Technology (IT) must partner with other school departments, including the Department of Instruction, to assess technological needs for its users. This effort is demonstrated in the Six-Year Educational Technology Plan that outlines RPS' strategic goals, targets and progress in measuring the application of technology within the classroom. The plan covers areas such as technological applications and tools to enhance student instruction; technology related to professional development requirements for teachers and administrators; and network infrastructure needed to support hardware and software used by students, teachers, and administrators. While RPS has developed a Technology Plan, it does not have performance measures to monitor progress in achieving its goals or targets. Without performance measures the progress made to achieve the Technology Plan goals can not be assessed.

### *Teacher Survey*

The City Auditor's Office developed and administered a survey of ninety-five randomly selected teachers throughout RPS. The thirty-nine responses indicated that teachers are divided in their opinion about the adequacy of technology. 56% of the teachers felt that the use of technology in their schools is adequate. However, the remaining 44% felt that the use of technology is inadequate.

***44% of teachers feel that the use of technology at RPS is inadequate***




Based on the above results, it appears that either the teachers do not have the adequate technology or they need additional training in using the available technology.

### *Analysis of Value Contributed*

Technology costs depend neither upon the demographic mix of the student population nor on the poverty level of the students. These costs include:

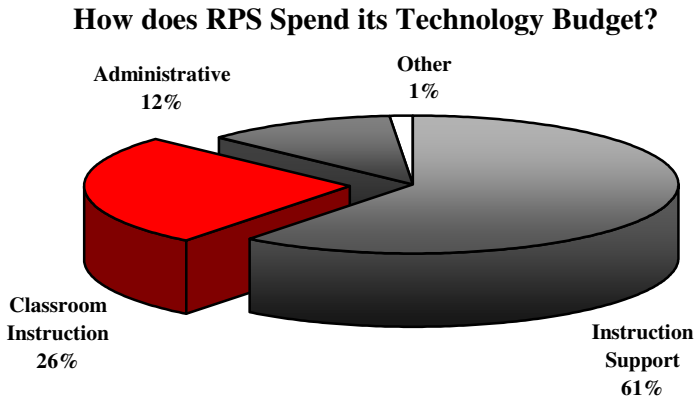
- Providing computers to students, teachers, and administration
- Providing support services to students, teachers, and administration

- Operating, enhancing, and maintaining infrastructure

The amount spent by any organization on technology depends upon the sophistication and adequacy of technological improvements. Therefore, a detailed comparison of spending may be necessary to analyze the effectiveness of spending.

***How does RPS Spend its Technology Budget***

In Fiscal Year 2005, Richmond Public Schools spent $11,203,140 on Technology. Below is a graph that shows the breakdown of RPS' FY05 technology expenditures:

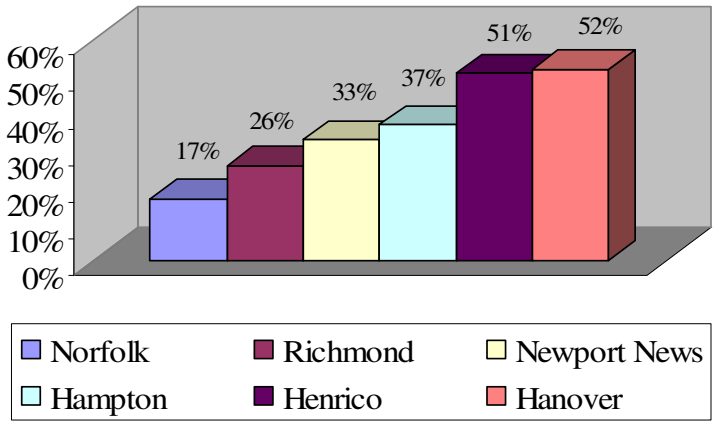



***At RPS, only 26% of the total technology related expenditures are spent in classroom***

Based on the above graph, 26% of RPS' technology expenditures were spent directly on classroom instruction, whereby, the students directly benefit. When comparing that with its peer group and the neighboring school divisions, RPS appears to have an opportunity to realign spending to provide increased technology use in the classroom as follows:

***Other school divisions spend a substantially higher percentage of technology expenditures in the classroom***

**What Proportion of Technology Expenditures Directly Benefit Students?**




***Source: Virginia Department of Education (raw data)***

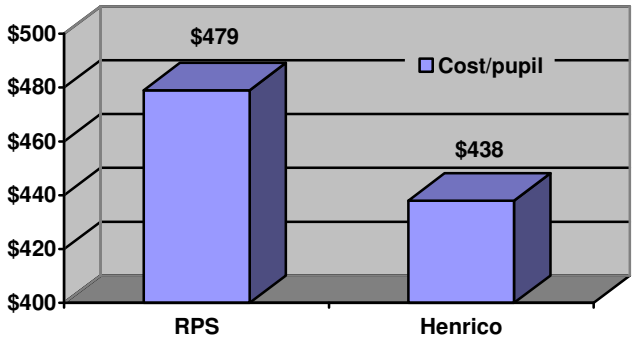
***Detailed Cost Analysis***

The Henrico County School Division has used technology very effectively for education and administration purposes. According to the Henrico School Superintendent, their program is being adopted by schools in the state of Maine. The Henrico County School Division provided the City Auditor's Office with details of their technology function.

***The Henrico County School Division has used technology very effectively in education and is considered a best practice case***

RPS could not provide desired details of amounts spent on technology. Therefore, a detailed analysis of RPS spending and comparison with Best Practices followed by the Henrico County Schools was not possible. Without appropriate information, it is not possible to use detailed cost analysis to evaluate RPS' spending. Therefore, overall technology costs were evaluated using spending per student and value received for the spending.

The following is a comparison of per pupil costs for FY2005 for RPS and the Henrico School Division:




***Source: DOE***

## *Benefits from Technology Spending*

Based on the above graph one may expect that RPS is more progressive due to the fact that they are spending more on technology. However, it is important to compare the benefits derived from the spending by both organizations. Henrico County Schools' technology processes and services offered are considered Best Practices in Virginia and beyond. The following comparison indicates that Henrico is able to offer more sophisticated technology and a significant higher number of computer equipment for educational and administration purposes:

| Description | RPS | Henrico |
|---|---|---|
| Expenditures (2004-2005) | $11,203,141 | $20,115,452 |
| Students | 23,384 | **45,961** |
| Cost per Pupil | $479 | **$438** |
| Number of Facilities Serviced | 65 | **75** |
| Number of Users Supported | 29,000 | **54,000** |
| Classroom Instruction | Comparable | Comparable |
| Type of Computers Available | 10,492 personal computers<br><br>1 computer to 5 student ratio for grades K-12 (classroom and lab assigned)<br><br>400 personal computers assigned to teaching and administrative staff | **49,000 personal computers**<br><br>**1 computer to 1 student ratio for 6-12 graders (assigned to individual students)**<br><br>1 computer to 5 students ratio K-5<br><br>**3,300 computers issued to teaching and administrative staff** |
| Network | Wide Area Network | Wide Area Network |
| Internet | Internet Service at school | **Internet Service**<br>**Contract with local service provider to offers Internet access for students and teachers who do not have access at home** |

**Bold text: Superior service**

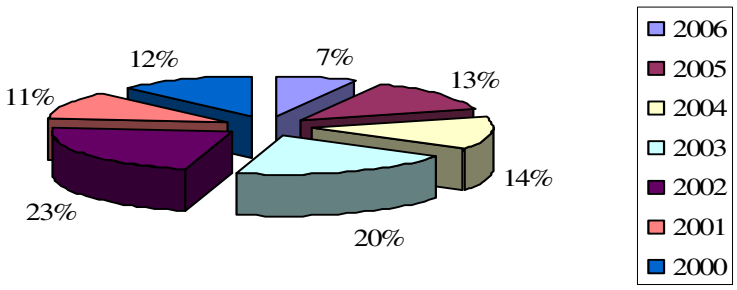
***RPS spends more on technology per pupil but receives less benefits***

Based on the above information it is clear that RPS is spending more and getting less in return. Improving the function's management and optimizing appropriated funds for technology is critical. It is desirable that RPS strive for a technologically enriched environment as that of Henrico. However, such a goal may be too optimistic to achieve prior to making some basic improvements. Once these improvements are in place and RPS staff is trained to manage available resources in a cost effective manner, further enhancement may be beneficial.

***Hardware Replacement***

RPS has 10,492 computing machines that consist of 1,714 Macintosh and 8,778 personal computers. Of these, 2,464 or 23% are older than five years as depicted in the following graph:

***23% of RPS' computers are older than five years***

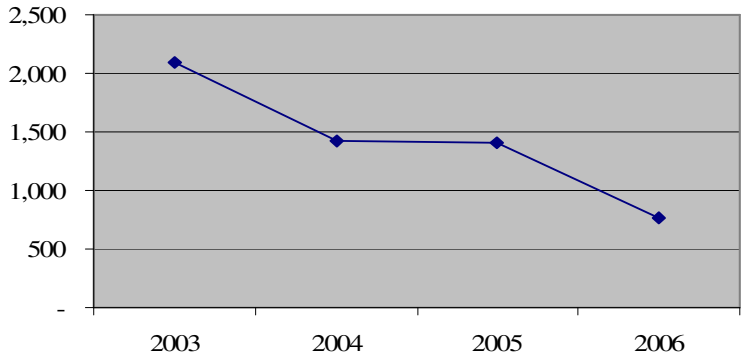



The computing capabilities of older computers have a negative impact on the efficiency and effectiveness of users. Also, compared to a newer computer, older computers carry much higher hidden costs such as maintenance, support, capabilities and compatibility issues. RPS needs to make a substantial

($2,018,016) investment to replace 2,464 computers that are older than five years.

The following graph depicts the spending pattern of RPS in computer replacements. Over the past four years, RPS has spent a total of approximately $4,868,376. However, the number of computers replaced dramatically decreased during 2003 through 2006.

**Pattern of Computers Purchased**




Without a proper computer replacement strategy and foresight, the needed replacements may not be accomplished. Spending on replacement of assets is an easy target for deferral, therefore, available spending for computer replacements could dwindle further.

This situation exhibits stark contrast to Best Practices followed by Henrico County Schools. They are able to provide the latest and superior technology in the form of laptops to most of the middle and high school students. RPS, on the contrary, defers replacement of desktop computers causing use of outdated

computers in the classrooms. These computers either may not be able to handle the entire technology based curriculum or may not handle it efficiently. Ultimately, an adverse impact may result on education.

***What is the impact?***

***RPS' passive computer replacement approach hinders progress towards closing the digital divide among Richmond students***

In the technology oriented business environment, the students who get proper education in using technology may have better a chance to be successful in the future. RPS' passive approach regarding computer replacement hinders progress towards closing the digital divide among Richmond students. Digital divide refers to the environment where some individuals have access to and are savvy about technology while others do not have this benefit. Furthermore, it could negate all other initiatives taken by RPS to integrate technology in the class-room as required by the "No Child Left Behind" Act.

***What does this mean?***

Although it was not possible for the City Auditors to identify the areas of improvement for better utilization of resources on technology, there certainly is a need for improvement in RPS' management of amounts spent on technology. In addition, if the Director of Technology could not retrieve and analyze details of technology spending it may not be possible for him to properly manage these resources.

## *What can be done?*

Based on audit research and interviews with the City's Director of Information Technology, it appears that improvement in technology at RPS cannot be accomplished in a short period of time. Adopting Best Practices of Henrico could be a goal; however, to achieve this goal without dramatically increasing spending, there needs to be a long-term, methodical process.

## *The First Step*

***Update the Available Hardware and Infrastructure***

***RPS needs a structured plan and recurring funding to keep hardware and infrastructure updated***

In order to update the existing computers, RPS must decide on a computer replacement cycle that assures replacements prior to the computers becoming outdated. It appears that a four year cycle is generally a popular target. Once the replacement cycle is determined, RPS must commit funding for the replacements. It appears that the most popular way of spreading replacement costs over the life of the computers is leasing them. As previously mentioned, the Henrico School Division leases computers, which accomplishes two goals:

- The replacement of computers is done in a timely manner which makes updated technology available to pupils
- The cost of the computer is spread over several years reducing annual budgetary appropriations.

Leasing would require RPS to commit funding for the lease payments over multiple years. This will prevent the deferral of computer replacements and assure appropriate resources are available in the classrooms.

RPS receives funding from the Department of Education's SOL Web-based Technology Initiative. The funds may be used to obtain and maintain infrastructure, software applications, and computers. However, due to the decline in computer purchases over the past several years, it appears as though RPS has opted not to allocate a significant portion of the funds to computers.

### *Recommendations:*

17. ***Lease computers rather than purchasing them in order to smooth budget spikes, facilitate standardized personal computers, and provide an effective disposal strategy for used machines.***
18. ***Consider negotiating inclusion of technical support including replacement parts, loaner programs, and expected service levels when entering into leasing agreement.***

### *Infrastructure Update*

Currently, the network fits RPS' needs and provides an industry cost-efficient solution. However, as schools move toward a more technology-based curriculum that may require transfer of enhanced graphic and streaming video files, the performance of the network could be hindered due to the increased flow of traffic on the network. RPS has a network application to manage the bandwidth (amount of data that can be carried from one point to another in a given time) that ensure critical applications, such as SOL testing, have priority. Based on the information received during this audit, it is questionable whether the current bandwidth will be adequate for future demands. Inadequate infrastructure will have to be upgraded to assure adequate services to RPS staff and students. RPS recognizes the need to improve the network

### *The current bandwidth management may not be adequate for the future demand*

***RPS may have to depend upon the City to obtain additional funding for infrastructure upgrades***

infrastructure and is taking advantage of the Universal Service Fund, commonly known as "E-Rate," which provides reimbursements for telecommunications, Internet access, internal connections, and basic maintenance of internal connections. However, there are restrictions on the products and services that are eligible for reimbursement. Currently, RPS has not begun planning for upgrades to its network due to uncertainty about additional funding to cover the costs, except those amounts approved by E-rate.

The City of Richmond has various facilities throughout the city. The City's Department of Information Technology (DIT) is responsible for installing, upgrading, and maintaining infrastructure connecting to these facilities, which are in close vicinity to school facilities. To upgrade the infrastructure of the RPS facilities, the School Division will incur significant costs. However, if the City were to perform this task, it would cost them marginal additional costs over the costs spent to upgrade their infrastructure. This is because they have to upgrade only infrastructure extending from existing City's facilities to the RPS facilities. This means that delegating maintenance of infrastructure to DIT is likely to generate savings and assure consistency in infrastructure assets throughout the City. Overall, the City's funding for upgrading and maintenance of combined infrastructure may be reduced. As already mentioned, RPS could not provide detailed information their on spending on technology, which prevented the City Auditor's Office from evaluating the existing costs and quantifying future cost savings.

### *Recommendations:*

***19. Delegate RPS' infrastructure maintenance and upgrade to the City's Department of Technology (DIT) by entering into a service level agreement with the City.***

***20. Ensure that the service level agreement includes an ongoing evaluation to meet changing education needs and relevant funding for future upgrades.***

***21. Eliminate amounts currently spent on infrastructure maintenance and upgrades by RPS.***

## *Other Technology Issues*

Currently, RPS spends approximately $485,186 annually for telephone service. There is opportunity for RPS' to upgrade its conventional telephone system to a more cost efficient and advanced technological solution called Voice over Internet Protocol (VoIP). The technology allows voice communication to be transmitted over the Internet. The service is offered by the local cable companies as well as telephone companies. Based on pricing offered to the City of Richmond by Verizon, RPS could receive a significant saving of $453,386 a year if it upgraded its telephone system to the VoIP. Such efforts would be an efficient management solution. There are costs associated with purchasing new hardware such as a new telephone device. Subsequently, with the annual cost savings for the service RPS would quickly recover its cost.

***Implementation of new telephone technology may result in savings of $450,000 annually***

### *Recommendation:*

***22. Require RPS to join efforts with the City of Richmond to contract for Voice over Internet Protocol telephone service.***

### *Compliance with State Mandate*

DOE dictates that there should be an Instructional Technology Resource Teacher for every 1,000 students. In September 2006, RPS hired 20 Instructional Technology Resource Teachers responsible for training and assisting in the integration of technology in the classroom. They are given copies of teachers' lesson plans and objectives to identify technology hardware and software applications that can be used to effectively teach students. RPS has obtained numerous hardware and software applications to be used in teaching. Currently, RPS has 20 Instructional Technology Resource Teachers that is 1 teacher for every 1,245 students. Therefore, the division needs to hire five additional Technology Resource Teachers to meet the State guidelines. The additional positions will cost about $336,088 annually.

### *Additional Instructional Technology Resource Teachers are needed to meet SOQ guidelines*

### *Recommendation:*

***23. Hire additional Instructional Technology Resource Teachers to comply with the Virginia Department of Education's Standards of Quality.***

### *Help Desk Staffing*

Another issue to be addressed is the fact that RPS has only 15 technicians that are responsible for repairing the machines and maintaining software in the schools. The Department of

Education's Standards of Quality dictates that school districts should have one technician for every 1,000 students. Currently, RPS has a ratio of 1 for every 1,660 students.

It appears that to achieve DOE standards RPS will have to hire 10 additional technicians that may cost approximately $572,658. However, based on audit research, there appears to be another solution to simplify technical support and avoid additional commitment of resources.

***Using new hardware configuration may prevent the need for additional support staff***

To reduce the number of additional technical support staff, RPS should consider Thin Client technologies. With Thin Client technology the user will need a monitor, keyboard, and mouse, but not a computer processor unit. The processors would be located in a centralized location at City Hall and reduced to blades, which allow effective and efficient management. By having a centralized location of processors, there would be better management of assets due to readily identifiable devices, reduced labor costs related to centralized point of installing applications, repairing devices and increased space in the classrooms and labs. Furthermore, if a user suffers hardware failure, there would be a reduced wait time for repairs because the administrator can quickly switch the user to a spare blade. That alone would reduce the number of technicians needed to support the users.

***Recommendation (RPS should implement either of the two options below):***

***24. At a minimum, RPS needs to comply with the Department of Education's requirement, which means 10 additional technical support staff needs to be hired.***

***or***

***25. Implement thin client technology in the classroom to better serve teacher and student users while reducing administrative costs.***

***User Training/New Systems***

***RPS staff knowledge of the automated systems implemented throughout RPS is questionable.***

City Auditors found that owners of systems were not using automated systems as management tools, but instead they serve as data storage facilities. Owners of the systems are not knowledgeable of the functionality of systems or able to generate meaningful reports that can be used for decision making and performance measuring. Several times throughout the audit City Auditors requested information that could not be generated due to lack of knowledge.

If data in the system is not or cannot be extracted easily and in a timely manner, then it is serving no value to RPS. Without

appropriate information RPS management may not have the ability to make meaningful and appropriate decisions about the school operations. During the audit, various departments were unable to provide City Auditors the type of report they should routinely request in order to better manage their operations. Occasionally, the departments appeared to rely heavily on the Department of Information Technology or its vendors to generate reports.

No new system should be purchased and implemented without the approval of Department of Information Technology. Furthermore, staff should be assigned to the various departments to oversee all automated projects. The staff should play a role in helping departments determine their needs and assist in the procurement and the implementation of the system to ensure functionality of the system is understood and proper training of the user groups is carried out.

## *Recommendations:*

***26. RPS' Department of Information Technology should assist in the planning and implementation of all new systems.***

***27. Provide adequate training to staff enabling them to effectively utilize the procured computer system for operational and management purposes.***

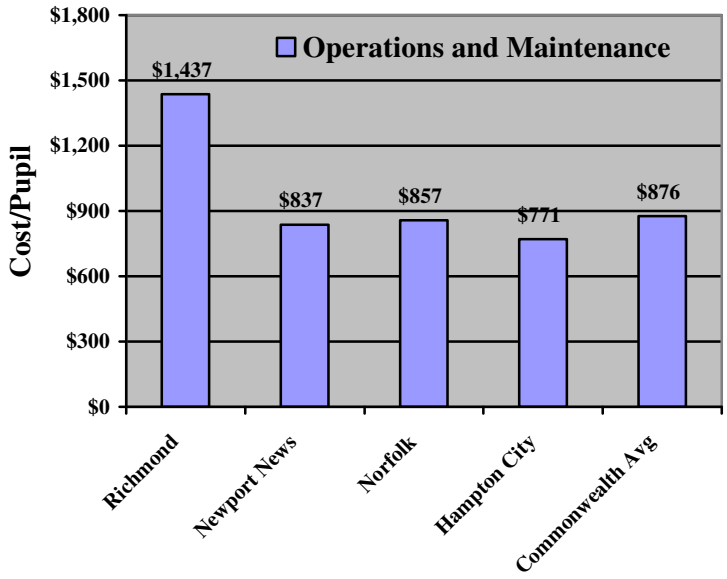
# *Operations and Maintenance*

## *Background*

"Operations and maintenance" includes several activities for keeping the facilities open, comfortable, and safe for use. It also includes activities such as electrical, structural, and mechanical maintenance, and the activities of maintaining safety in buildings, on the grounds and in the vicinity of schools.

The following graph sets forth RPS' expenditures on a per pupil basis for FY2005 compared to its peer group for the category of Operations and Maintenance:

***RPS spends 75% more on operations and maintenance compared to the Commonwealth average***



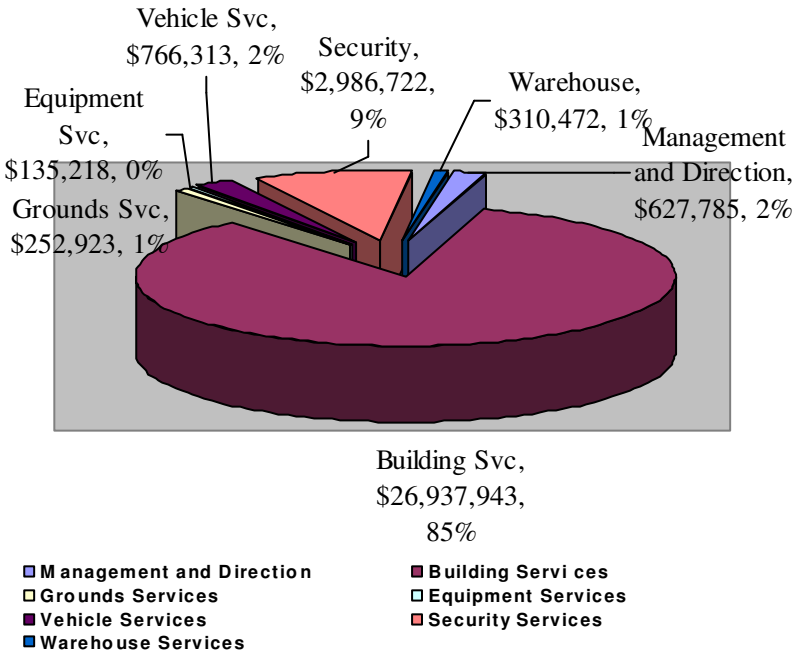

***Source: DOE***

The peer group figures in the above graph are consistent with the Commonwealth average. The reasons for incurring 75% more than the average peer group spending ($821/pupil) may be any

combination of the following:

- Some of the above spending may have been influenced by RPS' older facilities. Currently, it is not known if the older facilities are costing more to maintain because RPS was unable to retrieve all costs incurred to maintain each facility.
- RPS has a higher number of facilities, which increases overall operations and maintenance costs.
- Inefficiencies in RPS operations

As the following chart shows, during FY2005 the division incurred the largest operations and maintenance expenditures in the category of building and security services:




***Source: General Fund Operating Budget-Detail by State Function Code; Adopted Budget document for FY2006-2007***

## *Building Services*

The major areas are analyzed as follows:

- Facilities Maintenance
- Energy Management
- Custodial Services

## *Facilities Maintenance*

The Facilities Maintenance unit is separated into electrical, structural and mechanical maintenance groups. The following is a discussion of several issues identified in this function:

***There is a significant backlog of needed maintenance***

Like many governmental entities during the period of budget constraints, the most convenient expenditure to cut from the budget proposal is maintenance expenditures. Typically, the impact of such budget cuts is realized not long after it is deferred. RPS is not an exception. The annual infrastructure/asset maintenance, major repairs and maintenance are deferred until assets are no longer functioning properly and require additional resources. Recently, the School Board approved the FY2008 capital budget of approximately $144 million, including approximately $38 million for maintenance, which is evidence of this occurrence since the RPS funding for the Capital Improvement Program prior to the City of the Future plan was generally limited to a range of $2 million to $7 million since 2003-2004.

According to the Director of the Operations and Maintenance Unit, and the Supervisor of Facilities Maintenance (Mechanical),

***Lack of preventive maintenance and deferred maintenance may have adversely impacted overall condition of RPS properties***

RPS does not have a formal preventive maintenance program. The Director indicated that RPS had discontinued a formal program to minimize wear and tear and maximize efficiency about 10 years ago. Even though RPS generates a capital improvement plan for larger projects, RPS staff tends to operate day-to-day on a reactive basis. In this situation, the overall condition of the buildings may be impacted adversely. Additionally, older buildings often require different types of maintenance than newer facilities.

The APPA/Association of Higher Education describes maintenance activities as follows:

- Preventive maintenance includes activities performed on a scheduled basis annually or more frequently in order to control more significant and expensive maintenance efforts. *(Timely and most prudent)*
- Corrective maintenance consists of activities scheduled in advance and initiated by the maintenance crews without the need for a customer request. Major capital maintenance would not be included in this category. *(Delayed and more expensive than preventive maintenance)*
- Reactive maintenance is activity that ranges from a minor problem with equipment to unplanned repairs from customer requests. It is a known fact that timely and adequate preventive maintenance greatly reduces the need for reactive maintenance. *(Late and more expensive than corrective maintenance)*

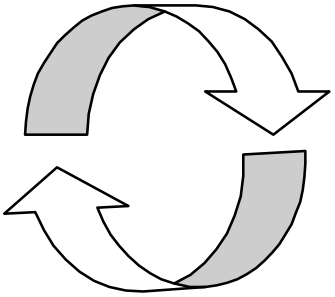
- Emergency maintenance is an activity that requires immediate attention due to interruptions or safety concerns. *(Significantly late and very expensive)*
- Non-maintenance is a lack of effort to maintain a facility and sometimes can be scheduled and planned, accordingly. *(Imprudent and most expensive as this may require replacement of the asset sooner than its normal life-cycle)*

Organizations use a combination of preventive through emergency maintenance as their assets get older. However, proper planning and management of resources can be efficiently used through mostly preventive and some corrective maintenance. Rarely, an organization should engage in emergency maintenance activity. However, it appears that absence of a preventive maintenance program requires RPS to perform other types of maintenance activities or in some cases no maintenance, which is an expensive method of providing services at the detriment to already old assets. This is indicative of the large amount of maintenance backlog at RPS.

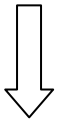
***Deferral or lack of repairs and maintenance could lead to early replacement of an asset***

The graphic below shows the impact of deferred maintenance and replacements:

**Deferred Maintenance and Replacement**



**Additional Repairs and Maintenance**



**Inefficiencies and Additional Spending**

Due to lack of relevant information, it was not possible to quantify the amount of additional repairs and maintenance from deferred maintenance and replacements. However, this is one of the factors that lead to overspending on operations and maintenance and cause RPS to exceed RPS' peer group spending by 75%. It appears that proper management and planning could optimize these costs, generating substantial savings.

### *Recommendations:*

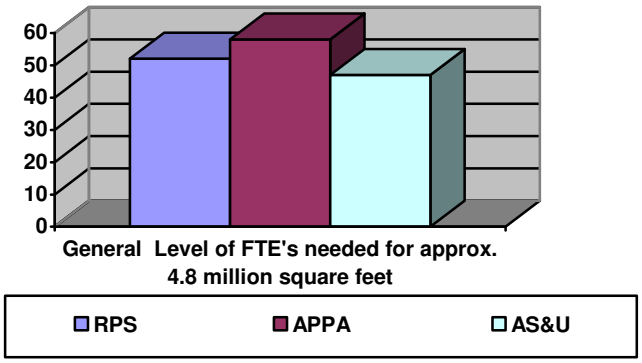
***28. Require RPS administration to adopt a formal preventive maintenance and replacement program based on systematic short and long range planning.***

***29. Justify costs in order to obtain needed budget appropriations.***

## *Staffing*

City Auditors reviewed staffing for this unit to ascertain whether the levels of staffing were adequate for the related square footage of RPS' facilities. Using staffing allocation formulas for *many different trades* (such as plumbers, carpenters, etc.) combined together as one unit is often difficult to perform and measure across the different levels of expectations.

There are two widely used guidelines (published by APPA and American School and University) to determine staffing for public educational facilities maintenance. City Auditors used these guidelines to compare RPS staffing as follows:




Based on the above information, it appears that RPS staffing for this function is in line with the published guidelines. However, this observation is not conclusive as further comparative analysis

***Conclusions about adequacy of staffing cannot be made due to the lack of appropriate information***

of types of services provided must be completed.

Currently, RPS is not able to evaluate the need for staff to effectively perform programmed cyclical operations and reduce emergency repairs. Additionally, due to lack of proper records there is no way to measure the level of service the Facility Maintenance unit provides and the level of customer (school principals, etc.) satisfaction related to the overall maintenance activity.

### *Recommendation:*

***30. Upon establishment of a proper preventive maintenance program re-evaluate and justify Facilities Maintenance staffing.***

***Other Issues***

The key to the unit's success requires the understanding of management expectations, establishing a method to evaluate performance, and a continued measurement process. The following opportunities for improvement were observed in RPS' operating procedures:

***There are additional opportunities for improving consistency and measuring performance***

- Although, the unit has a written mission statement with objectives in place, all the members of the staff are not provided with procedure manuals for day-to-day operations. Without such resources, work can be performed inconsistently and proper prudent practices may not be followed. As a result, the unit's mission and objectives may not be achieved.
- RPS does not utilize any customer feedback procedure for

their service request activity.

- RPS has not established and implemented accountability mechanisms to ensure the performance and efficiency of the unit. Currently, only generalized performance evaluations are used for staff. Supervisors cannot measure staff in terms of productivity because there are no standards established.
- RPS does not track work order response times for evaluation of each functional unit's performance. The system reports indicated many work orders had inconsistent completion and cost data. In this situation, it may be difficult for management to determine how much work is or is not being accomplished and the unit cost of work performed.

City Auditors found the following Best Practices in place:

***RPS uses some of the Best Practices in its maintenance operations***

- Training support is generally available for staff.
- Job descriptions are available to staff to ensure responsibilities are communicated properly.
- Daily work tickets are utilized, showing total time and time spent on each work request; daily work tickets are approved by supervisors.

## *Recommendations:*

***31. Establish detailed procedure manuals for maintenance staff.***

***32. Establish a customer satisfaction survey process with follow-up procedures.***

33. ***Add performance measurement standards for functional units and job classes to help analyze the service efficiency and effectiveness, and analyze this information for employee performance evaluations.***
34. ***Establish a process to track and evaluate service response times.***
35. ***Periodically review the Facilities Maintenance Unit to determine effectiveness and efficiency in terms of product output, unit cost or productivity and service quality.***

## *FAMIS System*

### *There was a lack of planning prior to system implementation*

In 2003 RPS procured services from Facilities Administration Maintenance Information System (FAMIS) web-based application called "On Demand." RPS obtained the system without appropriate planning for a facilities management system. The system was purchased without involving the end users. RPS entered into the contract for $24,656, which covered the total cost of implementation; however, the actual cost was $49,012 or almost double the original contract price. In addition to the implementation cost, RPS pays an annual subscription fee of $41,400. FAMIS owns the software and the hardware to support the system. However, according to the contract, RPS owns the data maintained on FAMIS servers.

### *System Functionality*

FAMIS appears to be a robust software that has various modules. If properly implemented, it allows continuous monitoring and proactive management of:

- Personnel costs
- Productivity
- Material costs
- Inventory levels

- Preventive maintenance
- Corrective maintenance
- Capital projects

***FAMIS is a robust management tool***

Typically, an organization can utilize this type of software to manage its operations effectively. However, RPS is using only a fraction of the capabilities this software offers. It appears that this software is mostly being used to track work orders. The information in the system database is either incomplete or RPS personnel are not able to retrieve the available information. In either case, RPS staff is unable to use the information for properly managing the function effectively. In addition, incidences of inadequate productivity and inefficiencies may not be identified, which could result in wasted public resources.

***Inadequate use of the FAMIS system by RPS***

The following audit observations indicate the inadequate of the use of the FAMIS system for managing operations:

- System reports showed numerous work orders in an incomplete status. Additionally, "estimated hours" data fields were not utilized properly. Incomplete information in the system may not allow the managers to determine the amount of work accomplished by the unit employees and the amount of work left to be done. Without this information, it is not possible to manage or plan their work effectively.
- The FAMIS system is not interfaced with RPS' accounts payable or payroll modules of the financial system. As a result, the procurement of parts is not properly updated in

***Not fully using a computer system for management and operational purposes represents wasted resources***

FAMIS.

- City Auditors noticed that purchases of the items not regularly stocked in the parts room were not always recorded in FAMIS. Incomplete information related to the parts and material costs will prevent identifying the true cost of providing a service and will not allow management to make meaningful operational decisions. In addition, labor costs are recorded at an average labor rate. A system interface will allow updating FAMIS with accurate labor costs to assure complete and usable information to determine the cost of delivering services.
- RPS does not have the training to generate reports using Discover, a reporting module that is a part of FAMIS. Without the use of reports, the data in the system is meaningless and use of FAMIS is ineffective as a management tool.
- The system is capable of maintaining a preventive maintenance schedule. However, due to the lack of preventive maintenance practices, this feature is not being used.
- RPS had assigned overseeing the implementation of FAMIS to one employee in order to administer, maintain and operate the system. RPS' reliance on this employee without any contingency plan or back up system for administration capabilities resulted in significantly diminished use of the system upon departure of the employee. Currently, the system is supported and maintained part time by a radio dispatch employee, who along with the remaining staff at

Plant Operations, does not have the appropriate understanding and training on FAMIS' functionality. This employee does not have the time or the expertise to perform these duties in addition to his regularly scheduled duties.

In conclusion, it appears that RPS has not used the FAMIS system to its fullest potential and missed significant opportunities to adequately manage a large portion of the operations and maintenance budget. Under this situation, inefficiencies will not be detected and corrected in a timely manner.

## *Recommendations:*

***36. Establish a policy that requires a representative from user groups be involved in the selection and implementation of the software applications.***

***37. Contact FAMIS to negotiate training pricing for all modules available through On-Demand.***

***38. Take advantage of the Web-X Training Session offered by FAMIS and become a member of ListServ to assist in staff training.***

***39. Obtain additional training from FAMIS, if needed, to gain a full understanding of the features and capabilities.***

***40. Contact FAMIS to explore the possibilities of interfacing the application with CIMS.*** *(By interfacing the systems, the need for double keying and recordkeeping would be eliminated. The systems should be able to share data such as chart of accounts, employee profiles, vendor profiles, fixed assets and accounts payable data.)*

***41. Assign a qualified individual that can devote sufficient time to administer the FAMIS system. Ensure that this individual has adequate training and expertise for the function.***

## *Energy Management*

Energy costs represent a significant cost to RPS and are a component of per pupil costs. The following table includes information relative to RPS' overall utility, including gas, water and electric costs:

| Year | Cost | Basis |
|---|---|---|
| FY 2005 | $6,167,820 | Actual |
| FY 2006 | $5,986,000 | Budget |
| FY 2007 | $6,686,000 | Budget |

### *RPS has not addressed energy management issues identified in the previous state review*

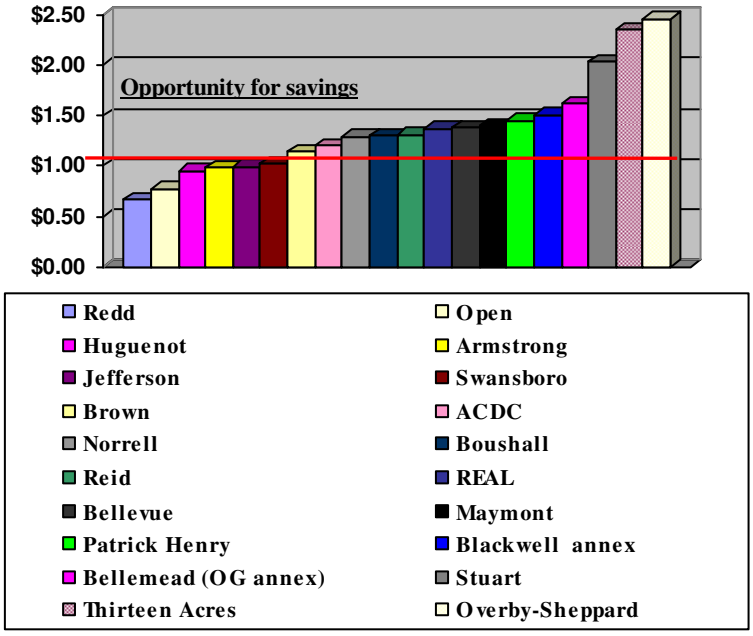
The City Auditors evaluated whether RPS practices resulted in optimal energy costs. It is reasonable to suggest that proper monitoring, tracking and analysis is necessary for understanding the requirements in order to conserve energy. RPS has not made significant progress to address issues associated with energy management identified in the previous state review. The following chart shows RPS' utility cost per square foot based upon unaudited data provided by RPS Finance staff:

| Utility costs/Sq. Ft. (all utilities) | |
|---|---|
| Average | $1.18 |
| Range | $.58 - $2.46 |

***The 12-month period was provided by RPS staff which ended February 2006; square footage was estimated at 4,714,062***

The broad range above suggests a need for investigating opportunities to reduce utility costs. Benchmarking utility costs per square foot is difficult due to the different utility rates and related heating/cooling degree days in the different regions and related usage and KW-hours. In addition, a building's cost per square foot may not be representative of its adequacy from an energy management standpoint due to many different factors, such as building occupancy. According to Energy Efficient Solutions, a non-profit agency based out of Virginia specializing in electric utility conservation, generally, a target of $1.00 per square foot is reasonable for the Mid-Atlantic Region.

The following graph shows the utility cost per square foot for selected school facilities, throughout the range mentioned above using the RPS data (this is not an all inclusive listing of all school facilities):



JLARC has identified several different school divisions across Virginia that have had success in keeping utility costs manageable. In 2004, JLARC reported that several school divisions across Virginia were successful in conserving energy by making appropriate investments. The following are some of the examples from the JLARC report:

- Prince William County had an energy management system that included incentives to the individual schools by letting them retain half of any annual savings they achieve for their activities. Further, the report discussed an on-going conversion to T-8 fluorescent lamps and electronic ballasts. The report indicated that the division estimated that due to energy management efforts, it had achieved over $3 million in savings to date, with $1.5 million being paid directly to the individual schools.
- Loudoun County school division had a contract with a private energy education company that guaranteed savings of 15 to 18 percent on its energy costs if students and staff followed certain energy-related rules. The division stated that their cost per square foot for energy was $1.10 per square foot in the 1990's and went down to $.97 at the time of the JLARC review. Further, Loudoun is also part of a consortium of schools to negotiate energy prices.

Several Virginia localities had joined the Rebuild America Program, a federally funded program and obtained substantial energy savings. Unfortunately, soon after RPS joined this

program, the program's funding was discontinued.

***An industry expert identified the inefficient use of energy at RPS***

According to staff, RPS does not have any formal strategy to manage energy costs. Without a formal strategy to improve energy consumption, RPS may not succeed in communicating the importance of energy conservation throughout the organization.

The City Auditor's Office researched this issue and approached Energy Efficient Solutions, an industry expert that has ties to the former Rebuild America Program. Energy Efficient Solutions agreed to perform a limited energy audit on several RPS facilities. Several school facilities were selected for a walk-through to analyze the buildings during operations and determine if RPS was using electric energy efficiently. The consultant provided the results in a report (See Exhibits "A" and "B"), which outlined several weaknesses and recommended changes in the overall energy policies and strategies. For the most part, the consultant found that in many instances RPS was still using inefficient and outdated technology, such as T-12 bulbs, incandescent lights and Metal Halide lighting as opposed to more energy efficient lighting sources, such as fluorescent fixtures and T-8 bulbs with electronic ballasts. This provides many opportunities for saving energy costs. Many areas within the school facilities were observed to be over-lit, creating glare throughout the classrooms.

Energy Efficient Solutions is of the opinion that if RPS followed the recommendations and implemented the strategies outlined in the report, RPS could expect to save 10% to 15% of its total

energy costs. According to RPS staff, FY2007 energy costs (excluding water, sewage and refuse disposal) are budgeted for $5,971,000. **This means that RPS has an opportunity to save energy costs ranging approximately $597,000 to $896,000 upon implementation of the consultant's recommendations.** In addition, more savings could be identified if all RPS facilities were audited by a firm specializing in energy audits.

In addition to the above savings, the City Auditors identified potential contract changes with Dominion Virginia Power that could generate savings of approximately $11,000 a year by simply asking the power company to apply appropriate rates for certain school facilities. RPS staff had this information since December 2005, but an action to generate savings was not authorized by RPS management.

RPS has established an energy program and has assigned one employee to monitor monthly usage and maintain the energy information system. However, in order for this program to be successful, RPS needs to make certain improvements as recommended in this section.

### *Recommendations:*

42. ***Implement all the recommendations made by Energy Efficient Solutions. (Exhibit A )***
43. ***Conduct a full energy audit of all RPS facilities to identify further savings.***
44. ***Develop detailed written policies and procedures related to energy use and conservation measures.***
45. ***Analyze energy usage and costs periodically.***
46. ***Consistently educate RPS staff about energy conservation methods and the importance of conserving energy.***
47. ***Require RPS management to authorize facilities maintenance staff to revise the Dominion contract for changes in rates that are more in line with the energy activities.***

## *Custodial Services*

Based on information provided by RPS, the estimated costs (personnel costs and janitorial supplies) of the custodial unit during FY2005 were approximately $8.9 million or 25% of the total operations and maintenance unit disbursements.

## *Appropriateness of Staffing*

At the time of the audit, there were approximately 243 custodians employed with RPS in the day-shift operations[2]. These custodial workers maintain 61 facilities, totaling approximately 4,714,062 square feet, as estimated by RPS staff, including two facilities that had recently closed. During the current school year, one of the schools reopened to accommodate students from another facility affected by storm water damage.

[2] RPS employs approximately 8 other maintenance workers for night-shift activities which include carpet cleaning, waxing, changing filters and maintaining several smaller offices. For the purposes of the audit evaluation, these positions and the additional square feet maintained were not included.

The APPA's *Custodial Staffing Guidelines for Educational Facilities* offers guidance for measuring productivity of custodians by establishing square foot measures per each custodian based upon the desired level of cleanliness, which helps to determine staffing requirements. The difference between Levels (One through Three) and relevant productivity measures are explained as follows:

| Level 1 – Orderly Spotlessness | Level 2– Orderly Tidiness | Level 3-Casual Inattention |
|---|---|---|
| ***Floors and base moldings shine, are clean and there is no buildup in corners or walls*** | ***Floors and base moldings shine, are clean and there is no buildup in corners or walls; there can be one or two days of dust, dirt or stains*** | ***Floors are swept, but upon close observation, there can be stains; a buildup of dirt and/or floor finish in corners and along walls can be seen*** |
| ***All vertical and horizontal services have a freshly cleaned or polished appearance; there is no accumulation of dirt, fingerprints, marks or scratches*** | ***All vertical and horizontal services have a freshly cleaned or polished appearance; upon close observation, there may be noticeable smudges, scratches or fingerprints*** | ***There are dull spots and matted carpet in walking lanes; there are streaks or splashes on base moldings; all vertical and horizontal surfaces have obvious dirt, dust, marks and fingerprints*** |
| ***Washroom fixtures and tiles gleam and are odor-free; supplies are adequate*** | ***Washroom fixtures and tiles gleam and are odor-free; supplies are adequate*** | ***N/A*** |
| ***Trash containers and pencil sharpeners hold only daily waste, are clean and odor-free*** | ***Trash containers and pencil sharpeners hold only daily waste, are clean and odor-free*** | ***Trash containers and pencil sharpeners hold only daily waste, are clean and odor-free*** |
| **Standard number of square feet maintained per Custodian** | | |
| ***Approx. 15,000*** | ***Approx. 20,000*** | ***Approx. 32,000*** |

Most educational organizations strive to meet Level Two requirements and this appears to be the industry standard for evaluating custodial staff productivity. The MGT of America, a national consulting firm, performed some of the efficiency reviews in Virginia and used Level Two (approximately 19,000-20,000 square feet per custodial employee) as a standard. City Auditors inspected four school facilities with assistance from the City's Facilities Operations Manager. According to his professional opinion, the cleanliness at various facilities varied from slightly better than Level Two to Level Three. Overall, he indicated that the cleanliness can be classified at Level Two.

Using the above observations and industry standards it appears that RPS has an adequate number of custodians as depicted in the following table:

| Gross Sq. Ft. | Total custodians | Sq. Ft./ custodian |
|---|---|---|
| 4,714,062 | 243 | 19,399 |

***Current custodial staffing is adequate. However, there is room for improvement in their productivity.***

Many other organizations have implemented new and improved cleaning techniques to improve productivity, such as Atlanta's team-cleaning techniques to allow it to reduce staff. In addition, automated equipment, such as all-surface cleaners, backpack vacuums and automatic floor scrubbers have sped up the cleaning process. RPS staff indicated that the schools generally do not employ most of these improved techniques. This may indicate that there is room for improvement in RPS' custodian productivity.

### *Cost per Square Foot*

Another way to evaluate custodian costs is to benchmark cost per square foot measurements, which can vary depending upon the circumstances and region. The following table shows the comparison of RPS custodial costs per square foot with those of the City of Richmond, Spotsylvania County and industry benchmarks.

***RPS has an opportunity to reduce its significantly high custodial costs per square foot***

| Source | Cost per square foot (payroll only) | Costs per square foot (including supplies) |
|---|---|---|
| RPS | $1.80 | $1.88 |
| American School and University's Cost Survey (median) April 2006 | $1.47 | N/A |
| Spotsylvania County* | $1.44 | $1.52 |
| City of Richmond – in-house staff ** | $1.05 | $1.38 |

****2005 Efficiency Review***
*****Audit Report #2005-14, issued July 2005***

Based on the above information it appears that RPS may have an opportunity to reduce custodial costs per square foot. To accomplish the reduction in costs RPS will have to perform a detailed analysis of its processes and consult other jurisdictions. Performing this type of analysis was beyond the scope of this review. However, there is another option. RPS can outsource this function. Audit research on this subject is discussed as follows:

Successful school reforms (e.g. Texas) identified that schools should put major facilities support services to the "yellow pages"

test to determine if it can outsource all or part of the function to reduce cost and improve services. The general assumption for this approach is that private businesses work efficiently without compromising quality to retain the customer and maximize profit.

***Local Examples***

***Outsourcing of custodial services is fairly common***

The Auditor's Office contacted the Stafford County, VA, Public School division, to determine the level of satisfaction with the outsourced vendor. The results indicated that this school division obtained higher levels of expertise, better quality of service, and higher satisfaction with the service.

Stafford County, VA outsources custodial operations at high schools for a total cost of $0.78 per square foot. Likewise, the City of Richmond's Department of Public Works outsources most of its janitorial services and received a rate of $0.96 per square foot. During the last few years, more middle and elementary schools have been added, with no significant problems noted.

***RPS can save up to about $4.3 million by outsourcing custodial services***

If RPS could outsource and obtain a rate of $0.96 per square foot (comparable to the rate obtained by the City), it could generate approximately **$4.3 million in yearly savings**. Additionally, if RPS considers inviting bids for these services jointly with the City, it is possible that an acceptable firm may offer rates better than $0.96 per square foot benefiting both RPS and the City.

### *Effects of Outsourcing*

If RPS is to obtain high quality service with cost-savings identified above, the Board would need to make a decision about structuring the vendor contract. If the contract includes a condition that the vendor use existing custodial staff, RPS' immediate cost savings may not be significant. With this option, cost-savings would take considerable time to transpire, since only RPS staff turnover would allow new contractor staff to be introduced. However, excluding this requirement from the contract would generate substantial savings (at least $4.3 million annually).

Additionally, RPS may choose to commence with the outsourcing with a phased approach, starting with high schools. As such, the savings will be limited to the extent of the outsourced activity.

***The amount of savings generated depends upon structuring of the vendor contract***

It should also be recognized that the transition from an in-house to an outsourced function could take some time. Therefore, RPS management must allow sufficient time to complete the transition as smoothly as possible prior to judging the success of outsourcing. The key to success in this area is to prepare a detailed contract outlining responsibilities of both parties and the division's expectations from the vendor. The contract must include appropriate performance measures and appropriate rewards or financial penalties depending upon actual performance compared to measures.

***If RPS can provide this service more economically, they will be able to make an investment in areas where improvements are needed such as class room technology improvements, capital maintenance and replacements, etc.***

## *Recommendation:*

***48. Evaluate the possibilities of outsourcing the custodial function including combining efforts with the City to obtain increased benefits.***

### *Security Services Background*

The Code of Virginia requires school divisions statewide to submit data annually to the Virginia Department of Education (DOE) on incidents of discipline, crime and violence. Additionally, DOE and the Commonwealth of Virginia collaborated to establish a School Safety Audit Protocol for the localities to use as guidance in the school safety audit progress. Each state receiving funds under the No Child Left Behind Act, has a policy allowing a student attending a public school categorized as "persistently dangerous" to attend a safe school within the local educational agency.

According to data received from DOE, RPS' Woodville Elementary School[3], Martin Luther King Jr, Middle School and Elkhardt Middle School of RPS were identified in November 2005 as exceeding the threshold criteria for "cautioned" schools for that school year. There is a consecutive three-year reporting requirement to reach the designation of a "persistently dangerous"

[3] RPS staff subsequently indicated that there was a data recording error relative to Woodville Elementary School.

school. At the time of this audit, DOE had not issued information relative to which schools were still on the list and would be classified as "on probation." As such, it is not known at this time whether any RPS schools will ultimately reach the designation of "persistently dangerous."

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The following chart shows a historical trend of RPS' reportable incidents:

| Description | FY2001-2002 | FY2002-2003 | FY2003-2004 | FY2004-2005 |
|---|---|---|---|---|
| Alcohol | 16 | 9 | 24 | 17 |
| Arson | 15 | 17 | 8 | 17 |
| Battery w/staff * | 56 | 0 | 196 | 241 |
| Battery w/student* | 2 | 50 | 945 | 1,045 |
| Malicious wounding* | N/A | N/A | 5 | 8 |
| School Threats | 22 | 0 | 14 | 12 |
| Burglary | 166 | 187 | 12 | 4 |
| Bullying | 417 | 234 | 244 | 444 |
| Disorderly conduct | 21,057 | 14,346 | 9,442 | 7,798 |
| Drugs | 59 | 48 | 102 | 105 |
| Fighting w/injuries | 31 | 95 | 186 | 29 |
| Fighting w/o injuries | 2,944 | 3,088 | 2,771 | 574 |
| Gangs | 0 | 0 | 10 | 17 |
| Homicides* | N/A | N/A | 0 | 0 |
| Kidnapping | N/A | N/A | 0 | 0 |
| Other Offenses | N/A | N/A | 12,820 | 10,864 |
| Robbery | 0 | 0 | 3 | 4 |
| Sexual Offenses | 160 | 173 | 145 | 105 |
| Rape/attempted rape* | 0 | 0 | 0 | 0 |
| Sexual battery* | 0 | 0 | 0 | 0 |
| Tobacco | 124 | 129 | 185 | 149 |
| Theft | 0 | 0 | 167 | 173 |
| Threats/Intimidation | 1,203 | 589 | 662 | 555 |
| Trespassing | 99 | 117 | 107 | 54 |
| Vandalism | 199 | 204 | 259 | 187 |
| Other weapons* | 81 | 73 | 117 | 81 |
| Firearms/ rifles/other weapons* | 7 | 2 | 4 | 4 |
| Look alike weapons | 53 | 58 | N/A | N/A |
| Total | 26,711 | 19,419 | 28,428 | 22,487 |
| **Total serious and weapon incidents (items "*"above)** | **146** | **125** | **1,267** | **1,379** |

***Note: N/A's are categories not in use***

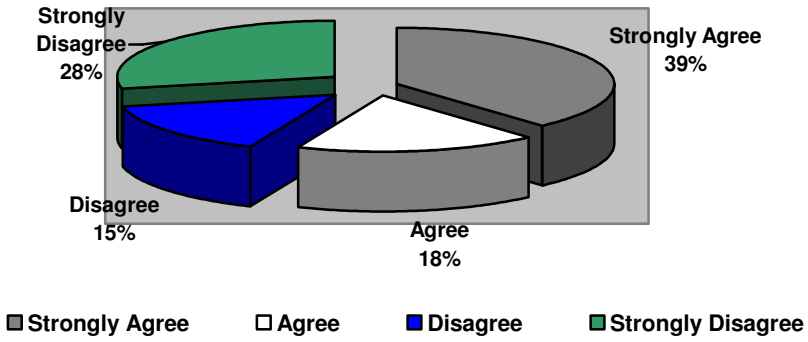
## *Environment*

According to the National Criminal Justice Reference Service, the characteristics of the population and community in which schools are located correlates to school disorder. This statement is applicable to RPS as demonstrated in the succeeding discussion.

## *A significant percentage of teachers are not comfortable with school security*

City Auditors surveyed teachers in order to ascertain whether teachers felt safe in their schools. Audit staff sent ninety-five surveys to teachers randomly selected from Richmond Public Schools. The thirty-nine responses to the surveys revealed that almost half of the teachers do not perceive the school security to provide a safe learning environment. These results are depicted in the following chart:

***"I believe there is adequate security in my school so that the learning environment feels safe."***




An unsafe environment could impact learning and student progress significantly. This issue has a direct impact on the School Division's core mission as well as the safety of the students. Therefore, this is a critical issue for RPS.

***Crime in the City***

A comparison between Richmond, its peer group, and the national average for crimes, murders and rapes per 100,000 people during calendar year 2004 shows crime in Richmond at the highest level.

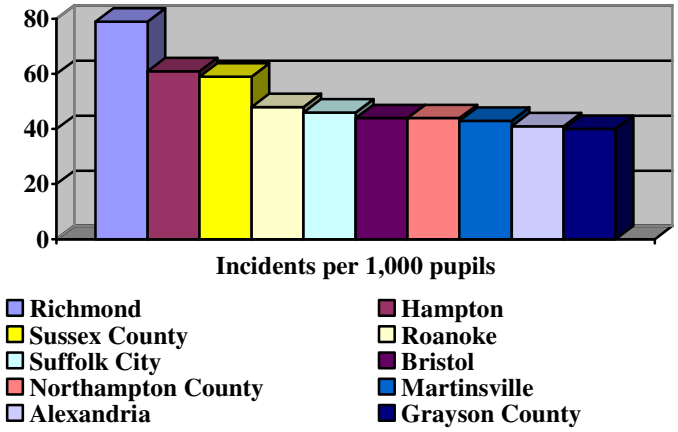
***Incidents in RPS***

The City Auditors focused on the incidents reported by DOE on individual school report cards, these incidents included:

- Assault and battery against staff or students
- Malicious wounding
- Homicide
- Attempted rape, rape and sexual battery against students
- Weapons and firearms
- Fighting with and without injury

City Auditors then computed these incidents on a per 1,000 pupil basis in order to evaluate the localities more closely. The following chart shows ten localities that reported the highest number of incidents per 1,000 pupils, included in their report cards:

## *Security Process*

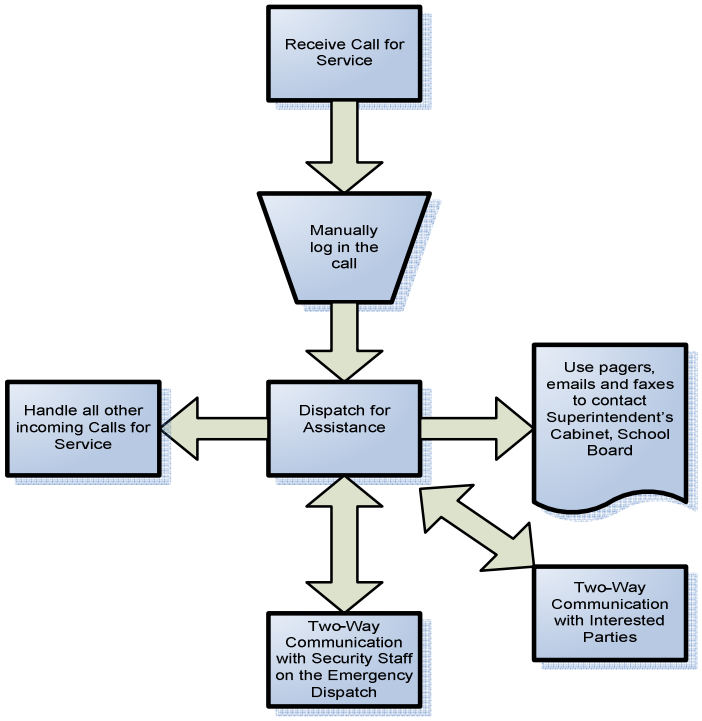



***Source: DOE's school report card data, which includes the categories of serious incidents and fighting***

The above chart reveals the analysis for both school divisions in urban and rural settings; RPS is still at the top of the list. It is important to note that each locality has flexibility in designing the student code of conduct guidelines and tolerance levels that were established by each school board.

### *RPS is not able to capture the nature of Calls for Service*

City Auditors met with RPS security staff to gain an understanding of their process to receive service calls and capture the data. RPS has one Communications Officer and one Security Specialist to handle the influx of telephone calls. However, RPS security management indicated that other staff members try to handle incoming phone calls as much as possible. The following flowchart represents the operation's call procedures:




The above diagram presents two weaknesses:

1. RPS is utilizing a manual system to record, accumulate and track service call data, which cannot be used for meaningful and timely reporting purposes without laborious manual summarizing. The RPS Security Services received over 2,800 calls for service last year. However, RPS could not provide summary data of the nature of the calls, other than to provide the types of calls they generally receive. Obviously, without proper analysis, developing an overall strategy to address the issue may not be possible.
2. It appears that the communication process needs improvement. The Communications Officer and Security Specialist are required to handle all of the emails, faxes and pages to the administration while manning the phones and staying in communication with the

security officers on the scene of the incident initially reported. A logical approach may be to use the RPS Public Information Office as a resource. The Public Information Office could perform the duties of sending the generic faxes, pages and emails relative to the particular incident in order to help streamline the process so that the security staff can focus on the issues at hand.

The audit research identified the following Best Practices:

In 2000, the General Assembly created the Virginia Center for School Safety (the Center) within the Department of Criminal Justice Services. The Center also collects, analyzes and disseminates various Virginia school safety data. The City City Auditors used data from the Center, along with suggestions from the National Crime Prevention Council; the National Center for Educational Statistics; and the National Institute of Justice to analyze the sufficiency of RPS' programs as follows:

| Best Practices | RPS Issues |
|---|---|
| **Access Control**<br>• Designated point of entry<br>• Monitoring of entries<br>• Visitor sign-in; ID badges<br>• Surveillance<br>• Screening of volunteers<br>• Classrooms locked during the day while empty<br>• Random locker searches<br>• CPTED (crime prevention through environmental design) | • As already noted, RPS may not have the most up-to-date technology.<br>• Not all volunteers receive background checks and fingerprinting. Staff could not quantify how many volunteers do receive this type of scrutiny. Staff estimated conservatively the cost of approximately $23 per volunteer for security screening. |
| | |
| **Planning**<br>• Written Crisis Management plan/emergency response<br>• Evacuation drills<br>• Written code of conduct<br>• Formalized threat assessment process<br>• Policies to address gangs, drug testing, dress code, weapons, bullying | • RPS has a written crisis management plan. However, RPS is currently updating the plan to be in compliance with post 9/11 requirements. |
| | |
| **Communications**<br>• Web-based notification system<br>• Staff surveys relative to safety concerns<br>• Partnership with local Police Department<br>• Two-way communication in classrooms | • RPS is in the process of establishing a notification system through grant funding activities.<br>• RPS does not currently perform safety surveys.<br>• Progress on completing a written Memorandum of Understanding with Richmond Police Department appears to have slowed to a halt. |

| Best Practice | RPS Issues |
|---|---|
| **Training-Prevention Programs**<br>• Security Officers receive DCJS training in subjects such as Defusing Problem Students; At-Risk Behaviors, Crisis Planning and Crisis Management<br>• Staff receive training on:<br>o Gang control<br>o Bullying<br>o Identifying behavior issues<br>o Conflict resolution; De-escalation<br>o Mentoring<br>o Peer mediation<br>o Violence prevention<br>• Prevention programs are in place for students covering a wide variety of topics. | • RPS' Security staff offers additional training upon request. Consequently, pro-active principals receive additional training for their staff; other schools may not receive any additional training. For instance, during the 2005-2006 school year, only 400 Pre K-5th graders received valuable training on School Bus Safety, performed by RPS Security Staff. |
| | |

## *Issues*

***Specific expertise for evaluating school security issues is needed to make rational decisions on several critical issues***

Analysis of available, limited data was not sufficient to determine the feasibility or appropriateness of implementation of the foregoing Best Practices. Also, due to lack of expertise, it was not possible for City Auditors to identify resolution of these issues. Audit research raised more questions as follows:

1. ***Does the School Division have an ideal staffing model?***

   Currently, the division has a limited staff of Richmond Police Officers. A total of nine sworn officers (School Resource Officers or SRO) are employed to provide services to all of the school facilities.

In addition, RPS employs 67 School Safety Officers (SSO), who are not sworn and have very limited authority. Many school divisions have this type of structure. However, considering the high number of major incidences at RPS it is questionable if this structure is effective.

2. ***Is the division measuring its security related workload appropriately? Does RPS have adequate staff to handle the workload?***

   Currently, RPS is not able to capture and analyze appropriate incident information to make this type of decision.

3. ***What role should the City Police Department play in school security?***

   According to the latest Safety and Security Minutes that were available to the public during the audit period (January 2006), progress on obtaining a written Memorandum of Understanding (MOU) from the Police Department appears to have slowed to a halt. An MOU is needed to ensure an understanding of the roles that the SRO's play on day-to-day security activities.

4. ***Is RPS using appropriate technology to provide security services effectively and efficiently?***

   There is a possibility for using a variety of appropriate security technology. For example, use of specific types of surveillance technology at each school may improve effectiveness of function. Another example of the use of technology is the use of metal detectors or metal detector wands by some schools. The Security

staff did not feel that all of RPS' surveillance technology was up-to-date. During the audit, RPS could not provide information on surveillance equipment at each school. They did not have information on the number, condition and adequacy of equipment installed.

5. ***What security training is adequate for administrative and instructional staff?***

   Best Practices indicate that proper training is necessary in order to prevent and deter crime. RPS does provide training in these areas. However, the main focus for teachers appears to be more instructional-based.

6. ***What security planning process does RPS need to follow to improve effectiveness of the program?***

   For FY2007, RPS hired 31 additional security staff. Usually, a hiring of this magnitude suggests that the resource shortage existed prior to existing school year. If security is a high priority, planning for adequate resources should be performed yearly and not based upon budgetary constraints.

7. ***What changes in the communication process are necessary to improve expediency of resolution and prevention of major incidents at RPS?***

   City Auditors had already observed weaknesses in the communication process through inquiries only. The communication and dispatch process should be streamlined in order to promote expediency.

It appears that an evaluation of RPS security procedures and resources needs to be done by a technical expert specializing in security area of public educational institutions. This may be an area where additional funding may be needed to assure the safety of pupils. With very high number of reportable incidents, RPS' current process does not appear to be effective in handling the security environment surrounding Richmond schools.

## *Recommendations:*

***49. Hire a consulting firm specializing in physical security of public educational institutions to review overall operations, staffing methodology, staffing adequacy and the use of Best Practices.***

***50. Adjust funding for the program to implement recommendations by the consultants.***

# *Transportation*

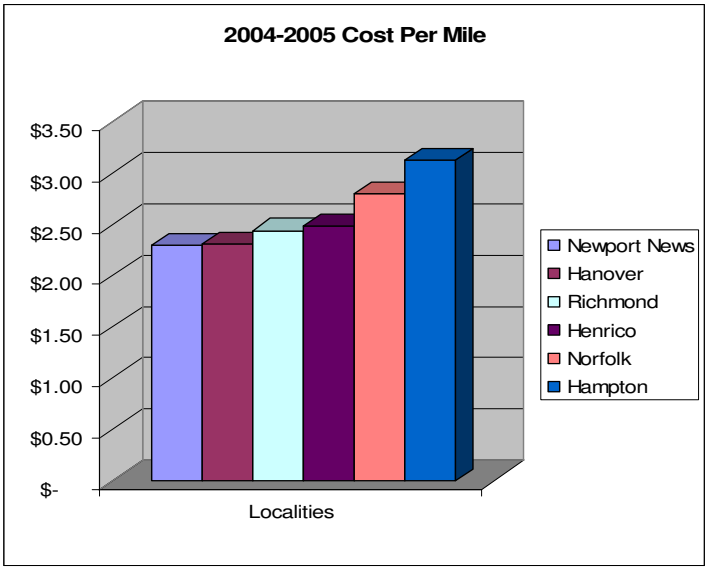
## *Background*

The Department of Transportation operates on the authority of federal and state laws, as well as by directives from the Virginia Board of Education and the Richmond School Board. The Department employs 25 administrative staff, 202 drivers, and 50 monitors. Its primary mission is to transport students to and from school. The Department also provides auxiliary transportation for students from school to various locations (i.e. vocational and exceptional education centers, sport activities and off-campus fieldtrips).

The Department is responsible for:

- Maintaining the bus fleet
- Hiring, training and managing bus operators and monitors
- Planning and updating bus routes
- Managing and operating the logistics infrastructure

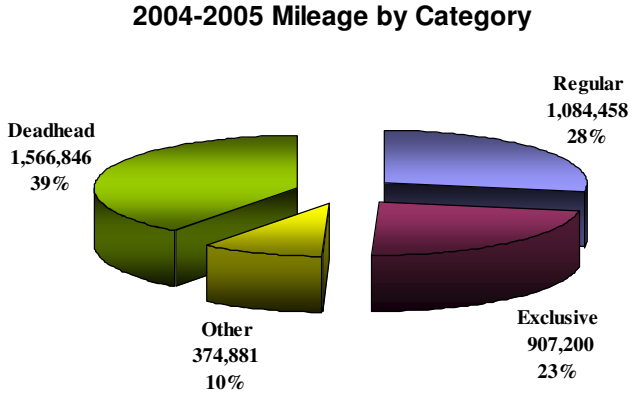
During 2004-2005, RPS transported approximately 17,000 students 3.9 million miles at a cost of $2.44 per mile. Compared to an analysis of five other localities, RPS' cost per mile was in the middle of the range during FY 2005.




## *Deadhead Miles*

Forty percent of RPS' miles were deadhead miles. Deadhead miles are incurred when students are not aboard the bus (i.e. from the garage to the first bus stop, in between routes and from the last bus stop to the garage). Below is a breakdown of mileage by category:

***RPS annually drives buses for 1.6 million miles without any pupils on board, known as "deadhead miles"***



Deadhead miles are an inherent part of the transportation function and cannot be prevented completely. However, this mileage results in wasted resources. With proper management, deadhead mileage can be controlled. Based on the available information, it was not clear what RPS had done to control this mileage. In comparison with other school divisions, RPS has incurred the highest percentage of deadhead miles as depicted in the following table:

***Deadhead miles are inherent to pupil transportation.***

***However, through proper management, RPS could reduce deadhead miles by 15%.***

| Locality | # of Deadhead Miles | Yearly Mileage | % of Total Miles |
|---|---|---|---|
| Hampton | 397,715 | 1,877,673 | 21% |
| Hanover | 772,612 | 2,632,344 | 29% |
| Norfolk | 1,040,778 | 3,466,568 | 30% |
| Newport News | 1,383,766 | 5,470,916 | 25% |
| Chesterfield | 1,560,730 | 7,903,479 | 20% |
| Henrico | 1,829,066 | 6,364,930 | 29% |
| **Average** | **1,164,111** | **4,619,318** | **25%** |
| **Richmond** | **1,566,846** | **3,933,385** | **40%** |

***Source: Virginia Department of Education 2004-2005 Transportation Report provided by Coordinator of Pupil Transportation***

The above table indicates that the average of deadhead miles incurred by other school divisions was approximately 25% of total miles. This means that RPS has an opportunity to improve management of deadhead mileage by 15% of its total mileage. Using the 2004-2005 cost per mile calculation of $2.44,

it could save approximately $1.4 million in transportation costs by controlling deadhead miles.

***RPS could save $1.4 million in costs by controlling deadhead miles***

**Causes for Deadhead Miles:**

Although, documentation was not provided to City Auditors, the Transportation Director attributes the deadhead miles to the following factors:

- In addition to providing transportation from home to school and vice versa, RPS also transport students to various programs and facilities throughout the day. RPS also provides out of zone transportation for non-special education students. However, all other school divisions are also providing some form of additional services to the students.
- The relocation of RPS' northbound compound resulted in additional mileage. Prior to the sale of the former northbound compound about two years ago, the compound was located on Overbrook Road (north side of the City). As a result of the relocation, the northbound buses are required to cross the river to reach their first bus stop. Thus, additional miles are incurred to service areas north of the James River.
- The Director indicated that operating on a four-bell schedule adds to deadhead mileage since these miles are incurred for each route. Thus, the more routes there are the more deadhead miles that are incurred.

**Additional Cause Identified by City Auditors**

- Some of the deadhead miles may be attributed to the fact that drivers are not required to return the buses back to the compound between the morning and afternoon runs. The drivers are allowed to take the buses home as long as they are maintained in a safe and secure location. In theory, this is a good practice if the drivers' homes are closer to their assigned afternoon routes because it would lead to fewer deadhead miles than would normally be incurred. However, the actual deadhead mileage incurred is unknown. The Transportation Director indicated that an analysis had not been conducted to identify the mileage associated with this policy. Also, documentation needed to quantify the applicable mileage could not be provided to City Auditors. In addition, this policy may compromise the safety of the buses if RPS has no control over where the buses are parked and if the buses are parked in easily accessible places subject to vandalism.

  In conclusion, the mileage associated with the above factors could not be quantified. Thus, it is unknown which deadhead miles were preventable and which miles were not. Although deadhead miles are an inherent part of the transportation function, proper management such as improving the efficiency of the routes through consolidation or elimination will help minimize deadhead miles.

### *Recommendation:*

***51. Analyze RPS' deadhead miles to determine necessary adjustments to minimize the miles.***

## *Out of Zone Transportation*

Pursuant to Section 6.05 of the School Board Bylaws and Policies, free transportation is provided to all elementary school students living more than one mile from a zone school or a school within megazone[4]. Free transportation is provided to middle and high school students who live more than 1.5 miles from a zone school. Middle and high school students are transported outside of their attendance zone for the following programs.

- Appomattox Regional Governor School for the Arts and Technology
- Richmond Community High School
- Open High School
- Maggie L Walker Governor's School for Government and International Studies
- Franklin Military School
- Binford Middle
- Any RPS school that operates an International Baccalaureate Program

[4] At the elementary level, the City is divided into three zones (I, II, and III). Within each zone there are designed schools to which students, living in that zone, can apply for enrollment. If accepted, transportation is provided.

Richmond Public Schools, unlike Hanover County and Chesterfield County Schools, provides out of zone transportation for non-special educational students.

Based upon RPS documentation, as of November 2006, out of zone transportation was provided to 5,792[5] students at a cost of approximately $3.4 million[6] annually. The annual total represents approximately 32% of the operational expenses for fiscal year 2006 (*latest available data*). RPS could achieve a substantial annual cost savings by eliminating out of zone transportation for regular education students[7]. The possibility for additional savings also exists through the potential elimination of drivers and buses.

Due to inadequate information provided by RPS, City Auditors could not thoroughly analyze and quantify the mileage and costs associated with providing out of zone transportation.

City Auditors noted that in the report issued by the Richmond Public Schools – City of Richmond Challenge Team dated May 7, 2002; RPS had previously considered eliminating out of zone

[5] Total consists of 4,683 special education students and 1,109 regular education students.

[6] Approximately $1 million of annual cost is recoverable through various programs such as No Child Left Behind and the Head Start Program.

[7] Pursuant to federal mandates, special education students are transported to any facility that has the programs that they need for an appropriate education. Thus, transportation would be for special education students was excluded.

transportation for high school students (except for Franklin Military, Richmond Community and the two Governor's Schools). Eliminating or reducing those services that are not mandated could result in substantial annual savings for the schools system.

### *Recommendation:*

***52. Reassess the policy for providing out of zone transportation.***

### *Fleet Capacity*

The Transportation Department should be commended for reducing the number of buses operating on daily routes from 227 in FY2006 to 180 in FY2007. However, ***buses are still operating at below capacity***. On average:

***Bus routes should be reviewed and updated periodically to account for a decrease in student demand***

- Regular education buses are operating at a 52% capacity level.
- Head Start buses are operating at a 19% capacity level.
- Special education buses are operating at an 18% capacity level.

RPS' Policy indicates that the targeted range for loading capacity is 69% to 86% (elementary schools have the higher capacity figures) and RPS generally strives for a 75% capacity level.

The Transportation Director for Hanover County indicated that in order to keep their transportation costs down their buses are operated at the maximum capacity. According to the Transportation Director for RPS, the main reason for buses operating at less than guideline capacities is that it would violate the maximum ride time if they were filled to capacity. However, Pursuant to Chapter II of the Transportation Manual, the established ride times may be exceeded in order to maximize routing efficiencies. In other cases, the assigned riders elect to get to school by some other means. The Director also indicated that recounts are conducted monthly and ridership fluctuates somewhat based on items such as time of year and weather conditions.

The routing plan is generally reviewed in response to complaints. However, the routing software is not being utilized to its fullest extent. Minimum analyses with the goal of reducing or eliminating unnecessary routes are conducted; only one analysis for FY 2006 could be provided to City Auditors.

Consolidation of inefficient routes should help improve the capacity at which the buses are operating and reduce transportation costs. Based upon FY 2006 data, RPS could achieve an estimated savings of approximately $28,000 for each consolidated and/or eliminated route. Pursuant to an analysis completed by the Transportation Department, RPS could achieve an estimated cost savings ranging from approximately $1.6 million to $2.5 million annually through route consolidation. The

City Auditor's Office has no information as to whether the RPS staff brought these savings opportunities to the School Board's attention.

In order to improve routing efficiency, the Transportation Director is in the process of obtaining strategic planning training and is currently recruiting a Strategic Planner to head up the their Planning Division.

### *Recommendations:*

***53. Require RPS Administration to take the necessary steps to improve operating capacity of its buses.***

***54. Review and update bus routes periodically to account for fluctuations in demands.***

***55. Use the routing software to its fullest extent.***

### *Fleet Size*

RPS has 250 buses on hand (238 yellow buses and 12 red/white activity buses). Of this total, 180 buses are operated daily to cover 518 school routes. The remaining buses serve as spares to cover downtime (i.e. maintenance, service, etc) for regular buses. Industry standards suggest 10%[8] spare buses should be needed to cover routes, however, RPS maintains 28% for spares.

### *RPS exceeds the industry's standard for spare buses Reducing the fleet size would lower costs*

As noted earlier, RPS operates on a four-bell schedule in which the school hours are staggered. This enables each bus to complete up to four routes. However, the majority of the buses

[8] Pursuant to Texas School Performance Review, dated May 2002, industry standard for spare vehicles was noted as 10%.

are currently operating on a three-route schedule[9]. Due to the limited activity that occurs during the fourth bell, it is more reasonable to anticipate more buses to be able to operate on a three-route schedule. Based upon the number of routes RPS operates and the potential for most buses to reasonably complete three routes each, there appears to be an opportunity for savings.

***Reduction in fleet size could produce significant savings***

By reducing its fleet size, Transportation could lower its operating costs by eliminating fuel, maintenance and insurance for applicable buses. RPS could also achieve savings in personnel costs by eliminating bus driver positions. Additionally, RPS can obtain savings from the sale of extra buses in its inventory. For instance, if all of the buses operated on a three-route schedule, the RPS would be able to reduce its fleet size by 40 buses and achieve one-time revenue of $50,880[10] from the sale of the buses. However, the real savings would most likely occur from reduced maintenance cost of having a smaller fleet.

## *Recommendation:*

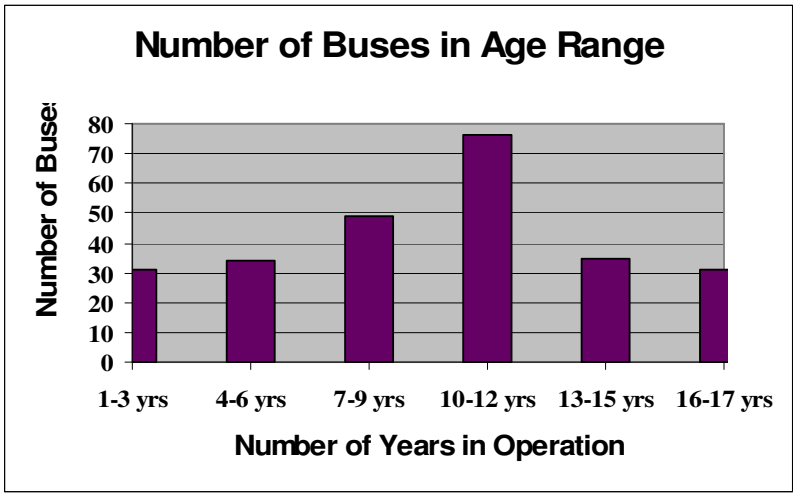
***56. Analyze the fleet size in order to reduce costs of maintaining spare buses.***

[9] The fourth bell was initially set up to accommodate the Alternative High/Middle School located at the Baker building which runs from 9:00 A.M. through 4:15 P.M. Also, transportation for the Preschool routes also provided during this bell.

[10] Average sales price was calculated from the Surplus Vehicle Information Report dated 10/31/06.

## *Age of Fleet*

One of the challenges the Transportation Department faces is operating an aging fleet. Approximately, 49% or 122 of RPS' fleet is 12 years or older. As the chart below shows, some buses have been in service as long as 16 to 17 years.




***Source: Bus Inventory listing dated 7/24/06 provided by Transportation Department***

RPS does not have a formal bus replacement policy or schedule. RPS' bus replacement cycle is generally a moving target dependent on available funding. Typically, the Department begins looking to replace school buses at 10 years or 100,000 miles whichever comes first but hardly ever reaches this goal due to lack of funding.

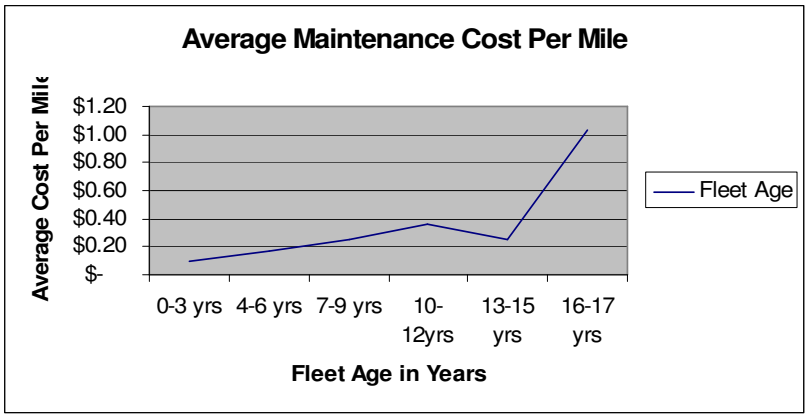
The National Association of State Directors of Pupil Transportation Services indicates, "Establishing school bus replacement policies is an important activity since it directly impacts the timeliness of introducing the latest safety, efficiency

and emissions improvements into the fleet. The elimination of school buses that do not meet the latest standards and requirements must be planned for within a realistic number of years. Policy makers must realize that school buses will not last forever, regardless of how they are equipped when purchased or maintained during their lives."

As previously mentioned, some of the buses have been in service as long as 16 to 17 years. The cumulative impact of current practices may be significantly increasing transportation costs. Replacing vehicles in a timely manner in order to keep the repairs and maintenance costs at an optimal level is an accepted and prudent fleet management practice (Source: American Public Works Association).

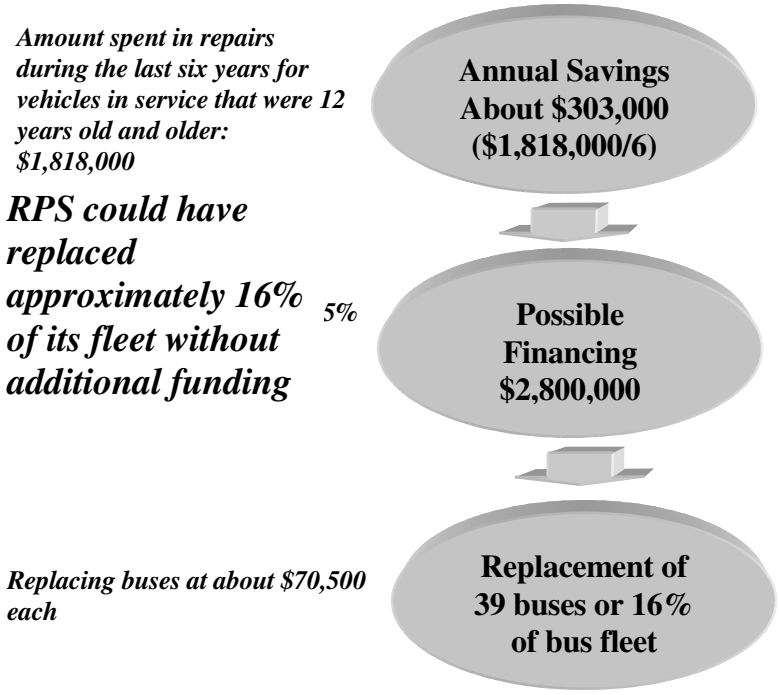
As shown in the chart below, it is more expensive to maintain older vehicles than newer vehicles. On average, it costs $1.03 to maintain a 16-17 year old bus compared to $0.36 to maintain a 10-12 year old bus.

***The average cost per mile to maintain a 17-year-old bus is three times greater than the average cost per mile to maintain a 12-year-old bus.***




***The average maintenance cost per mile does not include non-contract services which include major repairs, abuse, vandalism, etc.***

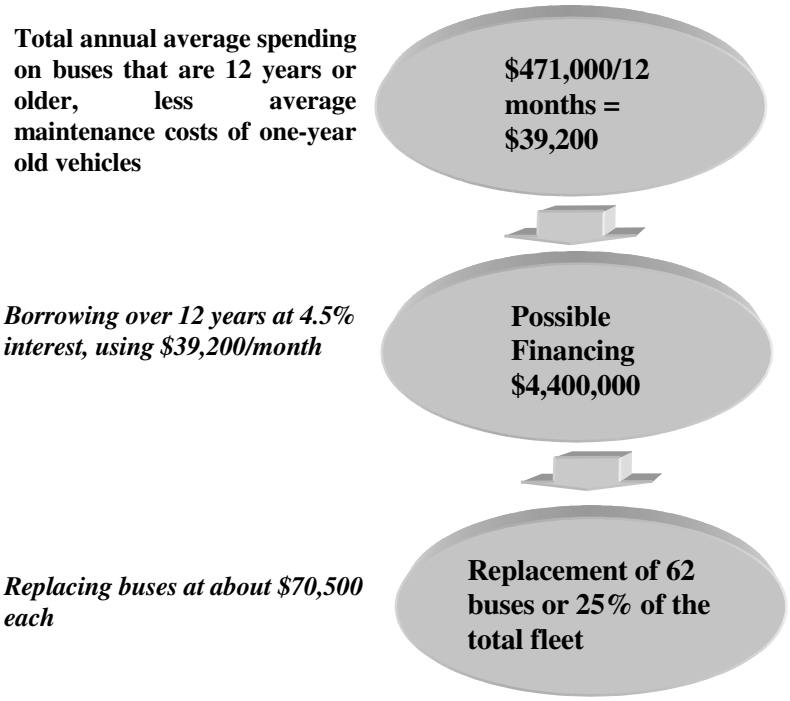
This means that RPS has an opportunity to reduce maintenance costs on certain buses at or near the 12th year mark. If the buses were replaced at 12 years of service, RPS could have achieved significant savings in repairs and maintenance costs. The savings, in turn, could have been used to replace buses. Thus, RPS could have upgraded its fleet without making a significant additional investment as depicted in the following analysis:



Essentially, RPS lost the opportunity to upgrade approximately 16% (39/250) of its fleet because it spent funds to repair older vehicles when it could have used the funds to make an additional investment in a newer fleet. In order to replace the buses on a sound fiscal schedule, RPS needs to develop and enforce a bus replacement fund. With the replacement fund, a specified amount of money is set aside each year to fund future replacements. These funds need to be earmarked and should not be subjected to the budget reduction process. RPS has projected approximately $3.8 million of new bus replacement funding for FY2008 within its Capital Improvement Program Budget (dated December 18, 2006).

Even though the maintenance data that RPS provided to the City Auditor's Office was limited, City Auditors were able to extract average maintenance details to suggest that there is a clear opportunity for savings. If RPS funds the same level of bus maintenance as in prior years and follows the scenario below, the funds will be used more efficiently.

RPS still has an opportunity to replace 62 buses out of maintenance savings and make a positive impact on the utilization of public resources as explained below.




Several assumptions were made for this scenario.

***RPS has significant opportunity to upgrade its fleet using savings generated from operating costs.***

- First, City Auditors only had six years of maintenance cost data. This assumes that the maintenance costs will continue in FY2008 at the same level as recorded from FY2001 to FY2006.
- Secondly, City Auditors recognized that even new buses would require maintenance costs in their first year. Therefore, the average maintenance cost of one year old buses was considered in order to reduce the amount available for debt service for replacement of buses.

As the illustration above shows, if the bus maintenance budget remains the same, RPS could replace 62 buses in the near future. In addition, it could generate revenue of approximately $79,000 from the sale of old buses.

This transaction will upgrade RPS' fleet and provide reliable buses that are cost-effective to operate and maintain. Accordingly, RPS will most likely be able to reduce the number of spares to match the industry standard of 10% instead of its current rate of 28%.

Finally, using this scenario, RPS would save $3.8 million from the capital budget and receive 12 more buses than expected since only 50 buses were slated for replacement in FY2008.

While establishing its replacement fund, RPS should also consider leasing as a means of introducing new buses to the fleet. With leasing, less upfront funding is needed than through a straight purchase. The remaining funds could be invested in the replacement fund. Leasing can also help build in budget commitments for vehicle replacements and help hedge against equipment obsolescence.

### *Recommendations:*

***57. Develop a bus replacement schedule.***

***58. Establish a fund earmarked for bus replacements, which is periodically replenished with appropriate amounts needed.***

***59. Investigate the feasibility of the purchase options for upgrading the existing fleet.***

## *Items for Future Consideration*

Throughout the audit, it was clear that there were other areas within RPS' structure that were in need of proper attention. The observations below were beyond the scope of this audit. However, additional opportunities for savings exist for each observation, which would require a change to an existing Human Resource Policy. The School Board should challenge the status quo of having these policies in place, in their entirety:

***Disciplinary Actions***

The protection offered to school employees by the School Board and the Virginia Code hinder principals and directors from swiftly and effectively dealing with employees who may pose a threat to the safety and welfare of the school division or students. City Auditors observed issues mostly with the bus drivers. However the impact of the issue throughout the entire school division is not known.

***Grievance Procedures***

Despite the fact that there are certain sections of the state grievance process that apply to only certified professional

personnel (i.e. teachers), RPS has chosen to apply the entire grievance process to all employees (except superintendents, assistant superintendents, principals, assistant principals and supervisors). These procedures are cumbersome and can result in an employee remaining on paid administrative leave for a prolonged period of time.

***Outsourcing***

In light of rising educational costs and budget constraints, some school systems are outsourcing[11] non-educational services such as transportation. Outsourcing transportation could help RPS reduce its transportation costs and address its aging fleet and personnel issues.

[11] Outsourcing is the assignment of specific work to a third party for a specific period of time with an agreed upon price for performance.

ATTACHMENT A – Energy Consultant Report

September 27, 2006

MEMO

TO: Randi Ricco, Auditor, Richmond City

CC: Pam Vosburgh, VSBN

FROM: Larry Schoff, PE, EES

Subject: Report – Walk thru of Richmond City Schools – September 25th, 2006

**Background:**

Based on contact with Ms. Pam Vosburgh, VSBN – the Rebuild America Representative in the Commonwealth – I was contacted to assist you with energy evaluation of Richmond City Schools, to provide you with information in support of the study you have been tasked. Based on our original phone call, two activities were going to be involved: 1) Input of utility/energy data into EPA/DOE Energy Star School evaluation program and 2) walk-thru of selected schools to observe energy use and make recommendations on energy improvements or management improvements that could be made to reduce energy consumption.

Input into the energy Star program has run into some difficulties with data provided and the program itself. These have or are being resolved and the results should be provided to you NLT October 2nd. After some schedule problems on my end, the walk-thru was scheduled for September 25th.

**Walk-Thru of Three School Buildings:**

The walk-thru of Thomas Jefferson HS, Fox Elementary and Boushall Middle was conducted on September 25th. The scope of the walk thru was to make observations and readings were appropriate on light levels and temperatures and to observe the operation of the systems in the classrooms and what actions that could be taken to reduce energy consumption.

The first school visited was Thomas Jefferson HS. The following observations were made during the walk thru:

The school was built in 1929 and has an enrollment of 750.

1. Most of the classrooms have windows and the are not taking advantage of this in lighting the classroom
2. Light levels measured in the classrooms are as much as 75% higher than recommended in the classroom – 55FC
3. Proper use of the light switches in the classroom is either not known or ignored
4. Several locations in the lower level are on 24/7 just because – when asked that was the response given – Boiler Room and storage areas
5. Several storage rooms lights were on – Need Motion Sensors installed
6. Hallway lighting – Though new is HID and an energy waste –
7. Gym Lighting – HID on over 16 hours a day
8. Daylighting controls
9. Media Center – Control of lights
10. Temperature controls – Room that was not occupied on the SW side of the building was measured at 67 degrees at about 9am in the morning and air was coming out at 60 degrees
11. Some incandescent lights were observed and could be replaced with CFL's to reduce energy consumption
12. Plug and Phantom Loads did not appear to be a problem
13. Computer Screens were observed to be on with no one in the room

**Fox Elementary School:**

This school was built in 1911 and currently has an enrollment of 490 students.

The following observations were made:

1. There are numerous incandescent lamps used throughout the building most of which are in the Hallways and in non-classroom areas of the schools.
2. Several areas of the school that are seldom used or visited were observed to have lights on and it was unknown how long the lights had been left on.
3. One soda machine was observed which significant energy savings could be mined.
4. Control of temperatures in the rooms is limited and increase control could result in significant energy savings
5. The basement fluorescent lighting fixtures appeared to be operated by only two switches, one at the top of the stairs and the other partway through the dining area. Switching upgrades need to be considered
6. There were numerous plug loads observed in the classrooms—small refrigerators, microwave ovens and other small appliances. It was also observed that many Computer screens were on and no one in the area.
7. Auditorium front half of the lighting on because of personnel using the stage area

**Boushall Middle School:**

This school was built in 1986 and has an enrollment of about 800.

The following observations were made:

1. Mercury lamps are being used in many areas of the school which should be replace with more efficient lamps and lighting systems
2. Lights left on in classrooms
3. Light levels in classrooms too high due to improper use of lighting system installed by occupants
4. Gym Lighting HID on in both gyms – auxiliary gym lights were on and no one using the gym 20 fixtures
5. Boilers were original and energy inefficient
6. Light levels in Media center high and all lights are on the entire day
7. Exterior lighting is HID
8. Computers were observed to be on and no one in the classroom
9. Lights were left on in the classroom and no one in the classroom and the door locked

**Recommendations – General:**

**1.** Based on observations during the walk-thru of the three schools noted above an enhanced energy policy should be adopted by the school board. Once the enhanced Policy has been adopted an Energy regulation should be developed which should include a section on Energy Education which would include a requirement for energy awareness training for all school personnel at least twice a year. Energy Education in the classroom should also begin. Students are the only segment of the school community that can sustain energy efficiency well into the 21st century. Once implemented, at least 10% reduction in energy use should occur with as much as 15% resulting. Items should include proper operation of light and heating systems and knowledge of the overall building envelope.

**2.** Based on the establishment of an energy policy and regulation, an energy management plan should be developed for the next 5 to 10 years with the goal after five years to reduce energy consumption by at least 30% for the established baseline and then to maintain and/or improve on this 30% for the following 5 years. Baseline year should be 2006-2007.

**3.** An Energy Education program for the classroom should be selected from one of the following three existing programs: National Energy Education Development (NEED) program (www.need.org), National Energy Foundation (NEF) (www.nef.org) and Alliance to Save Energy (ASE)(www.ase.org). Engaging the students through energy education in the classroom will also help reduce energy usage.

**4.** An energy audit should be accomplished on all facilities to identify those items that have the potential of reducing energy use and costs. All areas and systems of the

school should be addressed. Consideration should be given to utilizing the existing state contract for performance contracting to accomplish some of these energy and system improvement identified from the audit. The use of this contract would reduce the time to place the contract into effect. A pay back of 12 years should be considered as the maximum so that as many improvements to the schools energy systems can be accomplished.

5. In the policy and resulting regulation should include a provision for an energy efficiency evaluation element on all school administrators and all key administrative position in the district. This will be a means of evaluating the success of the program from an administrative view.
6. Recommend all lamps and light fixtures be cleaned to remove dust and dirt. This would increase light output by as much as 5%.
7. School board approve a policy on personal appliances in the classroom to limit or restrict the type and number of appliances allowed. This would also help to reduce electrical energy consumption .
8. HVAC controls should be reviewed and more controls put into place to improve the overall indoor air quality and humidity and temperature control.

**Specific Recommendations:**

The following recommendations are made based on the observations:

1. Change HID Lamps in Gyms in all schools to Fluorescents fixtures -- 6/8 Tube fixtures – High Bay Lighting. These fixtures would significantly reduce energy consumption.

**TECHNOLOGY BRIEF** • Interior High Bay Lighting Applications


*"From an energy savings perspective, this was the easiest decision I had to make. The increase in the quality of light was a bonus; lights are brighter and turn on faster. We're saving even more with the occupancy sensors we installed. In the past, if we had one light on, they were all on; now, only the lights we need are on. I've been telling other wineries in the area about this retrofit."*

Tobin Ginter
CFO, Rodney Strong Vineyards

*"We were having a lot of trouble with our old lights – they were too dark, especially at night. My staff and the kids noticed an incredible difference after installing the new T5 high bay linear fluorescent fixtures. There's a lot more light in the gym now when the kids are playing."*

Don Law
Executive Director, YMCA Youth Center, Richmond, CA

**For more information about saving energy at your business, please call the Business Customer Service Center (800) 468-4743 or visit www.pge.com/business**

Pacific Gas and Electric Company®

PG&E's Energy Efficiency Rebates for Your Business

# HIGH BAY LINEAR FLUORESCENT FIXTURES

**Interior High Bay Linear Fluorescent Fixtures can cut your energy costs by 50%.** Standard metal halide fixtures have long been the dominant technology in high bay lighting applications, but developments in fluorescent fixtures now make it possible to reduce energy costs and improve lighting quality by installing high bay fluorescent fixtures. High bay applications are often found in warehouses, schools, gymnasiums, storage rooms, large retail stores, and other building types with ceilings 15 feet and above.

## ADVANTAGES OF LINEAR HIGH BAY FLUORESCENT FIXTURES

**ENERGY SAVINGS** – Linear high bay fluorescent fixtures can provide up to 50% energy cost savings over standard metal halide systems. At 4,000 annual operating hours, operating cost of a fluorescent fixture ranges from $133 to $140 per year, compared to approximately $275 for each 400 Watt standard metal halide. At $0.15 per kWh, that's an estimated savings of up to $142 per fixture per year.

**INSTANT ON AND INSTANT RESTRIKE** – Unlike standard metal halides, fluorescents turn on instantly, even after a power interruption. The immediate illumination provided by fluorescents can improve safety and productivity as compared to the slower strike and restrike times associated with standard metal halides.

**OCCUPANCY SENSORS AND PHOTOCELLS** – Additional energy savings can be realized by pairing a fluorescent system with sensor controls that switch lights off when not needed. Rebates are available for qualifying occupancy sensors; please refer to Energy Efficiency Rebates for Your Business Lighting Catalog for details.

**CONSISTENT LIGHT OUTPUT** – Fluorescents provide 94% of original light output over their rated lamp life while standard metal halide lamps can degrade by nearly 35% over their rated lamp life.

**ENHANCED LIGHT QUALITY** – Fluorescent lamps do not suffer from color shift while many standard metal halides can vary in color both initially and over time. Consequently, when standard metal halide fixtures are adjacent to each other, some may appear pinkish while others may appear bluish or greenish.

**IMPROVED COLOR** – Fluorescents offer better color rendering, which can make retail displays more attractive and improve productivity and worker satisfaction in warehouses and manufacturing spaces. On the Color Rendering Index (CRI) scale, sources with ratings closer to 100 render colors more accurately in comparison to a standard reference source. While standard metal halide lamps rate between 62 and 70 CRI, 800 series fluorescent lamps rate between 82 and 86 CRI.

**BETTER LIGHT DISTRIBUTION** – Because of the linear nature of the lamps, fluorescent fixtures can be designed to provide more uniform light within a space and fewer shadows than point-source standard metal halide lamps.


At 7 cents a kWh the savings for each fixture would be around $70 per/year. A 24 fixture gym would mean a savings of $1,680 per year. While this figure seems rather small, consider this: if 75% of the schools currently utilize this type of lighting and have an inventory of 20 or more lights, the savings would equate to approximately $61,600.

2. All classrooms should have the lights levels checked against recommended levels of 55 Foot Candles. Based on some readings taken during the walk through's were as high as 100+ FC. The savings potential could be significant.
3. Replace all incandescent lamps with Compact Fluorescents lamps. . Payback on these would be less than 1.5 years. Example: Current lamp being used is a 100

watt incandescent lamp. It operates 10 hours a day for 200 days a year. Energy Cost is $0.07 / kWh. Cost of lamp $0.50. Lamp must be replaced twice during the year. Total cost for one year of operation = (10 x 200 x 100)/1000) x 0.07) + 2 x 0.50 = $15.00 Cost of Operation for one year. **Replace this lamp with a 26 watt CFL. Same operating times and energy costs ; cost of lamp is $4.00 and does not require replacement for 5-6 years. Cost of operation of CFL = $4 + (10 x 200 x 26)/1000) x 0.07 = $7.64 or a savings of about $7/year per individual lamp.**

4. Existing parking lot and building lighting are HID fixtures and lamps. Recommend that these be replaced with fluorescent lamps and fixtures. As mentioned above, this replacement will result in significant savings in energy use and cost and a pay-back in the range of 4-5 years. These units would allow for use of motion detectors on exterior lighting and result in immediate re-strike encase of power outages and better controls on overall exterior lighting.

Overall, the expected cost savings initially is expected to be 10-15% of overall utility costs. If programs above are implemented and all lighting is converted as mentioned in the recommendations, further savings can be expected in the range of at least 10%.

The key to the success of any energy reduction programs is Energy Education and Energy Awareness training for all members of the school community. The impact of this if properly applied will reach far outside the walls of the schools to all members of the community. It must always be remembered the following: “Buildings do not operate themselves, people do.”

*ATTACHMENT B – Resume – Lorenz Schoff*

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42 years background in facilities management, 22 years with K-12 schools. Served 7 years as the Schools Sector Technical Analyst for the U.S. Department of Energy Program Rebuild America/EnergySmart Schools, providing technical assistance to schools to improve the learning and teaching environment increased energy efficiency of both existing and new schools facilities. Currently provides energy consulting services to K-12 schools and colleges and universities. A member of the USGBC Application Guide for Schools committee, developing a LEED document for schools to better apply LEED NC 2.2 in the construction of new schools. Served as Director, Facilities Maintenance and Transportation, Montgomery County Public Schools (Virginia), from 1984 to 1997, where he was responsible for 20 public schools with 9,000 students. Managed a $30 million capital improvements program for renovation and new construction of three schools, and developed a school construction plan valued at over $100 million, including comprehensive programs for energy management and recycling. Served in the U.S. Air Force, 1964 to 1984, specializing in energy efficiency and facilities management and operations and maintenance. Retired as a Major. Obtained a BSCE from Oregon State and an MSCE from Arizona State; a registered professional engineer (PE).

*ATTACHMENT C – RPS Responses*