Final Report
May 2014

Operational Efficiency Audit for the Tucson Unified School District

Submitted by:

GIBSON CONSULTING GROUP

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for the

Tucson Unified School District

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Introduction

In October 2013, Gibson Consulting Group, Inc. (Gibson) was contracted by the Tucson Unified School District (TUSD) to conduct an Operational Efficiency Audit. This study began in November 2013 and was completed in May 2014. The objectives of this project were to identify opportunities to improve efficiency, to achieve cost savings, and to make recommendations for improving management practices in the district. This report presents the results of the audit.

Gibson wishes to express our appreciation to the TUSD management and staff for its responsiveness in providing us with the information needed to perform this important work, and for its cooperation and willingness to assist us during our site work.

Context of Study

It is important that this efficiency audit report be read in the context of several factors related to Arizona public education and the history of TUSD in particular:

Lower State Spending

Arizona spends less on public education per student than most states in the United States. In 2013, the statewide expenditure per student was $7,496, while the estimated national average was $11,068 (unadjusted for cost of living differences). Some school districts in the northeastern United States have expenditures per student that are more than double that of Arizona's average, the difference due in part to a higher cost of living in that region. This lower spending on Arizona public education reinforces the need for efficient school systems.

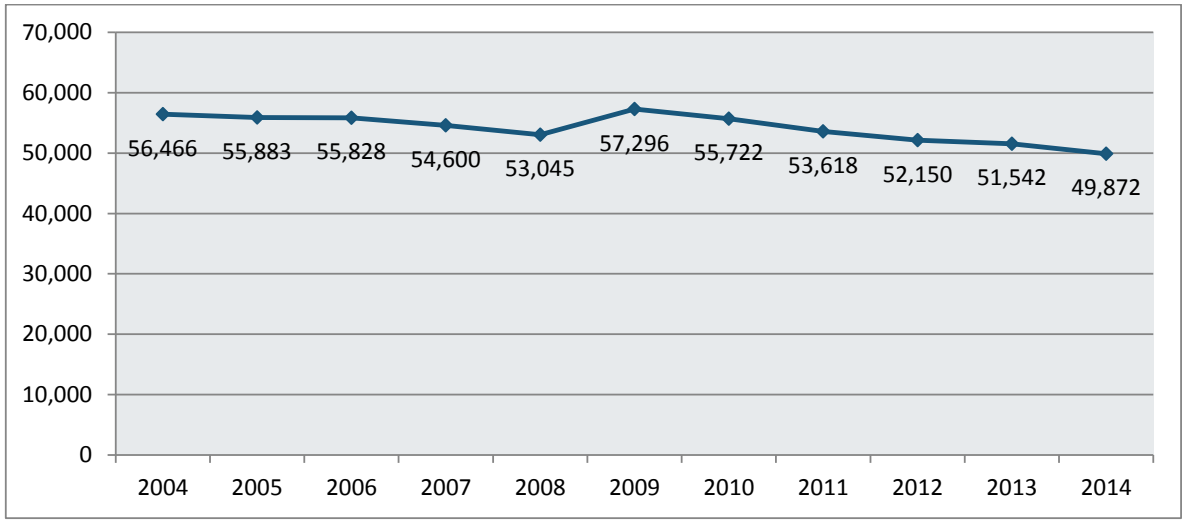
Declining State Spending

Between 2008 and 2013, Arizona had the highest percentage decrease in public education spending per student with a decrease of 21.8 percent. Most states went through budget cuts during this time, but none more so than Arizona. Low funding, combined with declining funding, creates challenges in managing school district resources, particularly with the current environment of increasing standards for student achievement.

Declining Enrollment

A third factor is TUSD's enrollment decline. Because state funding for TUSD is based largely on enrollment, declines in enrollment have contributed to reduce funding. Figure 1 provides TUSD enrollment trends over the past 10 years. Enrollment has declined from 56,466 students to 49,872 students during this time, a drop of 12 percent. TUSD currently projects a continued decline to 45,000 students by 2019.

Figure 1. TUSD Enrollment, 2003-2013



Source: TUSD

This enrollment decline has led to a $50 million decrease in funding over the past 10 years. Many attribute the decline in enrollment to strong competition from charter schools.

Because of the nature of school district costs, expenditures do not drop at the same rate as enrollment. Enrollment declines are generally dispersed among many schools, and within schools among many grade levels. The loss of one student from a class will likely not result in a commensurate reduction in costs. If TUSD were a growing district, the opposite would be true. Students could be added to many classes without having to hire additional resources or purchase additional equipment.

Because Arizona school funding, like most states, does not recognize the nature of school district costs, school systems like TUSD with declining enrollment are in essence penalized financially – the loss of funding is larger than the reduction in cost.

Desegregation Lawsuit

The district has been involved in desegregation litigation for decades, and currently funds a $64 million desegregation plan, also known as the Unitary Status Plan. This plan addresses the concerns and requirements resulting from a nearly 40-year legal battle, and sets a goal to achieve unitary status by 2017. While a separate local tax helps support this investment, it does not cover all the resources applied to plan activities.

TUSD has endured these financial pressures by closing schools and reducing costs through budget cuts and improved efficiency. Over the past five years, TUSD spending per student has declined by 5 percent, most of which occurred in 2012-13.[1] However, total spending per student at TUSD ($8,421) remains

[1] Arizona School District Spending, Fiscal Year 2013, Office of the Auditor General, February 2014

significantly higher than both the Arizona peer district average ($7,185) and the state average ($7,496). This efficiency audit seeks to find ways to further improve the efficiency of TUSD.

Report Summary

This report contains 62 recommendations to improve efficiency and management effectiveness at TUSD. The district is already moving forward on some of these and other initiatives. For example, TUSD does not currently have a long-range strategic plan to guide its organization, but has moved forward with the decision to develop one this year. Many district processes are also inefficient, manual, and paper-intensive, but the district engaged with an outside firm last year to assist in streamlining many of these processes and is considering a different route for its finance, human resources, and student information systems. TUSD has recognized problems with salary compression, a pay inequity of their salary structure, and has taken steps to remedy the situation. Negotiations with labor unions have resulted in streamlined approaches to employee leave and helped the district save money. In summer 2013, TUSD staff worked diligently to identify ways to achieve class sizes closer to the district targets, resulting in additional savings. Several improvements have been made to improve the efficiency of facilities management. Separately, and occurring simultaneously with this audit, the district is conducting a curriculum audit to support improved student achievement. These efforts demonstrate a culture for continuous self-improvement at TUSD, and increase the chance for success in implementing recommendations contained in this report as well as other studies.

TUSD was also found to be extremely lean in certain areas. School clerical staff levels are lower than industry standards, and lower than any school system reviewed by Gibson over the past 20 years. This is particularly noteworthy because the operating processes applied by school clerical staff are highly manual, paper-intensive, and take more time than what would be applied in an efficient model. The same is true for custodial services. Recent cuts to custodial services have left staffing levels significantly below what industry standards would prescribe, and custodial work efficiency is adversely affected by the lack of current equipment.

Several of the recommendations in this report are not new. However, it was important to provide a snapshot of current operations to inform district leadership of where things stand today. In several chapters of this report, references are made to recommendations from prior studies and, where applicable, concur with those recommendations.

One of the factors contributing to TUSD's higher cost structure is the number of schools relative to the student population. The district has closed schools in recent years, but several schools remain significantly under capacity. Unless the enrollment decline rebounds, TUSD should consider closing additional schools and eliminating portable building space at underutilized schools. These two initiatives will result in significant savings to the district.

Human Resources represents another area where significant improvements and streamlining are needed. The recruiting process is not as effective as it needs to be and takes too long, resulting in the loss of qualified candidates. The district maintains its position control inventory on a spreadsheet

instead of application software, lengthening a cumbersome approval process for new or changing positions. The district is also significantly underutilizing its substitute management system, creating unnecessary work at the schools and central office. With the exception of Food Services, all hourly personnel record their time on manual timesheets, also requiring excessive work.

The district also needs to move forward in implementing integrated information systems and re-engineered processes. TUSD has used technologically advanced software to support its human resources and financial operations for eight years; however, as of January 2014 most of the manual, inefficient processes remain. The district was previously criticized for not employing effective methods for the selection, implementation, and integration of information systems – this is part of the reason the existing systems are not meeting district needs. Implementing information systems – and implementing redesigned processes that take advantage of the technological capabilities of these systems – will lower the work demands of TUSD staff at the school and district level, will improve internal control over the accuracy of their work, and will increase the efficiency and responsiveness of their day-to-day activities.

Other major recommendations in this report include:

- Implement performance measures and targets throughout the district to improve accountability and transparency. These measures should be linked to the district's new strategic plan, and should also be used to justify budgeted expenditures in each department.
- Implement an internal audit function that reports directly to the governing board. It is unusual for a district the size of TUSD not to have such a function. Internal audit helps ensure that the district meets its objectives; complies with applicable laws, policies, and regulations; adequately protects taxpayer funds and district resources; and operates in an efficient manner.
- Reorganize the Student Equity and Intervention Department to be more functionally aligned by type of service (e.g., discipline management, social services, and academic support). The current alignment by ethnicity does not support the coordination or leadership of these services.
- Document a decision-making framework to clarify what decisions should be made at the schools versus the central office.
- Reduce finance office staffing to levels commensurate with similar-sized school systems after implementing new information systems and streamlined processes.
- Improve financial reporting at the board and department/school levels.
- Develop procedures and controls for the district's procurement card program.
- Reorganize the Human Resources Department to focus resources on operational improvements.
- Improve and streamline the hiring process through several initiatives.
- Conduct a dependent eligibility audit to ensure that only eligible family members receive benefits.

- Develop a technology project management methodology using industry standards to improve the ability of TUSD to implement technology projects successfully, on time, and within budget.
- Bring all technology-related positions and resources located in other departments under the responsibility of the Technology Services Department to improve accountability and coordination.
- Update technology job descriptions to reflect current technology requirements. Current job descriptions reference technical capabilities that are 10 years old, resulting in an under-qualified staff.
- Implement a new Computerized Maintenance Management System (CMMS) to support more effective and efficient processes, and to provide more useful management information.
- Enhance the district's preventive maintenance program to lengthen the life of facilities and maintain them at a lower cost.
- Centralize the management of custodial services.
- Implement additional energy conservation measures to reduce utility expenditures.
- Implement new bus routing and scheduling software to optimize routing efficiency.
- Renegotiate labor agreements to pay bus drivers and bus monitors for actual hours worked.
- Implement a more effective bus replacement program.
- Allocate additional Maintenance and Operating Fund costs to the Food Services Fund. The Food Services Department can continue to be financially self-supported by increasing student meal participation.

The recommendations contained in this report can be implemented over the next five years (2014-15 through 2018-19). Once fully implemented, these recommendations will result in net annual savings of $10,833,171 by 2018-19. If fully implemented, recommendations contained in this report will require one-time investments of $1,798,000 and additional investments in subsequent years with a five-year net savings of $37,439,087.

For those recommendations involving position reductions, average pay for that position was applied in calculating savings. It is expected that some of these positions can be eliminated through attrition. A benefits rate of 30 percent was applied in calculating gross savings from position reductions.

Appendix A lists all recommendations made as a result of the review, by operational area, along with estimated savings, investments, and net fiscal impacts.

Methodology

Data Collection

To conduct a comprehensive review of TUSD, Gibson used a variety of data collection and analysis approaches. This comprehensive review of TUSD's non-instructional areas included the following data collection approaches:

- Existing TUSD data
- Interviews with district staff
- School site visits
- Focus group sessions
- Arizona state average and peer data
- National peer data

Existing TUSD Data

To provide proper context for the review, Gibson requested from TUSD a broad spectrum of data and documents related to the operational areas under review. Gibson collected over 1,000 documents from TUSD staff. The purpose of this data request and subsequent analyses was to gain a deeper understanding of TUSD operations and to provide background and context for the review. In addition, these data and documents were utilized to help formulate questions for the interviews and focus group sessions held with district administrators, department heads and staff, school administrators and staff, and teachers. Data analyses, discussed later, were conducted to determine levels of efficiency within the organization.

Interviews with District Staff

To ensure a complete and thorough understanding of district processes, procedures, operations, and issues, the review team conducted interviews with key TUSD staff involved in day-to-day operations from January 6 through 17, 2014. Interviews included governing board members, district leadership, department heads and staff, school administrators and staff, operational leads, and support staff, among others.

Since some preliminary data analyses were completed prior to the site visit, interview time was dedicated more to understanding performance trends, in addition to learning about system processes and staff responsibilities. Through these interviews and focus groups, the review team was able to develop a better overall understanding of district operations and to clarify any data questions that arose during preliminary analysis, including the investigation of possible causes of unfavorable variances, of current efficiency or performance measurement systems, of current plans and initiatives, of the current approach to cost savings, of recent cost savings or cost cutting measures, of decision-making frameworks, and of additional areas of concern for the staff.

School Site Visits

A sample of TUSD schools was selected for site visits based on school type and geographic location within the district. The review team selected and conducted site visits to TUSD elementary, K-8, middle, and high schools. The purpose of the school visits was to gather information on school operations, facilities, and staff members' perceptions of the services provided by the central office.

Focus Group Sessions

Focus groups are an effective way of obtaining more in-depth information from staff than a one-on-one formal interview or other data collection instrument. In addition, the dynamics of a focus group often stimulate the expression of ideas that might otherwise go unstated. The project team conducted focus group sessions with varying groups of stakeholders (e.g., principals, teachers, operational area leads, departmental staff, and school staff). These focus groups were conducted during the January 2014 site visit.

State and National Peer Data Analysis

Gibson used the most recent State Auditor's report to compare TUSD to state and peer averages as well as to other selected peers. This report is published annually; the most recent report available at the time of this study was for information relating to the 2012-13 school year. In other instances, research of individual school systems was conducted to provide additional peer comparisons.

Analysis

Data Analysis

As discussed previously, existing TUSD data were requested and analyzed to provide background and context for this review. During the assessment phase of this project, each functional area was reviewed individually to determine whether efficient financial and operational management practices were in place.

Interview and Focus Group Data

Qualitative interview and focus group data were analyzed by functional area leads conducting the focus group sessions to determine common trends across the various stakeholder groups (e.g., district administration, school leaders and staff, and department heads and staff). Other sources of input (e.g., observations, district data, and industry best practices) were also included in analyses.

Organization of Report

The remainder of this report is organized into the following:

- Chapter 1 – District Organization and Management
- Chapter 2 – Financial Management
- Chapter 3 – Human Resources
- Chapter 4 – Technology Management
- Chapter 5 – Facilities Management
- Chapter 6 – Transportation Management
- Chapter 7 – Food Services
- Chapter 8 – Other
- Appendices

Chapter 1 – District Organization and Management

Introduction

The effective and efficient education of students depends heavily on a school system's governance structure, administrative management, and planning processes. The role of the governing board (board) is to set goals and priorities, to establish policies, and to approve the plans and funding necessary to achieve district goals and objectives. The superintendent is responsible for managing school district operations, recommending staffing levels, and preparing a plan for spending financial resources in order to carry out the governing board's goals and objectives. Department and school administration execute the plans and measure performance against established targets that are aligned with the district's goals and objectives. Each component of this system of governance and administration helps ensure that goals and objectives are in fact achieved, and that departments, schools, and the individuals that oversee them are held accountable for results.

This chapter provides commendations and recommendations related to board governance and district administration in two sections: *governance* and *management and administration*.

The Tucson Unified School District (TUSD) is the second largest school district in Arizona. In 2013-14, the district served approximately 50,000 students in 87 schools, including 49 elementary schools, 13 K-8 schools, 10 middle schools, 10 high schools, and five other special purpose schools.

Compared to its Arizona peer districts, TUSD has high administration costs. Table 1.1 shows three measures of efficiency for district administration tracked by the Arizona Office of the Auditor General in its most recent report to the legislature: the percentage of administration cost to total operating expenditures; administration cost per pupil; and students per administrator. Administration costs include salaries and benefits for superintendents, principals, business managers, department managers, and clerical staff.

In Table 1.1, TUSD is compared to its peer average and to Mesa Public Schools (MPS), the largest school district in the state. For the ratio of students to administrators, the lower the ratio is, the larger the number of administrators relative to the student population. TUSD has 23 percent more administrators than the peer average and 16 percent more than MPS relative to their respective student populations.

Table 1.1. Comparative Administration Efficiency Ratios, TUSD and Peers, 2012-13

Efficiency Measure	TUSD	Peer Average	MPS
Administration Cost as a Percentage of Total Operating Cost	10.2%	Not Available	7.9%
Administration Cost per Pupil	$865	$640	$611
Ratio of Students to Administrators	62/1	80/1	74/1

Source: Arizona School District Spending, Fiscal Year 2013, Office of the Auditor General

One of the factors contributing to higher administration costs at TUSD is smaller schools. In 2011-12, TUSD's average school size was 490 students. MPS' average was 742 students, 51 percent larger than TUSD. While TUSD has closed 10 schools since 2011-12, the gap likely remains significant. A smaller average school size means more schools relative to the student population, which in turn means more school administrators. At the school level, TUSD school administrator levels are at or below recommended guidelines. The issue is with the number of open schools in the district. This topic is discussed separately in *Chapter 5 – Facilities Use and Management* of this report.

Other factors appear to be contributing to this variance. TUSD, unlike its peer districts, receives $60 million in desegregation funding through a separate tax rate, and some of these funds are dedicated to administrative costs for program oversight.

As noted in other chapters of this report, inefficient and manual, paper-intensive processes are contributing to greater work demands and larger staff levels at the central office. TUSD human resources and finance offices have higher administration and clerical staffing levels than other large districts relative to their student populations.

The remainder of this chapter focuses on TUSD's governance and administration practices not addressed in other chapters of this report.

Governance

TUSD is governed by a five-member school board. Each member serves a four-year term and is elected at-large. Board member terms commence on January 1st of the year following the election. Table 1.2 lists the current TUSD board members, their role on the governing board, and the date their term expires.

Table 1.2. TUSD Governing Board Members

School Board Member	Title	Current Term Expires
Adelita S. Grijalva	Board President	December 31, 2014
Kristel Ann Foster	Board Clerk	December 31, 2016
Michael Hicks	Board Member	December 31, 2014
Cam Juarez	Board Member	December 31, 2016
Dr. Mark Stegeman	Board Member	December 31, 2016

Source: TUSD website, http://www.tusd1.org/contents/govboard/govboard.html.

Regular board meetings are held on the second Tuesday of each month. In addition, at least one special board meeting is conducted monthly. Board meeting agendas and supporting information are posted online on the district's web site.

The governing board appoints the superintendent, establishes district policies, adopts the budget, and votes on TUSD decisions requiring board approval, such as purchases and contracts exceeding a predetermined dollar limit. The TUSD policy manual and the district's budget are both presented on the TUSD web site.

Recommendation 1-1: Develop a long-range strategic plan and related performance measures.

TUSD has a document entitled *Strategic Plan 2011-12*. This document was prepared by an architectural firm, and actually represents a long-range facilities plan as opposed to a school system strategic plan. Facility management is only one element of an organization's strategic plan.

TUSD does not have any other document that constitutes a strategic plan. These plans are generally five to seven years in duration, and outline the school system's mission, vision, goals, and specific measurable objectives. A strategic plan provides guidance to the development of other district planning documents, including the facilities master plan and a long-range technology plan. Strategic plans also drive shorter term academic improvement plans and more detailed measurable objectives. TUSD schools currently prepare an annual School Continuous Improvement Plan with measurable objectives, but these are not based on any districtwide objectives.

The State of Arizona establishes baseline achievement expectations and measures schools and school districts on an A through F grading scale.[2] In the most recent results, TUSD received an overall grade of "C" with 30 percent of the schools receiving a grade of "B" or higher. However, TUSD has improved its overall performance, moving from a "D" grade to two points away from a "B" grade in three years.

[2] Title 15, Section 15-241 of the Arizona Revised Statutes

Some efforts at TUSD have been implemented to develop pieces of a strategic plan. In 2012, TUSD announced its new *Vision for Action* and *Core Values*. The district's *Vision for Action* is "Delivering Excellence in Education Every Day." The *Core Values* are:

- **Student-Centeredness** – making every decision with student success in mind
- **Caring** – acting with respect, dignity, and concern for all
- **Diversity** – celebrating and accepting our differences as our strength
- **Collaboration** – partnering to reach common goals
- **Innovation** – embracing new ideas and challenging assumptions
- **Accountability** – taking responsibility to do things right and to do the right thing

In 2013 academic and business leadership teams were developed to implement a more structured approach to planning. These planning initiatives have been effective in identifying critical needs and solutions for TUSD. Each planning initiative identifies a TUSD staff member responsible for the initiative, the desired outcome or product, and a target date of completion.

The leadership team plans are effective in identifying what TUSD is expected to "do." It does not effectively define what TUSD is expected to "achieve." Herein lies the primary benefit of a strategic plan – establishing specific performance expectations to support accountability for results. TUSD should develop a long-range strategic plan that establishes such expectations.

Below is a model for a strategic plan recommended by one of the leading providers of strategic planning for school districts[3]:

- **Beliefs** – A statement that is a formal expression of the organization's (and community's) fundamental values: its ethical code, its overriding convictions, its inviolate commitments. (TUSD has already established beliefs.)
- **Mission** – A statement that is a clear and concise expression of the district's identity, purpose, and the means of action. (TUSD has a *Vision of Action*.)
- **Strategic Parameters** – Limitations the organization places upon itself. They are things the organization either will never do or will always do. The intent is concentration of effort on the mission and objectives.
- **Objectives** – The planning organization's commitment to achieve specific, measurable end results in terms of student success, achievement, and/or performance.
- **Strategies** – The most important part of the planning discipline; the articulation of bold initiatives through which the organization will deploy its resources toward the stated mission and objectives.

[3] Cambridge Strategic Services website: http://www.cambridgestrategicservices.org/services/strategic-planning.html

- **Other Elements:**
  - Internal Factors: A thorough, unbiased, examination of the organization: strengths, weaknesses, and a critique of the organizational design.
  - External Factors: An examination of those forces which an organization has little or no control, such as social, political, economic, demographic, technological, or educational trends.
  - Competition: Any other organization providing the same service in the marketplace (e.g., charter schools).
  - Critical Issues: Threats and opportunities redefined strategically.

The difference between a goal (e.g., all students will achieve academic success) and a measureable objectives is important. A measureable objective will establish the short-and long-term timetable for performance growth. For student achievement, this could be measured by standardized test results, graduation rates, college entrance exam participation, and college entrance exam results. These items are presented in TUSD's school continuous improvement plans but are not linked to any districtwide objectives or growth targets. The objective should establish the five-year growth target, and this should support annual improvement rates for each school. However, this does not necessarily mean that each school will have the same annual growth rate expectations. TUSD should ensure that the collective achievement of school-level objectives meet or exceed the district-level targets.

With respect to operational efficiency, there are no current short- or long-term measurable objectives established at TUSD. Some TUSD departments track some measures of performance (e.g., gross square feet cleaned per custodian, energy cost per square foot), however most do not. Performance measures and related targets should be developed for each major operational and administrative area for the school district. Appendix B provides a sample of performance measures that can be used to support the development of objectives related to operational efficiency.

Fiscal Impact

TUSD has already taken the step to hire a consultant at a cost of $92,500 to assist in its strategic planning effort. No additional cost should need to be incurred. The two Deputy Superintendents should be designated by the Superintendent to be the primary owner of the strategic plan's development and devote (or designate) 160 hours per year each to the assembly of information for the strategic plan and plan updates. Most of the development can be facilitated by the existing academic and business leadership teams. On average, department leaders and staff will need to spend 40 to 80 hours per year developing targets, measuring results, analyzing performance, and identifying plans to improve performance.

Recommendation 1-2: Implement an internal audit function at TUSD that reports directly to the governing board.

TUSD does not have an internal audit function, which is unusual for such a large school district. Internal audit provides the necessary checks and balances for large organizations to minimize organizational risks such as non-compliance, theft, inefficient practices, or other unfavorable circumstance. Internal audit functions should report directly to the governing board and the work of internal audit should be based on a comprehensive assessment of district risks. Other special projects requested by the governing board may be warranted, but the vast majority of the internal audit effort should relate to the highest risks of the district identified through an independent risk assessment. A risk assessment is an independent evaluation of the each area of an organization in the context of different types of risk, including the budget and number of staff in the area, complexity of compliance requirements, turnover in staff, risk of theft, risk that objectives are not achieved, risk of inefficiency, risks associated with implementing new technologies, and other factors.

TUSD should develop an internal audit charter, conduct a risk assessment, and then identify the amount and types of resources it needs to implement an internal audit program. A risk assessment will result in a focused and impactful internal audit function. It will define the technical requirements of the district's in-house and contracted resources and result in the development of a five-year internal audit plan.

The items listed below represent examples of risk factors that should be addressed in a comprehensive risk assessment.

- Injury, accident, illness, or death of students or employees
- Violation of laws, regulations, or rules
- Fraud and theft risk factors
- Violation of contract terms or grant provisions
- Department failure to meet stated objectives or goals
- Ineffective – or inefficient – use of TUSD resources
- Risk of inaccurate data for administrative management reporting
- Negative public sentiment towards TUSD

Internal audit functions are commonly associated with accounting and financial matters, but the function should address all program, operational, and administrative areas in a school system, including special education, technology and information systems, safety and security, construction management, and transportation. Accordingly, an internal audit function should be staffed with an internal audit director, and two to three additional staff with experience in traditional financial auditing, program compliance auditing, and student information auditing. The district could decide to outsource a portion or all of its internal audit function.

The internal audit function should report directly to the TUSD governing board so that it is independent of the organization it is auditing. TUSD currently has a board audit committee, but the committee does

not have any board members as committee members, and is in essence an advisory board (as prescribed by TUSD board Policy BDFA). The audit committee charter includes the following provisions:

- To assist the governing board in complying with its fiduciary oversight obligations.
- To provide advice and assistance to TUSD staff and make recommendations to the governing board regarding strengthening internal financial controls.
- To provide greater transparency over public funds while improving public trust.

While this advisory committee provides input and advice to TUSD, it cannot oversee the internal audit function because it does not have board members serving on the committee. If the board decides to preserve this advisory committee, it should be renamed the "Board Financial Advisory Committee."

Fiscal Impact

TUSD should hire an outside firm to conduct an independent risk assessment and assist in the development of an audit plan for the district. Hiring an outside firm to conduct a comprehensive risk assessment would cost approximately $75,000.

Based on the size of TUSD, it should invest $250,000 a year in an internal audit function, likely through a combination of in-house (one to three full-time equivalents) and contracted resources. While there is no guarantee, most internal audit functions experience a return on their investment through cost savings or improvements in internal controls.

Recommendation 1-2	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2017-18
Implement internal audit function.	($75,000)	($250,000)	($250,000)	($250,000)	($250,000)	($250,000)

Note: Costs are negative. Savings are positive.

Recommendation 1-3: Maximize the use of available technologies to streamline board meeting management.

The TUSD governing board has a board office that prepares for board and committee meetings, records the minutes of those meetings, and provides information and support to board members. The governing board office currently has a dedicated staff of three full-time equivalent (FTE) positions – one director and two staff assistants. The mission of the governing board office is:

- To represent board members in their roles as the governing body of the Tucson Unified School District.
- To serve as the support staff for board members by performing services required to carry out the duties of their elected office.

- To execute all requirements and details necessary for the conduct of board meetings, hearings and other activities in accordance with pertinent Arizona laws and regulations.
- To serve as a resource for the superintendent, administrators, staff, parents, students, and the community at large for information and referral in response to their requests and needs.

Board members manage their own communications, but the governing board office receives and forwards some communications for board members and other district staff. Open records requests are fulfilled by the TUSD general counsel's office.

The governing board office uses *NovusAgenda* for posting board agendas and related information. *NovusAgenda* is an electronic board meeting software tool to help create, approve, and track board meeting items. This software also allows organizations to automate their paper-intensive process for providing information to board members and supports online communications between board members. This tool is used by other school districts in Arizona, including Vail and Sunnyside. TUSD pays approximately $8,000 per year to use this system.

The governing board office uses this tool, but the office is also requested by the governing board to provide hard copies of board information. This results in a duplication of effort to photocopy, organize, and bind documents.

Other components of the *NovusAgenda* software are either underutilized or not used at all. For example, *NovusMEETING* allows the tracking of motions, votes, and discussions during the meeting to support the development of minutes immediately after the meeting. The governing board office prepares minutes manually after the meeting. This approach does not take advantage of this software and results in delays in finalizing meeting minutes.

The current approach to board meeting management and board minutes production is duplicative, time consuming, and does not take advantage of the available technology. All board members should be viewing board packets, board agendas, board minutes, and board committee information online.

The Governing Board Office Director, in consultation with the board, should define the functional requirements for online board meeting management and evaluate *NovusAgenda* and other solutions against those requirements. Fully implementing an automated solution will significantly reduce the work demands of the governing board office, and accordingly reduce the number of needed positions.

Fiscal Impact

There should not be any additional cost to expand the use of the existing board management software. However, if a different solution is selected the annual cost could increase by up to $4,000 a year based on cost estimates provided by another vendor. Savings can be achieved through the reduction in governing board office positions over the next two years. By fully utilizing the software and converting to full online document management, TUSD should be able to perform governing board office functions through one director position. Unless the governing board office is handling all board member

communications and/or performing independent research for board members, most school board offices operate with one FTE staff or less.

It is assumed that one senior staff assistant position could be eliminated in 2014-15 and an additional position in 2015-16. The base salary for one senior staff position is $50,300 and $63,580 for the other. With an estimated benefits rate of 30 percent, the estimated savings would be $65,390 in 2014-15 and $148,044 in each year thereafter.

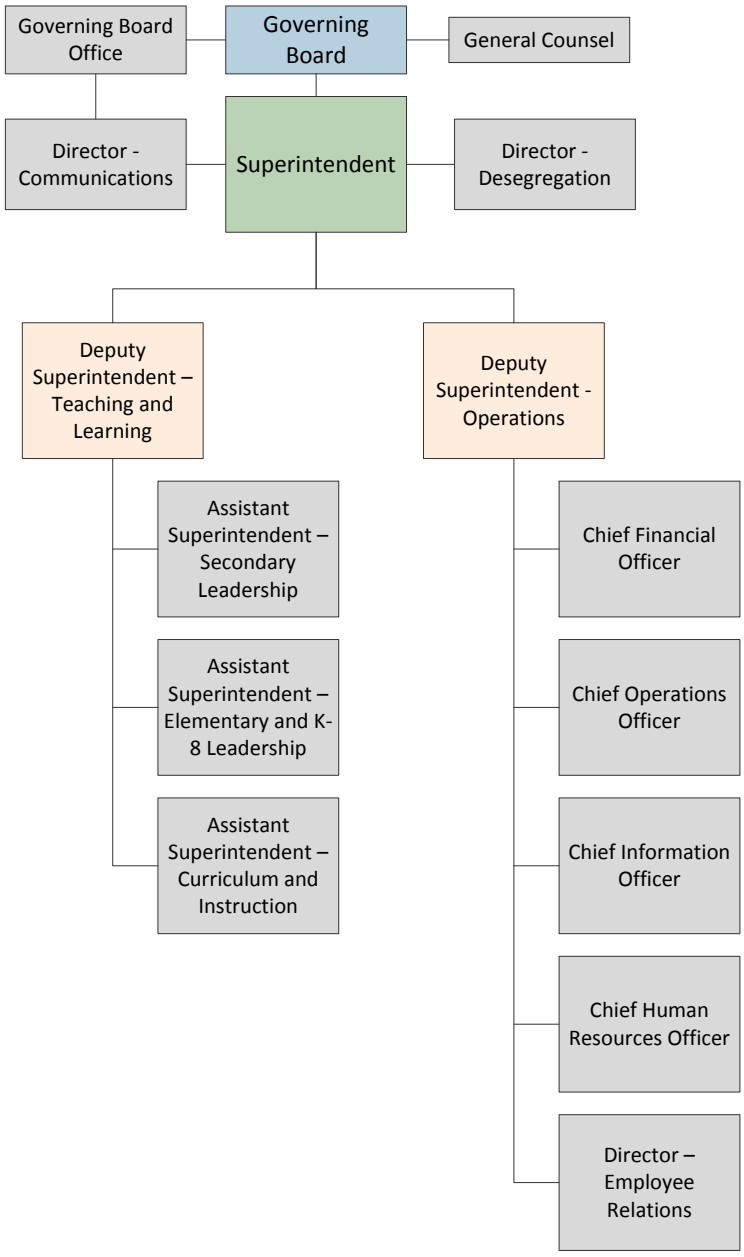
Recommendation 1-3	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Maximize the use of available technologies to streamline board meeting management.	$0	$65,390	$148,044	$148,044	$148,044	$148,044

Note: Costs are negative. Savings are positive.

District Administration

TUSD's organization structure is presented in Figure 1.1. The district is led by the Superintendent, who reports to the governing board. Two deputy superintendent positions reporting to the Superintendent oversee teaching and learning and operations. Two other functions – communications and desegregation – also report directly to the Superintendent. This organization structure was implemented by the current Superintendent in 2013. The primary change made was the addition of a deputy superintendent position over operations.

Figure 1.1. Current TUSD District Organization Structure



Source: TUSD 2013-2014 district organization chart

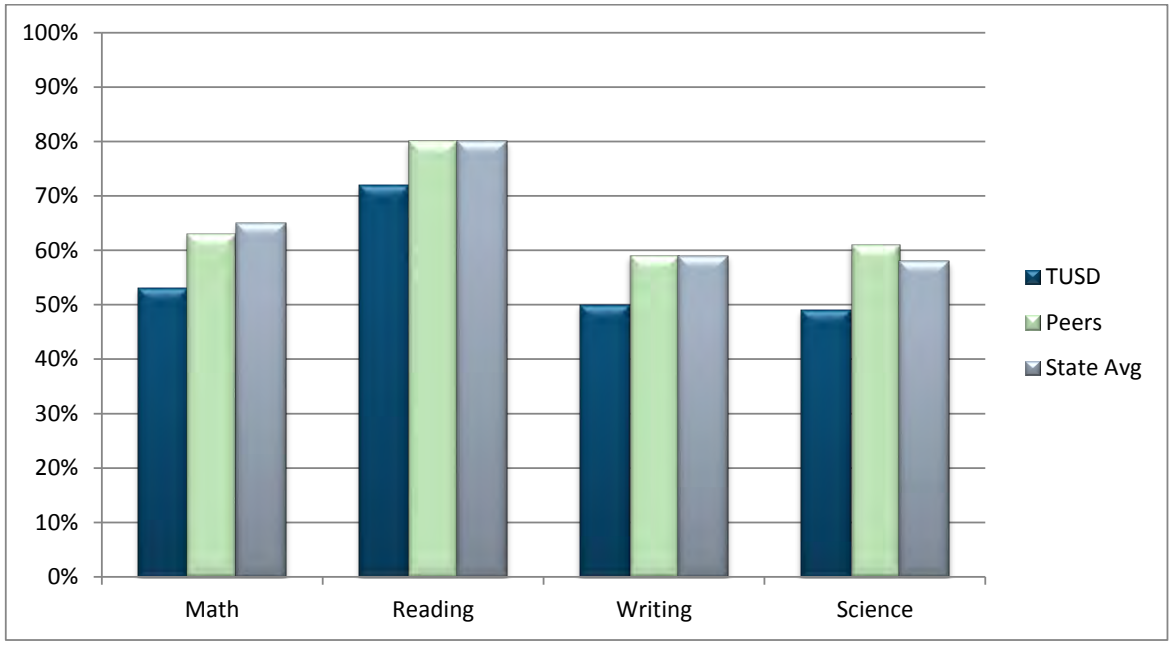
The current district organization chart reflects a logical alignment of functions and reasonable spans of control for a district of 51,000 students. The "deputy superintendent" model is applied by many large school systems. This model recognizes that the superintendent position in a large school system has significant "external" responsibilities with the community and its stakeholders.

Recommendation 1-4: Reorganize instructional and student support services by function.

The Vision for Action of TUSD is "Delivering Excellence in Education Every Day." The extent to which this vision is achieved is largely dependent on the quality of its academic programs and student support services, and the effective and efficient use of district human and financial resources. Having adequate processes in place to identify student educational needs, providing for those needs, and measuring performance as a result of these programs are all critical to the success of an education system.

TUSD has shown some academic gains in recent years, but continues to struggle academically when compared to its Arizona peers and the state average. On the state's A through F grading scale, TUSD has a C grade and 53 percent of TUSD schools have a grade of C or lower. The district scores lower than its Arizona peer districts and the state average in all four core subject areas. Figure 1.2 shows the percentage of TUSD students who met the state standards on the Arizona's Instrument to Measure Standards (AIMS) test compared to its Arizona peer group and the state average for Math, Reading, Writing, and Science. The peer group assigned by the state considers district size, student demographics, and other factors.

Figure 1.2. Percentage of Students who met State Standards (AIMS), TUSD, Peers, and State Average, 2012-13



Source: Arizona School District Spending, Fiscal Year 2013, Office of the Auditor General

TUSD's spending on academic programs and support services is higher than its peers, MPS in particular. MPS is the largest district in Arizona with 62,000 students; TUSD is the second largest at approximately 50,000 students. Table 1.3 shows comparative expenditures per student for TUSD, peer districts, the state average, and MPS. TUSD spends more per student overall and more so in non-classroom areas than classroom spending (as a percentage of the total expenditure). Non-classroom spending, however,

includes amounts for student support and instructional support, both of which are also higher than the peer group, state average, and MPS.

Table 1.3. Comparative Expenditures per Student, 2012-13

Efficiency Measure	TUSD	Peer Average	State Average	MPS
Total Expenditures per Student	$8,421	$7,185	$7,496	$7,706
Classroom Dollars	$4,139	$4,074	$4,031	$4,336
Non-classroom Dollars	$4,282	$3,111	$3,465	$3,370
Student Support	$816	$571	$582	$500
Instruction Support	$589	$374	$448	$533

Source: Arizona School District Spending, Fiscal Year 2013, Office of the Auditor General

As discussed previously in this chapter, most of the higher cost structure can be attributed: to (1) the larger number of schools at TUSD relative to its student population; (2) desegregation spending that is not incurred (or funded) by other Arizona school districts; and (3) higher costs in operational and administrative areas that are discussed in separate chapters of this report. Table 1.4 shows some of the variables that relate to instructional and student support spending. TUSD's pupil-teacher ratio is lower than the state average but in line with the peer average and MPS. A lower pupil-teacher ratio indicates a larger number of teachers relative to the student population. TUSD's average teacher pay is higher than peer and state averages, but significantly lower than MPS.

Table 1.4. Comparative Administration Efficiency Ratios, TUSD and Peers, 2012-13

Efficiency Measure	T USD	Peer Average	State Average	MPS
Pupil-Teacher Ratio	17.9	17.9	18.3	17.7
Average Teacher Salary	$46,592	$44,916	$45,264	$50,188
Poverty Rate (2012)	30%	25%	25%	26%

Source: Arizona School District Spending, Fiscal Year 201, Office of the Auditor General

Overall, TUSD is a higher cost, lower performing district, which suggests that its resources could be better allocated to meet student needs. This recommendation focuses on organizational changes under Teaching and Learning at the district level.

TUSD is under a court-ordered Unitary Status Plan (USP) pursuant to a lawsuit that dates back to the 1970s. Following is a summary of the history of this litigation and the impact on TUSD.

- 1970s – Case brought by parents against TUSD
- 1978-2009 – TUSD operating under court supervision and stipulation of settlement
- 2009-2011 – TUSD declared unitary, no court supervision
- 2011 – TUSD unitary status revoked, returned to court supervision
- 2012 – Special master appointed
- 2013 – USP finalized

The USP requires TUSD to meet specific requirements in order to attain unitary status. To support these requirements, the district is permitted to assess an additional local tax to generate funding. In 2013-14, $62.4 million, or $1,223 per student (based on total enrollment), was budgeted to support district desegregation efforts. These "desegregation" funds are allocated to various functions, as illustrated in Table 1.5.

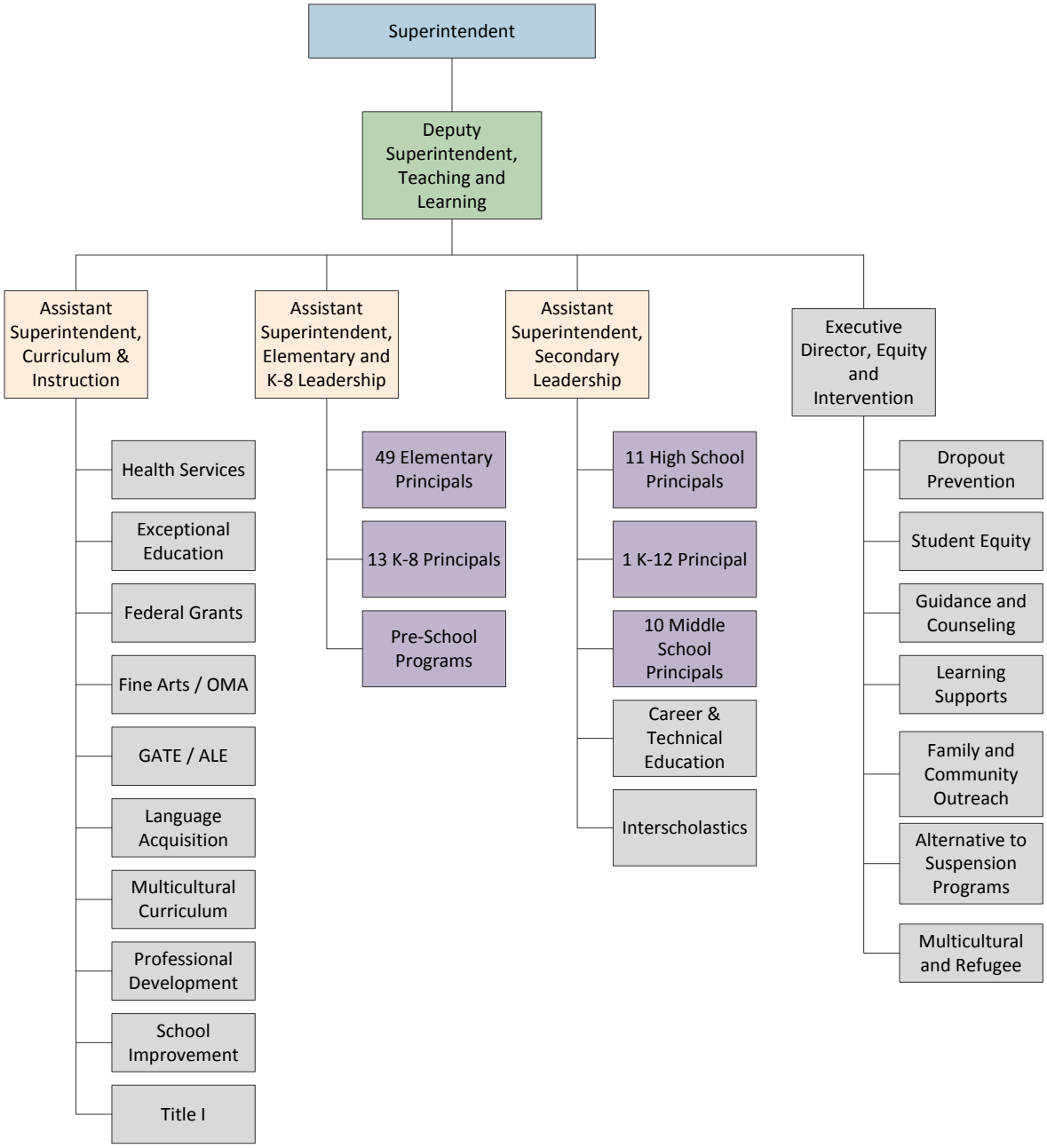
Table 1.5. Budgeted Desegregation Expenditures by Function, 2013-14

Function	Desegregation Expenditures	Percentage of Total
Instructional	$27,531,330	44%
Instructional Support	$13,054,179	21%
District Administrative	$5,043,935	8%
Operations	$520,482	1%
School Administrative	$13,169	0%
Student Support	$8,186,551	13%
Transportation	$8,015,334	13%
Total	**$62,364,980**	**100%**

Source: TUSD FY 2013-14 Budget District Summary

TUSD organizes its academic programs and schools under a Deputy Superintendent, with three Assistant Superintendents and one Executive Director reporting to this position. Figure 1.3 presents the organization chart for TUSD academic programs and support services. TUSD schools and some programs report up through two Assistant Superintendents. Curriculum and instructional services reports to an Assistant Superintendent, and equity and intervention services report to an Executive Director.

Figure 1.3. Current Teaching and Learning Organizational Structure

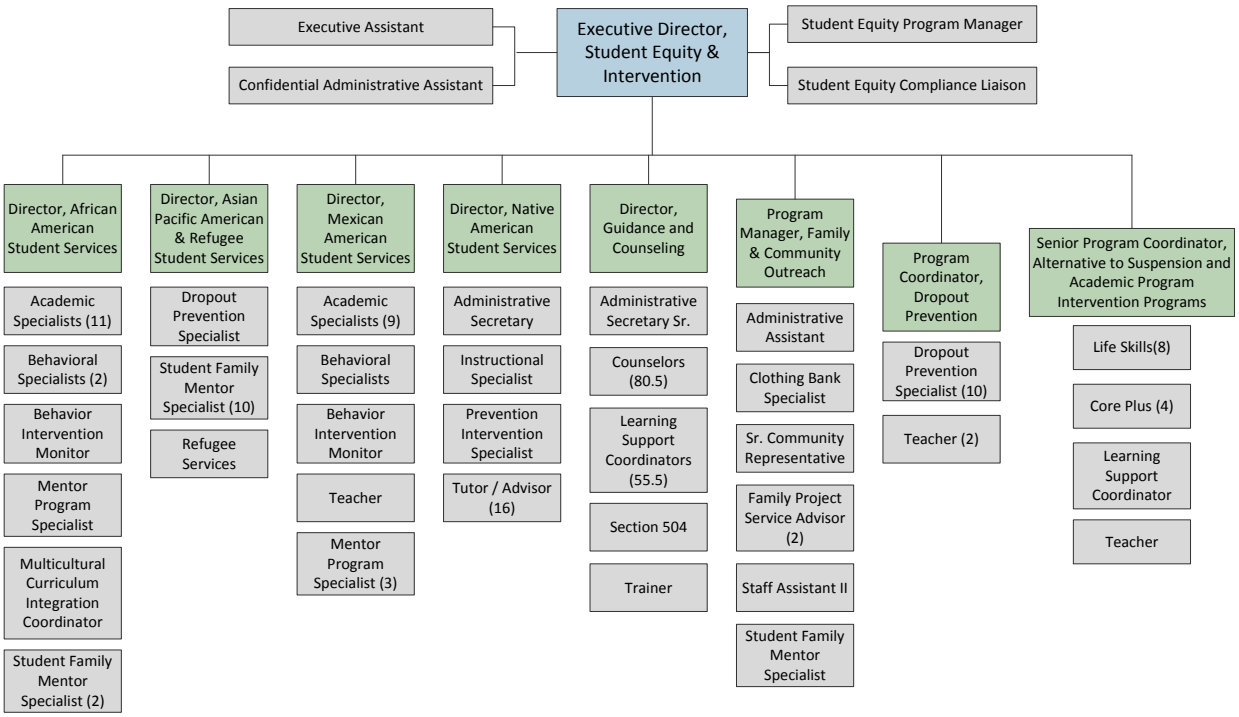


Source: TUSD Teaching and Learning Organization Chart, 2013-2014.pdf

One of the departments under Curriculum and Instruction is Student Equity and Intervention. This department oversees much of the instructional and student support services in the district. The department's organization structure is presented in Figure 1.4. It is led by an Executive Director, who reports to the Deputy Superintendent for Teaching and Learning. Eight managerial positions report to

the Executive Director. Four of these management positions lead student services for particular ethnicities (e.g., African American, Mexican American); the other four relate to functions (e.g., Guidance and Counseling, Dropout Prevention).

Figure 1.4. Current Student Equity and Intervention Organization Structure



Source: TUSD 2013-14 Office of Student Equity Intervention – Org Chart.pdf

The Office of Student Equity and Intervention assigns staff resources to one or more schools based on need, and services under each ethnicity director are not limited to those students. However, the primary focus is on the particular ethnicity. There is no apparent relationship between the number of TUSD students by ethnicity and the number of Student Equity and Intervention staff that support them. Table 1.6 presents the TUSD enrollment, Student Equity and Intervention staff counts that support them, and the respective student-to-staff ratios. The pupil-staff ratios vary widely, ranging from 73 to1 to 2,083 to 1.

Table 1.6. Staff Ratios by Ethnicity, Office of Student Equity and Intervention, 2013-14

Ethnicity	TUSD enrollment	Department Staff FTEs	Pupil-Staff Ratio
African American	2,751	18	153 / 1
Mexican American	31,252	15	2,083 / 1
Pacific American	1,094	15	73 / 1
Native American	1,945	19	102 / 1

Sources: TUSD Ethnic/Gender Enrollment Breakdown for Instructional Day 50, 2013; TUSD 2013-14 Office of Student Equity Intervention – Org Chart.pdf

There are several observations related to the current organization structure for the Office of Student Equity and Intervention:

- Some positions are aligned functionally (counselors, LSCs), others are aligned by ethnicity (academic specialists, behavior specialists), and some are aligned under both (student family mentor specialist).
- Positions exist for some ethnicities and not others:
  - Native American Student Services has 16 tutors/advisors, but no academic specialists; none of the other ethnicity units have tutor/advisor positions.
  - Asian Pacific Student Services has 10 family mentor specialists; African American Student Services has two and the other two ethnicities do not have any.
- The Office of Student Equity and Intervention has several positions that are similar to positions/functions in other departments of TUSD:
  - TUSD's Title I unit under Curriculum and Instruction has community representatives; student equity has family and community outreach staff. There are 47 family and community outreach staff in TUSD, 17 of which report under student equity.
  - Four other academic specialist positions report under the TUSD Internal Compliance Office.
  - Curriculum and Instruction has a multicultural curriculum unit; a multicultural curriculum integration coordinator exists under Student Equity.
- The Office of Student Equity and Intervention provides a wide range of student services, but has no social workers. All social workers report through TUSD's Exceptional Education unit.
- Several position titles do not reflect the type of work being performed:
  - According to departmental leadership, Learning Support Coordinators spend most of their time on behavior program support and training, not student learning matters. The position title does not represent the nature of the work. Section VI of the Unitary Status Plan (Discipline) requires that all schools have a Restorative and Positive Practices Site

Coordinator (RPPSC), yet does allow a school's learning support coordinator to serve as the RPPSC. The RPPSC title more accurately reflects the type of work being done by this position.

- According to departmental leadership and school administrators, academic specialists spend most of their time providing student support services and not academic (instructional) support.

Principals reported that the Student Equity and Intervention staff are very helpful at their schools, but they were not always aware of what the staff did.

The current approach of providing instructional support and student services is organizationally inconsistent and fragmented. Organization structures should represent logical alignments of functions to support coordination and accountability over those functions. TUSD has multiple types of alignments, some of which are functional, others based on ethnicity, and others based on funding source. The district should apply a single, functional approach to its organization of instructional support and student services. Separate organizational units (Desegregation, Title I) can monitor compliance, but service delivery (and the related positions) should be organized functionally.

The Office of Student Equity and Intervention should be re-named the Office of Student Support Services. The current title implies that this department's responsibility is to achieve and maintain student equity, when these should be requirements of every TUSD position connected to students.

Student Equity and Intervention has academic specialists, tutors, and learning support coordinators, but it is unclear to what degree these positions are actually providing instructional support to TUSD students. Before any academic positions are reassigned from Student Equity and Intervention, each instructional and student support services position should be analyzed and observed to validate what the position does.

Once a complete and accurate inventory of all instructional and student support services is validated, all instructional support positions should be moved under Curriculum and Instruction, either under the School Improvement unit or a newly created separate Instructional Services unit. All teaching and multi-cultural curriculum positions should also be moved under Curriculum and Instruction. The remainder of support services should be functionally aligned under the Office of Student Support Services as follows:

- Social Services – including family and community outreach. The Family Engagement Coordinator required by Section VII.B. of the Unitary Status Plan should report under this unit
- Behavior programs / discipline management – all RPPSC positions should report under this unit
- Guidance and Counseling
- Drop-out Prevention
- Alternate Education Programs (Life Skills, Core Plus)

Any TUSD positions providing these direct services under other departments or units should be moved under the respective functional area under the Office of Student Support Services.

The implementation of this change will have several important impacts and benefits:

- Demonstrate organizationally that the entire district is dedicated to student equity, not just one department.
- Improve coordination of instructional (academic) support to students, and in turn improve student achievement.
- Establish functional/technical leaders in each of the functional areas (e.g., discipline management, social services).
- Organizationally support a more coordinated approach to providing support services. This, in turn, will improve accountability over those functions and should help improve students' readiness to learn.
- The validation and possible redefinition and renaming of positions will help clarify and communicate expectations of what that position is to accomplish.
- Identify duplicative and/or overlapping services that could result in either a reallocation or reduction of positions to best meet student needs.

Each functional area should establish goals and measureable objectives and track actual performance against them.

Fiscal Impact

The reduction of director positions under Student Equity will be offset by a new director position over Behavior Programs. The Program Manager for Family and Community Outreach should be upgraded to a director position over Social Services. Curriculum and Instruction will require a director position over Instructional Support Services. The district may choose to eliminate two director positions or reassign them to other purposes.

The fiscal impact of this recommendation cannot be determined at this time. A position inventory and validation exercise needs to occur first in order to determine the types and number of positions for each student support service. Also, all of the recommended changes related to instructional and student support services should not be made without considering recommendations from the district's curriculum audit, which may also have fiscal implications. Because of financial constraints, district leadership should be able to implement this recommendation without incurring additional costs. It is possible that cost savings can be achieved after the position inventory is validated and the curriculum audit is complete.

Recommendation 1-5: Develop a decision-making framework for instructional and school administrators.

TUSD currently does not have a decision-making framework or any single document that defines decision-making authority between the central office and the schools.

TUSD governing board Policy CF (Leadership Principles) states that "All duties, authority, and responsibilities of the principal will be delegated only by the Superintendent or designee." This same

policy states that the principal is "responsible for the operation of the educational program of the school." This implies some level of authority but it is not specific. TUSD Regulation CF-R (Leadership Principles) outlines additional expectations for administrators but does not define decision authority.

The job descriptions for principals outline specific responsibilities, including providing direction on curriculum and instruction, using and promoting the use of assessment data, modeling and supporting professional growth at the school, hiring and evaluating school staff, communicating the school accountability plan, and being responsive to the parents and community. Job description tasks provide a deeper level of detail related to the above responsibilities, but do not define the decision authority of principals. The TUSD policy manual provides guidance on some decisions (e.g., TUSD board policy CFC defines the authority of school councils), but there is no single source for principals or district management to reference in making decisions.

During principal focus groups, teacher focus groups, and school visits, the review team identified examples where the lack of a decision-making framework was contributing to inefficient practices. For example:

- **School leadership.** In years past, schools were provided significant flexibility in determining school leadership positions. In fact, several schools decided to eliminate the principal position at the schools. This led to a leadership vacuum and was later changed.
- **Custodial services.** School principals have decision authority over custodial services at their schools, yet principals are not trained in the operation of a custodial function. Certain decisions related to equipment, cleaning frequencies, and custodial supplies should be made by positions that are trained in such matters. A decision-making framework will help identify where current decision authority may be displaced in an organization.
- **Manual logs.** Some schools continue to use manual logs and spreadsheets as a back-up to the district information systems. Decisions to use these tools are school-based, and contribute to duplicative and inefficient practices.

Historically, TUSD has experienced a wide range of decision-making approaches based on the preference of the Superintendent. Some superintendents exercised more central office authority; others promoted a highly decentralized decision process. At one point, TUSD schools could decide whether to have a principal and two schools actually eliminated the position. While these actions were later reversed, the example shows the potential impact of a management approach that is perhaps too decentralized.

Some decisions, such as curriculum decisions, should be made or guided centrally in order to provide consistent application and efficient operations at the school and district administration levels. Other decisions, such as differentiation of instruction for individual students, can and should be made at the school level. Documentation of a single decision-making framework will help ensure that all principals and district administrators understand the criteria for making certain decisions. Adopting a decision-making framework will ensure its consistent use by all positions involved in decision making. At a minimum, decisions should be identified in the following four categories:

1. **Site-based decisions not requiring district administration approval**. These are decisions that can be made or approved independently by principals or their designees without intervention or approval by district administration. These decisions might include teaching strategies used and assignments of special projects to staff.
2. **Site-based selection from a list of district-provided options**. Examples of selection lists might include computer and instructional software available for purchase. Schools can be provided choices of computer brands and software as long as they meet minimum specifications established by district administration's technology function. Purchasing items that are not on the approved list could result in the inability of the technology function to effectively support the hardware or software. Selecting from a list provides decision-making flexibility within a framework that helps ensure districtwide efficiency and effectiveness.
3. **Site-based decisions requiring central office approval**. Certain decisions, such as hiring or terminating school staff, should require the approval of district administration to ensure compliance with state and federal laws and district policy.
4. **Central office decisions**. There are certain decisions that should be made by district administration and enforced at all schools. A single standardized curriculum and the school bell schedule are examples of decisions that should be established, or standardized, by district administration. In making these decisions, however, district administration should elicit input from schools to ensure that decisions make sense for the schools, as well as the district.

In developing a site-based decision-making framework, the authority, using the four options above, should be defined for the types of decisions. Differing types of decisions are included in the following list.

- Curriculum / curriculum guides
- Academic program decisions
- Ability to re-allocate instructional and/or non-instructional staff to meet needs identified by school
- Response to Intervention
- Benchmark testing
- Course offerings (secondary)
- Identification of professional development needs
- School calendar
- School bell schedule
- Class size
- Bus routes
- Cafeteria schedule
- Authority over custodians and how they spend their time
- Authority over food service workers and how they spend their time
- Work schedules for any categories of staff
- Number of work days per year for any categories of staff

- Block scheduling (secondary)
- Terminating school staff
- Establishing staffing needs
- Establishing non-staff budget needs
- School facility renovations
- Student discipline – code of conduct
- Student activity funds – software / processes
- Class rank determination / computation
- Purchasing decisions as they relate to teachers' or principals' authority to select vendors, versus using the district administration purchasing department or only pre-approved vendors
- Computers / servers
- Instructional software purchases
- Hiring school staff

In implementing this recommendation, district administration should first conduct a brief online staff survey to gauge perceptions of decision-making authority based on the list of decisions, and any additional decision areas desired by district management. A committee of school principals, the deputy superintendents, assistant superintendents, and district leaders from all program and operational areas should be convened to review the survey results and develop the decision-making framework.

Job descriptions for all affected instructional and school administrative positions, assistant superintendent positions, and central office leadership positions should reference the decision-making framework.

Fiscal Impact

The district is expected to need outside assistance ($50,000 in consulting or contractor fees) in implementing this recommendation. This is based on an estimated 250 hours of facilitation and advisory services at an hourly rate of $200. In addition, school and district administrators will need to dedicate approximately 20 hours each to the development of the framework and modification of job descriptions. The outside consultant/contractor will serve as an independent facilitator for the committee and be primarily responsible for developing the decision-making framework materials.

Recommendation 1-5	One-Time Costs/ Savings	2013-14	2014-15	2015-16	2016-17	2017-18
Develop site-based decision-making framework.	($50,000)	$0	$0	$0	$0	$0

Note: Costs are negative. Savings are positive.

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Chapter 2 – Financial Management

Introduction

School districts are public entities entrusted with federal, state, and local funds to pursue their educational mission. Financial managers of school districts are charged with implementing the processes and procedures to manage those funds in accordance with the law, regulations, and district policy. As resources for education become increasingly limited, effective financial management is critical to ensuring that the school system meets objectives.

To thrive in an environment of increasing expectations and limited resources, a successful school district must continue to look for ways to leverage available resources while maximizing learning opportunities for all students. Stated simply, a successful school district operates efficiently, manages its costs wisely, and streamlines operations. Sound financial management includes:

- Developing an organizational structure that balances the responsibilities of financial management, fosters good communication within the department and with other TUSD schools and departments, and enhances the ability of the department to accomplish tasks in a timely manner.
- Formulating budgets to monitor spending, control costs, and enforce accountability across the district.
- Employing processes, procedures, and controls to ensure that vendors and employees are paid accurately and timely, and to ensure that financial transactions are recorded properly.
- Implementing information management systems that facilitate the efficient processing of transactions and the reliable reporting of financial information.
- Accounting for funds entrusted to the district in accordance with applicable federal and state laws.

TUSD's financial operations include payroll, budgeting, purchasing, accounts payable, student fund management, and general accounting functions. These are critical functions because goods and services must be acquired, paid for, and recorded if the district is to accomplish its core mission of educating children.

TUSD's budgeted expenditures (all funds) for the 2014 and 2013 fiscal years were $405.7 million and $400.1 million, respectively. Of the total budget, approximately $188.6 million (46.5%) was allocated for instruction in 2014 and $201.3 million (50.3%) was so allocated in 2013.

Table 2.1 provides summary information about TUSD's Maintenance and Operations Fund (M&O) for the most recent five years.

Table 2.1. TUSD M&O Summary Actual Revenues/Expenditures, Fiscal Years 2008 through 2012

Year	Revenues	Expenditures	Other Sources	Change in Fund Balance	Ending Fund Balance
2008	$357,209,751	$351,123,943	$269,435	$6,355,243	$19,222,087
2009	$333,423,113	$350,241,266	$10,316,895	$(6,501,258)	$12,720,829
2010	$349,809,829	$335,625,193	$16,088,219	$30,272,855	$42,993,684
2011	$313,517,069	$313,919,030	$1,597,981	$1,196,020	$44,189,704
2012	$317,809,992	$316,438,103	$1,084,148	$2,456,037	$46,645,741

Source: TUSD 2012 Comprehensive Annual Financial Report.

Table 2.2 presents information on undesignated or unrestricted fund balances (i.e., funds available to meet future obligations). Since 2008, the unrestricted portion of fund balance has risen to its current level of $44.9 million, or 14.4 percent of budgeted expenditures for fiscal year 2012-13 of $310.5 million. Both total fund balance and the undesignated portion thereof have increased each year, except in 2009. The percentage of future year's budgeted expenditures covered by available funds has also increased substantially since 2010. This trend demonstrates increased financial stability for the district.

Table 2.2 TUSD Appropriations, Expenditures, and Fund Balances (FB), Fiscal Years 2008–2012

Year	Final Budget	Actual Expenditures	Expenditures as a Percentage of Budget	Total FB	Undesignated Fund Balance	Undesignated FB as a Percentage of Total FB	Undesignated FB as a Percentage of Future Years' Budget
2008	$359,680,996	$351,123,943	97.6%	$19,222,087	$17,065,201	88.8%	4.7%
2009	$363,498,623	$350,241,266	96.4%	$12,720,829	$10,247,050	80.6%	3.0%
2010	$338,273,999	$335,625,193	99.2%	$42,993,684	$24,431,693	56.8%	7.6%
2011	$319,887,126	$313,919,030	98.1%	$44,189,704	$41,673,112	94.3%	13.2%
2012	$314,886,520	$316,438,103	100.5%	$46,645,741	$44,949,257	96.4%	14.5%

Source: TUSD 2012 Comprehensive Annual Financial Report.

TUSD expenditures per student in fiscal year (FY) 2013 were $8,421, higher than both the state average of $7,496 and the peer average of $7,185. Table 2.3 compares TUSD's various per student spending amounts to its Arizona peer districts and the state average. TUSD is close to peer districts and the state average on classroom expenditures per student, but is substantially above both averages (37.6 percent and 23.6 percent, respectively) in non-classroom spending.

Table 2.3. Comparative Expenditures per Student, TUSD, Peer Districts, and State Average, FY 2013

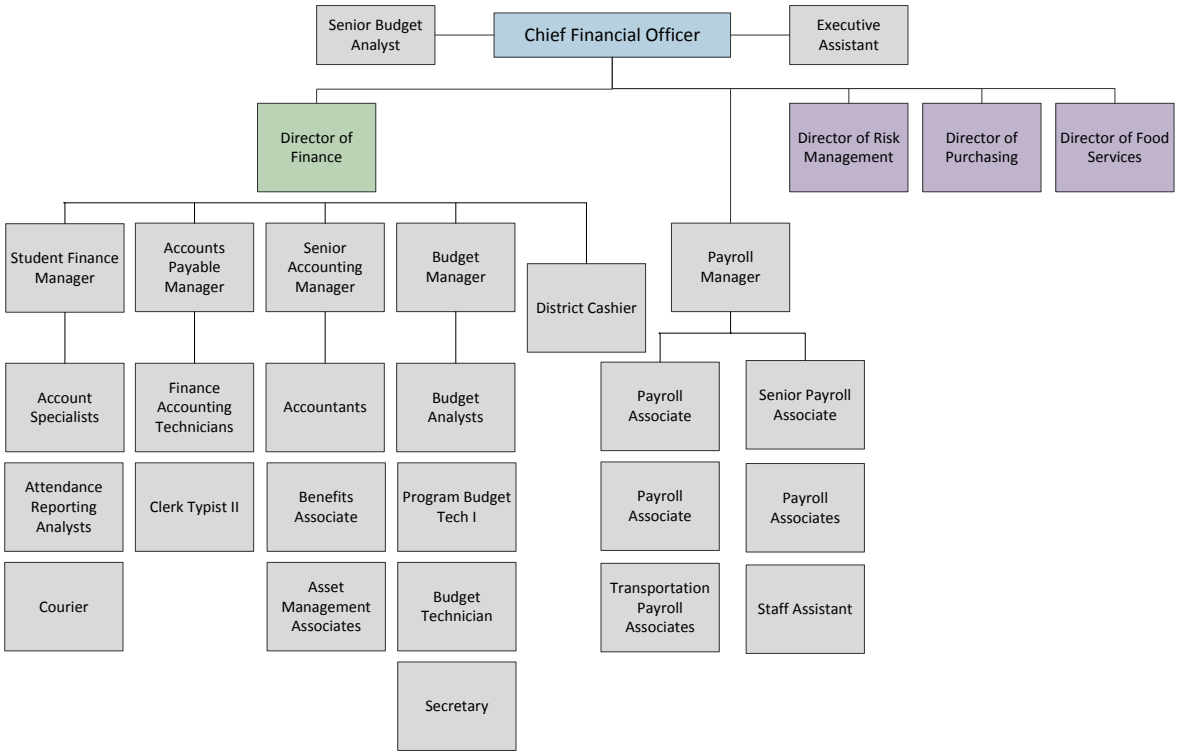
Spending Measure	TUSD	Peer Average	State Average
Total Expenditures per Student	$8,421	$7,185	$7,496
Classroom Expenditures per Student	$4,139	$4,074	$4,031
Non-classroom Expenditures per Student	$4,282	$3,111	$3,465

Source: Arizona School District Spending, Fiscal Year 2013, Office of the Auditor General

Several chapters in this report address causes of this higher cost structure. This chapter focuses on the TUSD Finance Office and opportunities that exist there to streamline operations and reduce administrative costs.

TUSD's financial management functions are executed through the Office of the Chief Financial Officer which is composed of the Chief Financial Officer (CFO), the Senior Budget Analyst, and an Administrative Assistant. The CFO coordinates budget activities for the district and estimates and monitors state funding and other revenues. This office oversees several functions, including finance, payroll, risk management, purchasing, and food services. Purchasing is discussed later in this chapter and the food services area is addressed in a *Chapter 7 – Food Services* of this report. The Finance Office organization structure is presented in Figure 2.1.

Figure 2.1. Current Finance Office Organizational Structure



Source: TUSD CFO-Finance Org Chart.pdf

The Student Finance Manager oversees student activity funds and attendance reporting. The Accounts Payable Manager oversees payment to vendors from all other funds. The Senior Accounting Manager oversees general accounting functions, benefits management, and asset management. The Budget Manager oversees the development of the budget and the approval of positions and budget transfers.

Recommendation 2-1: Reduce Finance Office staffing after new information systems and re-engineered processes are implemented.

In 2012, TUSD implemented the Lawson Financial Information System to support its financial processes and reporting. Previously, the district used PeopleSoft as its financial systems and continues to use PeopleSoft for human resources and payroll functions. The district is considering changing both Finance and Human Resources/Payroll systems. (See related discussion in *Chapter 4 – Technology Management*.)

In 2013, many of the processes in the finance office were analyzed and re-engineered (on paper) to streamline operations and take advantage of available technologies, including those in the current information systems. As of the date of this review, few of the re-engineered processes have been implemented, primarily because the district is considering changing financial information systems again. Once all operational streamlining has occurred, the resulting work demands will decrease and the Finance Office will not need as many positions to perform the work. Districts of similar size using streamlined processes have approximately 60 percent of the positions that TUSD has now. As a result, TUSD will be able to achieve a return on its investment in its information systems once the processes are re-engineered and streamlined, and once the job descriptions are redefined.

Below are examples of inefficient processes identified during this review that have been noted in previous TUSD consultant studies.

Payroll Processing

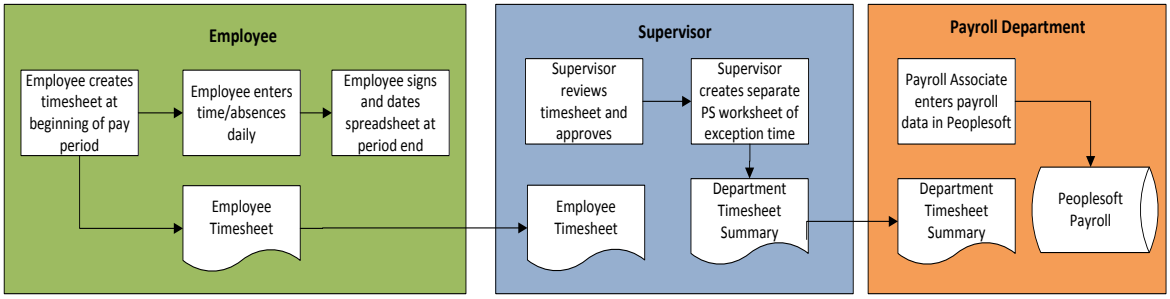
Payrolls are processed using the PeopleSoft application. Payroll data are processed in PeopleSoft and uploaded to the district's primary general ledger accounting system maintained in Lawson. Until recently, TUSD received "partial patches" from PeopleSoft to update the system for various tax tables. However, in the past year, the PeopleSoft vendor has not provided TUSD with these partial patches, so the Payroll Manager has made those revisions in the software manually. This increases the time spent by the Payroll Manager to perform a function that should be automated, but it greatly increases the likelihood of systematic errors in processing. The district has recognized this risk and has engaged a law firm to perform periodic reviews of quarterly taxes, withholdings, and other reported amounts to minimize the risk of errors.

Payroll – Timekeeping

The district uses an automated timekeeping system (Kronos) in only three departments: the Food Service Department, the central district Finance Office, and the Technology Services Department. Altogether, these three departments account for approximately 500 employees out of a workforce of over 7,000.

The rest of the district uses a highly manual and paper-intensive process for time reporting. The process in TUSD for tracking time involves multiple spreadsheets and manual data entry. The process is depicted in Figure 2.2.

Figure 2.2. Timekeeping Process



Source: Gibson Consulting Group, developed from interviews of TUSD staff

The employee timesheet (in Excel format) is downloaded from templates created by the Payroll Department for each pay period. Employees complete the spreadsheet with standard weekly hours, employee department, and identification number. Each employee must print out his/her spreadsheet at the end of each pay period in order to sign the timesheet and provide it to his/her supervisor. The supervisor maintains one spreadsheet for his/her employees and records exception data (i.e., any hours worked in excess of standard time and any leave time [vacation, sick leave, etc.]) taken. This summary spreadsheet is forwarded to the Payroll Department for data entry in PeopleSoft. Because the process is manual, the payroll associates must track all employees in each department to ensure that the supervisor worksheet includes all departmental employees.

There are several benefits of automated timekeeping systems. Automated timekeeping systems, or time clocks, eliminate the need for paper timesheets. Paper timesheets must be completed by the employee, physically transferred to the supervisor and central payroll office, and maintained in paper file storage. Paper records are also copied at various stages. The employee, the department where the employee works, and the Payroll Department will all likely maintain their copy of the timesheet.

Paper timesheets can also be lost or misplaced. It is easier to track electronic records and route these records to the supervisor and Payroll for review and approval. Outstanding records are easier to track using an automated timekeeping system.

Finally, automated timekeeping systems reduce the time and resources necessary for data entry of data from the paper timesheet to the payroll system. Errors in data entry are also minimized using automated time clocks.

TUSD has not updated the Kronos system since its implementation and more recent versions of the software are available. The district should move forward with its plans to fully implement Kronos for all employees districtwide.

Payroll – Integration with Substitute Management System

The district uses an automated system for substitute management called SubFinder. This system manages the process of reporting an absence by a teacher and notifying a substitute of the vacancy. The SubFinder system is designed to track, for payroll purposes, the leave taken by the absent teacher and the time worked by the substitute. However, the SubFinder system is not being used as designed by all schools. Some TUSD schools do not use SubFinder at all, preferring instead to call substitutes directly. Because of the inconsistent use, the TUSD Payroll Department is not using SubFinder to capture substitute days worked for entry to PeopleSoft during the payroll process. Instead, paper worksheets are submitted for each teacher to document the leave taken each pay period, and the individual who substituted for that teacher. All of the steps in the payroll process require the additional time of:

- Teacher – must complete a leave form
- School secretary or administrative staff – must maintain leave documents and, for certain schools, call the substitute teachers
- Substitute Teacher – must review the leave form and sign-off as proof of working as a substitute
- Payroll Associates – must review forms, input leave, and input substitute data directly to PeopleSoft

Chapter 3 – Human Resources of this report contains a recommendation to fully implement SubFinder as the software was designed. Integrating this system with the district's payroll system will provide additional benefits by eliminating manual payroll and leave reporting functions.

Paycheck Stubs

The TUSD Payroll Department produces few actual paychecks each month. Approximately 50 paychecks are issued within any given pay period, and most employees receive compensation through direct deposit to their bank account. The department also utilizes approximately 1,300 pay cards to further reduce the number of paper paychecks issued.

The district still produces hundreds of hard copy pay stubs each pay period, despite the fact that PeopleSoft has a function allowing employees to access their pay stub information online. According to the Payroll Manager, the implementation of eBenefits in PeopleSoft in 2012 resulted in the corruption of certain data files that are used when employees access their leave balances online. The district should resolve the errors in accumulated leave balances to allow the department to discontinue printing and distributing paper payroll stubs for all district employees.

Budgeting – Position Control

Approximately 70 percent of TUSD's expenditures are personnel related. Position control is a critical component of effective district budgeting and financial management. Within the Budget Office, position control is currently managed using a spreadsheet. For smaller districts with only a few schools and modest central office staffing, position control can be maintained adequately using tools such as

spreadsheets; however, for districts the size of TUSD, this method is very cumbersome, labor intensive, and more susceptible to error. Manually updating each personnel change in a spreadsheet (TUSD's position control spreadsheet contains over 10,000 rows of information) creates additional and unnecessary work demands for the Budget Office staff. Changes must be made to the spreadsheet whenever a position is added, when a position becomes vacant, and when the vacant position is filled. The spreadsheet must also be kept in sync with actual personnel records, which requires time for another manual process of reconciliation. Most enterprise resource planning (ERP) systems automate the processing of requests for personnel changes.

Budgeting – Processing of Personnel Action Forms and Recruiting Action Forms

According to data received from the TUSD Budget Manager, the office processed approximately 12,500 personnel action forms (PAFs) and recruiting action forms (RAFs) in the most recent fiscal year, or approximately 4,200 per Budget Analyst. PAFs and RAFs are paper forms and the manual routing procedures for the review and approval of these forms are described in further detail later in this report section. The manual nature for PAF/RAF processing requires additional time for school and departmental staff involved in the process for scanning, copying, and filing each form. Staff in the Budget Office, as well as those of each school and department involved, have established additional procedures to track the status of each form, which requires additional time for processing. Most ERP systems automate the routing of requests for personnel changes. Automated routing would eliminate the additional time spent scanning, copying, filing, and tracking these forms.

Staffing

Other school systems operate with a smaller finance office staff. TUSD was compared to Mesa Public Schools (MPS), Arizona's largest school district, and Katy Independent School District and Arlington Independent School District (ISD), two Texas school districts that have integrated information systems and streamlined processes – best practice districts. All districts are larger than TUSD yet have smaller finance office staff levels. Table 2.4 compares TUSD's Finance Office staffing to these benchmarks.

Table 2.4. TUSD Finance Office Staffing Level Comparisons, FY 2014

Finance Area	TUSD	MPS	Katy ISD (Texas)	Arlington ISD (Texas)
Student Enrollment	49,852	60,404	57,213	64,913
Total Finance Office Employees (FTE)	44	35.5	23	27
Selected Areas:				
Payroll (FTE)	13	8	5	8
General Accounting (FTE)	6	7	5	4
Accounts Payable (FTE)	7	5	8	7
Student Activity Funds (FTE)	4	6.5	-	1
Grant Accounting and Reporting (FTE)	1	4	-	2
Budgeting and Cash Management (FTE)	8	5	2	4

Source: TUSD Finance Office organization chart; MPS information obtained directly from Finance Office; Katy ISD web site: http://www.katyisd.org/dept/bf/Pages/StaffDirectory.aspx; Arlington ISD: AISD Office of the Internal Auditor

Note: Other TUSD finance office positions are not represented in this table as only financial reporting functions are included.

The payroll and budgeting areas appear to represent the most significant opportunities for operational streamlining.

Fiscal Impact

The implementation of new/upgraded information systems and streamlined procedures will reduce the work demands in the Finance Office, primarily in payroll, accounts payable, and budgeting.

The fiscal impact of the reduced work demands assumes a 33 percent reduction (16 FTEs) in TUSD Finance Office positions, beginning in 2015-16 and phasing in over the following three years (five positions in 2015-16, five additional positions in 2016-17, and six additional positions in 2017-18). Assuming an average annual salary of $40,000 and benefits of 30 percent, the estimated savings after full implementation is $832,000 per year.

Recommendation 2-1	One-Time Costs/Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Reduce Finance Office staffing after new information systems and re-engineered processes are implemented.	$0	$0	$260,000	$520,000	$832,000	$832,000

Note: Costs are negative. Savings are positive.

Budgeting and Financial Reporting

The TUSD budget development process begins in August of the prior year and most of the staff effort is fundamentally completed by March. Arizona Revised Statutes Section 15-905 requires that a public hearing and budget adoption occur by July 15th of each year.

Once the budget is approved, the Finance Office enters the budget into the district's financial information systems and compares actual to budgeted expenditures throughout the year. Budget transfers (not requiring board approval) and budget amendments (requiring board approval) may occur during the year as unforeseen events transpire.

Recommendation 2-2: Improve financial reporting to the board and ensure accessibility of financial reporting to department and school leaders.

TUSD Board Policy BBAA specifies that:

> *The role of the Governing Board is to establish District wide policy and direction and otherwise to direct the affairs of the District in the manner specified by law, with day-to-day management of the District primarily being the responsibility of District Administration.*

One of the legal responsibilities of the board is to adopt the district's annual budget. This responsibility includes monitoring the district's budget status throughout the year. TUSD periodically provides budget status reports to the board.

At the February 11, 2014 board meeting, the board received a budget status report of the fiscal year, which began on July 1st. The report contained the financial information through November 30, 2013. Table 2.5 presents the financial data provided to the board for the M&O Fund.

Table 2.5. TUSD Budget Status, November 30, 2013 (in $ millions)

Category	M&O
Projected Budget	$245
Expected Expenditure	$90
Expenditures as of July 31, 2013	$150
Remaining Expenditure	$5

Source: TUSD Board Agenda Item, February 11, 2014, Budget Update FY 2014

The budget update presentation included other budget comparisons to the prior year and more details related to the FY 2014 budget, but no other information was presented regarding the budget-to-actual comparisons nor were explanations as to what the variances meant provided.

A similar presentation was delivered to the board in 2013 on October 22nd for the July 31st budget status. No other budget status reports have been provided to the board during FY 2014. It is important to note that the CFO position at TUSD was vacant from the beginning of the fiscal year to January 2014.

However, in the prior year, the first budget status update (in a format similar to above) was provided at the November 13th board meeting for the end of September financial reporting period.

Neither the level of detail nor the frequency of reporting is sufficient for the board to carry out its responsibilities with respect to monitoring the budget. These variances are analyzed at lower levels by TUSD management, but the results of the analysis are not communicated to the board. TUSD should adopt the following procedures in its budget to actual reporting to the board:

- Submit a budget status report to the board monthly at each regular board meeting.
- Provide budget status by fund, major object category (e.g., salaries, contract services, supplies, etc.), and department (e.g., technology, human resources, middle schools combined).
- Provide percentage of budget expended to date, and the expected percentage of budget expended to date. This is important because the percentage expected does not necessarily represent the number of months to date divided by the 12-month fiscal year. Some expenditures are planned for the beginning of each year or semester; other expenditures are extremely light during the summer months.
- Provide explanations of variances noted in expected versus actual budget variances.

This information will provide the board with sufficient information to know that the budget is being spent according to the plan approved by the board. During the year, certain situations will arise that cause the budget to be amended. Improved budget status reporting will help explain these amendments.

Online budget to actual reporting is also insufficient at the department and school level. Based on interviews with department and school leaders, monthly budget-to-actual reports from the district's financial information systems are not routinely monitored. The district's current financial system is not able to generate this information in the desired format. In addition, there may be several factors as to why available reports are not being reviewed:

- The department leader (or individual having budget responsibility) does not have access to the district's financial information systems.
- The department or school leader has the ability to access the information, but does not do so
  - because lower level staff have the access;
  - and because their own spreadsheet systems are used to monitor budget status (out of concerns that the district's financial system was not up-to-date).

Insufficient reporting leads to those with budget authority not having the information that they need in order to be accountable for their budget. In order to hold department and school leaders, those with budget authority, accountable for spending, real-time access to budget and actual information should be granted to them, and they should use the information to monitor their budget status.

Fiscal Impact

TUSD can implement this recommendation with existing resources.

Recommendation 2-3: Implement the feature in Lawson that checks for available funds for requisitions and budget transfers.

When budget technicians review budget transfer/modification requests, they must also determine the availability of budget funds in each budget code involved in the potential transaction. Lawson has not been configured to automatically check for available funds when purchase requisitions or budget transactions are initiated.

The district should implement the feature in Lawson that checks for available balances whenever the school or department initiates a purchase requisition or budget transfer/modification. The funds available feature would ensure that available funds exist before the school or department can initiate transactions and also would reduce the time and effort of budget and accounting staff.

Fiscal Impact

TUSD can implement this recommendation with existing resources.

Recommendation 2-4: Reduce the volume of Personnel Action Forms by eliminating multiple codes for substitutes.

The PAF is used to document and approve any changes in personnel or payroll. For example, when an employee changes his/her position or moves to another school, a PAF is required to approve the change and record the new job code number in PeopleSoft. The PAF is a paper form and requires manual routing for review and approval. Each PAF must be approved by the following:

- School or department (initiating employee)
- School principal or department director
- Finance – Budget Office
- Human Resources – Recruitment
- Human Resources – Records
- Payroll

Multiple job codes are used for substitute teachers that correspond to certain schools, length of service, and other factors. One individual working as a substitute for the district over time may have several different position numbers. Whenever a change occurs, a new PAF must be completed and approved before that person's pay can be processed. These changes include substituting for teachers at different schools and working for more than 10 consecutive days (for pay differential). These types of changes occur frequently.

The district should eliminate the multiple codes used for substitute teachers by implementing a substitute management system that captures all necessary information automatically.

Other school systems use one position control number for all substitutes and the substitute management system can determine what differential rate of pay is appropriate based on the school location and tenure – no personnel action is required unless the substitute becomes a regular teacher.

Fiscal Impact

TUSD can implement this recommendation with existing resources.

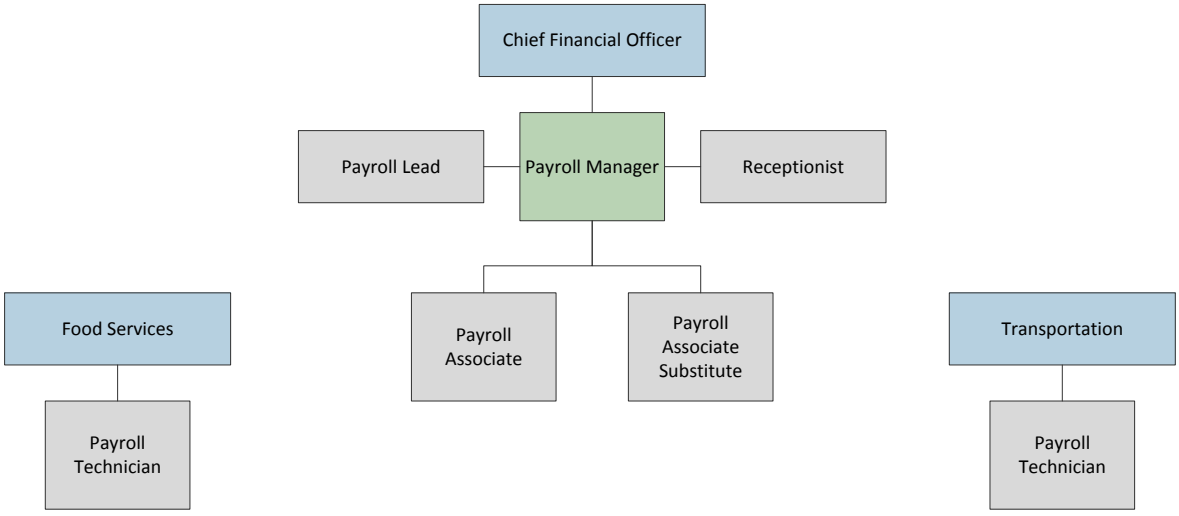
Payroll

The goal of an effective payroll system is to pay valid district employees on a timely basis. The Payroll Department is a critical TUSD support function that requires sound fiscal and operational management because of the federal and state laws governing the compensation of district staff. The Payroll Department utilizes specialized timekeeping and information processing software to record employee time, to track leave balances, and to pay district staff on a timely basis.

Recommendation 2-5: Consolidate district payroll functions under the Chief Financial Officer/Payroll Manager.

TUSD employs 16 payroll staff in three departments: the central district payroll office under the CFO, Transportation, and Food Services. The staffing for the payroll function is shown in Figure 2.3 below.

Figure 2.3. TUSD Payroll Functions



Source: TUSD Organization Charts

The Payroll Manager in the Finance Office is responsible for all district payroll functions. The staffing within the central district payroll office also includes a vacant lead position and eight payroll associates. Two of these payroll associates are responsible for processing substitute teacher payrolls, and the other associates process monthly and bi-weekly payrolls. Two of the associates are hourly employees and not permanently budgeted in the Payroll Department.

In addition to the central Payroll Department, the district also employs payroll staff in Transportation and Food Services. The Transportation Department includes three payroll technicians who assist the central office in gathering and processing timesheets, leave, and other payroll data for approximately 560 transportation employees located in the East, Central, and West bus terminals, respectively. The Food Service Department employs two payroll technicians with responsibilities similar to their counterparts in Transportation. Approximately 360 food service employees are paid on a bi-weekly basis.

TUSD should realign and consolidate its payroll staff under the CFO to support increased accountability over the payroll function. Supervisory review of time sheets will still occur at the departmental level for all departments.

Fiscal Impact

TUSD can implement this recommendation with existing resources.

Fixed Asset Management

In addition to general accounting and financial reporting, the General Accounting Office manages the district's inventories of furniture, fixtures, and equipment. The district's current policy is to capitalize (create a depreciable asset account as opposed to an operating expense) all assets with an acquisition cost of $5,000 or more, and to tag and track all assets with value of $1,000 or more. An asset listing provided for this review showed over 12,000 tracked assets of $1,000 or more with cost, applicable depreciation for assets greater than $5,000, and net value as shown in Table 2.6 below.

Table 2.6. TUSD Capital Assets, 2013

	Amount
Original cost	$425,897,255
Accumulated depreciation, to date	$123,672,113
Net book value	$302,225,142

Source: TUSD Detailed Asset Listing, November 2013

Recommendation 2-6: Implement bar codes and scanners to more efficiently track fixed assets.

Of the 12,000 tracked assets, approximately 6,500 have an original cost under $2,000. These assets comprise over 50 percent of the total number of assets, but represent less than 2 percent of the total original cost.

District policies require the physical verification of all assets regardless of age or net book value. The district is also considering tracking additional items less than $1,000 that may have the tendency to "walk away." This includes electronic tablet devices, digital cameras, and other technology purchases.

The district affixes a numerical tag to each equipment item; however, the department does not use a bar-coded asset tagging system that would enable school and departmental staff to efficiently scan equipment items using hand-held scanners or wands.

The efficiency of the asset management function would be improved by utilizing bar codes and hand-held scanners for equipment tagging, and by developing a risk-based hierarchy of assets for annual verification that considers factors such as equipment type, age, and net book value.

Fiscal Impact

This recommendation will require investment in hand-held scanners to streamline the annual inventory process. The district will need to develop a Request for Proposals to purchase the necessary equipment, but it is estimated that the one-time cost will not exceed $50,000.

Recommendation 2-6	One-Time Costs/Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Implement bar codes and scanners to more efficiently track fixed assets.	($50,000)	$0	$0	$0	$0	$0

Note: Costs are negative. Savings are positive.

Purchasing

The Purchasing Department oversees purchasing for most TUSD schools and departments. Purchasing for Food Services and Student Accounts are managed by staff in those departments. Student finance procurement is handled by three student finance account processors. Food Services staff includes two purchasing specialists.

The volume of purchase orders (PO) processed in 2012 and 2013 are shown in Table 2.7. Total POs processed have declined by 6 percent.

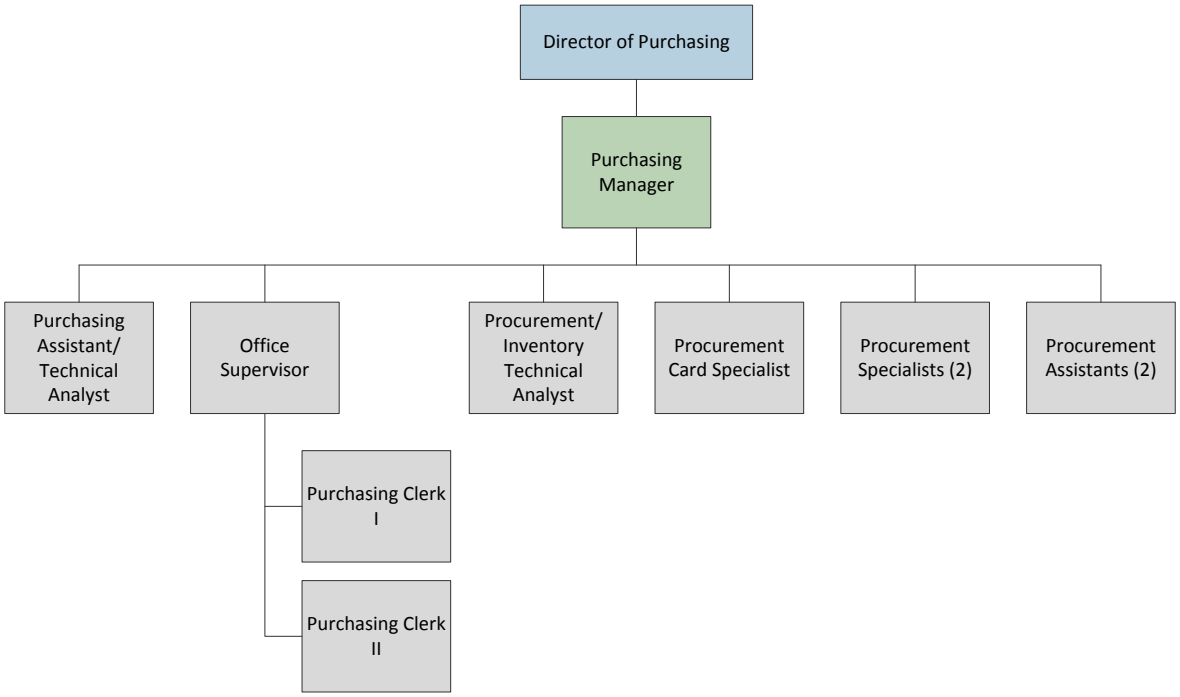
Table 2.7. Purchase Orders Processed, FY 2012 and FY 2013.

Department	2012	2013
Purchasing Department	11,542	10,656
Food Services	5,804	5,687
Student Finance	3,903	3,604
Totals	**21,249**	**19,947**

Source: Tucson Independent School District Purchasing Department

The TUSD Purchasing Department is comprised of 12 positions as shown in Figure 2.4.

Figure 2.4. Current Purchasing Department Organizational Structure



Source: TUSD CFO-Finance Org Chart.pdf

Staff of the department do not all report to the Purchasing Manager as indicated in the organizational chart; supervisory duties of the office are shared by the Director and Manager. Both employees also assist staff in large dollar or complex contractual procurements. The duties of other department staff are as follows:

- Office Supervisor – supervise the work of the purchasing clerks.
- Purchasing Clerk (I and II) – process purchase orders and provide administrative support for the buyers.

- Purchasing Assistant/Technical Analyst – provide technology support for the department and liaise with the TUSD Technology Services Department with respect to purchasing-related application development.
- Procurement/Inventory Analyst, Procurement Specialists, Procurement Assistant – all function as "buyers" by supporting TUSD departments in sourcing goods and services. Each buyer specializes in purchases of different commodity types (maintenance, transportation, academic services/supplies, etc.).

Recommendation 2-7: Develop procedures and controls for the district's procurement card program.

The TUSD procurement card program (the Plan) was presented to the TUSD Board of Trustees at its December 2012 meeting, at which time a contract with a financial institution for procurement card services was discussed and approved. The plan included steps to immediately begin using procurement cards (P-Cards) to facilitate payments to certain vendors to take advantage of rebates offered by the card issuer. The plan also included one step in the implementation to "explore how P-Card can be inserted at the Site/Department in accordance with purchasing rules and regulations." As of the date of our review, this aspect of the plan had not been undertaken, but is planned for next year. Subsequent to the review team's site work in January 2014, the district met with the Arizona Auditor General to address issues of compliance with Arizona regulations and general internal control considerations.

A procurement card, also known as a P-Card, is a type of charge card that allows goods and services to be procured without using a traditional purchasing process (issuing purchase orders, etc.). P-Cards are usually issued to employees who are expected to follow their organization's policies and procedures related to P-Card use, including reviewing and approving transactions according to a set schedule (at least once per month). Unlike typical credit cards, organizations can implement a variety of controls for each P-Card, such as:

- A single-purchase dollar limit
- A monthly limit
- Merchant category code restrictions
- Restricted use for specific vendors

A cardholder's P-Card activity should be reviewed periodically by someone independent of the cardholder, such as the employee's supervisor. The data provided by the credit card issuer can also be analyzed statistically to identify anomalies or inappropriate charges.

Typically, a P-card is used for smaller dollar purchases of goods and services (less than $1,000 per purchase) in lieu of the normal requisition and purchase order process. Procurement cards significantly reduce the time and effort that purchasing staff would normally spend on goods and service where the sourcing and pricing of the items is not considered critical. Procurement cards also significantly reduce the volume of invoices processed by accounts payable staff because only one disbursement – to the credit card issuing bank – is made monthly instead of hundreds of smaller dollar checks.

The data provided by the credit card issuer can also be uploaded directly to the accounting system, eliminating the data entry for thousands of individual transactions each month.

In implementing P-Cards, TUSD should:

- Continue to work with the Arizona Auditor General to determine the best method for satisfying regulatory requirements.
- Develop policies, procedures, and controls for procurement card use, including a user's manual for all cardholders and approvers.
- Implement training for all card holders and approvers.
- Develop tools for the automated upload of cycle-end financial data directly to the district's financial ledger system.

Fiscal Impact

Implementing the procurement card program could be accomplished with existing resources. While the efficiency gained by implementing a procurement card program may not result in the reduction in Purchasing or Finance Office staffing, these staff members may be able to shift their efforts to more valuable account analysis or work with schools and departments to improve the use of resources.

Recommendation 2-8: Expand "punch-out" purchasing programs with high volume merchants.

The district currently has a punch-out catalog with Office Depot; however, the process is not fully automated. In a punch-out system, the communication between high volume vendors and the district is all handled electronically. The district employee logs into the vendor's network to place an order and all related data for the purchase, including the purchase order and invoice, are shared electronically. Typically, the vendor is also paid directly through electronic funds transfer rather than with a regular check, which further simplifies the process. The range of goods available and the prices negotiated can be updated electronically, and the volume of paperwork handled by purchasing and accounts payable staff is greatly reduced.

The district should identify other major vendors that conduct a high volume of business with the district and work with those vendors to develop interfaces through which POs, invoices, and payments can be exchanged electronically.

Fiscal Impact

Expansion of the program to other vendors and the enhancement of the relationship with Office Depot can be accomplished with existing resources.

Recommendation 2-9: Implement performance measures for the Purchasing Department.

Currently, the department tracks only one measure of productivity and efficiency: the average time required to process purchase transactions, from creation of the purchase requisition to the issuance of the PO. That measure has improved from 8.72 days in 2012 to 8.04 days in 2013. Estimates of the time required to process transactions before the automation of the work flow using Lawson in 2011 was approximately 21 days.

Other measures of productivity and efficiency that the department should consider tracking include:

- Competitive Procurements – Total purchase dollars for purchases above the single quote limit that were competitive divided by total purchase dollars for purchases above the single quote limit.
- Strategic Sourcing – Total vendor dollar spend for strategically-sourced goods and services divided by total procurement dollars spent, less construction spending.
- Procurement Card Transactions – Total number of procurement card transactions divided by the total number of procurement transactions.
- Procurement Card Spend – Total dollars spent by the district using procurement cards divided by the total procurement dollars spent by the district.
- Purchasing Office Operating Expense Ratio – Total Purchasing Department (payroll and non-payroll) expenditures divided by total procurement dollars spent by district including procurement cards, less construction.
- Certified Professional Staff – Number of professional purchasing staff and supervisors with certifications divided by the total number of professional purchasing staff and supervisors.
- Processing Time – Average number of days to process all requisitions.
- Electronic Procurement Transactions – Total number of electronic procurement transactions (e.g., punch-out catalog) divided by the total number of procurement transactions, including procurement card transactions.
- Cost per Purchase Order – Purchasing Department expenditures divided by the total number of procurement transactions.

Where practical, comparison of TUSD performance measures should be made to established benchmarks or peer districts. Table 2.8 provides two examples of TUSD calculated performance measures compared to the most recent Council of Great City schools (CGCS) survey. Both of these measures indicate that there is room for greater efficiency at TUSD.

Table 2.8. Performance Measure Comparison

Measure	TUSD	CGCS Median Score
Purchasing Office Operating Expense Ratio	1.47%	0.54%
Cost per Purchase Order	$68.33	$53.51

Source: Financial and operating data per TUSD 2013 and 2014 Budget Book; Council of Great City Schools

Fiscal Impact

TUSD can implement this recommendation with existing resources.

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Chapter 3 – Human Resources

Elementary and secondary education is a labor-intensive undertaking: nationwide personnel costs typically consume at least 80 percent (or more) of the average school district budget, according to ongoing reports by the Association of School Business Officials (ASBO). Consequently, effective school systems place a major emphasis on human resources management.

The employees of any school district are its most valuable asset. The recruitment, selection, orientation, training, salary, and benefits provided to the workforce contribute greatly to the effectiveness of the district. To comply with state and federal laws and to maintain a high-quality, effective workforce, a school district must ensure the appropriate licensing of professional staff and instructional support staff as well as ensure that all teachers and paraprofessionals meet "Highly Qualified" criteria as defined by the Federal law commonly referred to as *No Child Left Behind (NCLB)*.

Leading human resource (HR) and organizational measures from the Society for Human Resources Management (SHRM) provides metrics for benchmarking using a database of more than 1,500 organizations including some public school systems. In its research, *2012 Human Capital Benchmarks Report*, SHRM provided these benchmarks related to HR budgeting:

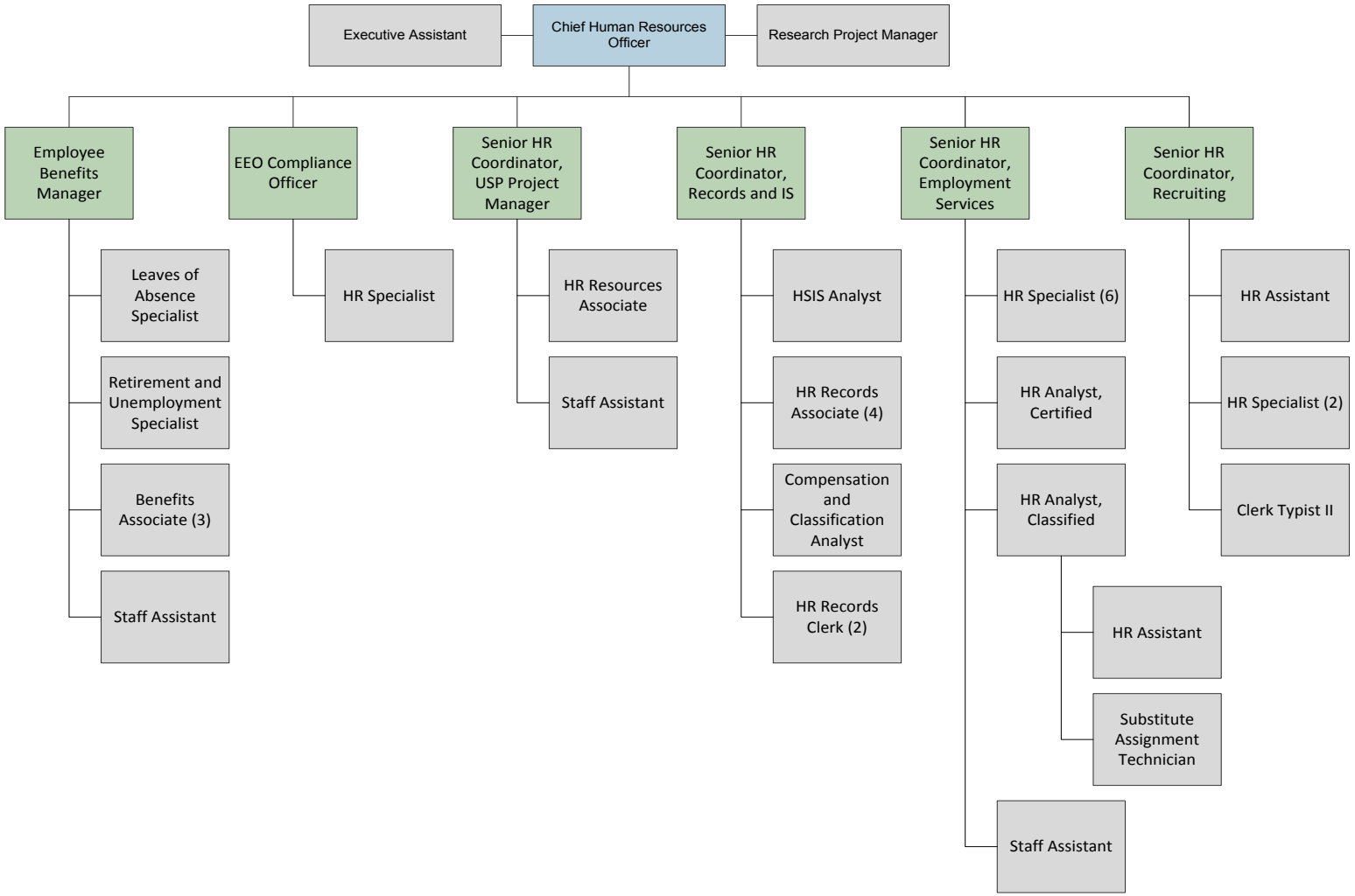
- *HR Expense to Operating Expense Ratio*: This metric depicts the amount of HR expenses as a percentage of the total operating expenses. Although SHRM does not suggest a specific budget percentage to spend on HR functions, it can be used to assess spending trends over time.
- *HR Expense per Full-Time Equivalent (FTE)*: This metric shows the amount of HR dollars spent per FTE. The 2012 SHRM benchmarking study reports that the HR expense per FTE rate remained relatively stable at a median of $1,174.[4] Another report from The Hackett Group reported in September 2013 that companies defined as "world class" – the top 25 percent of companies among the thousands that Hackett studies – spent $1,390 HR dollars per employee annually.[5]

The current organization of the Tucson Unified School District's (TUSD) HR Department is shown in Figure 3.1.

[4] Human Capital Benchmarks Report. (2012). *Society of Human Resource Management*. Retrieved from http://www.shrm.org

[5] Bression, Nathalie and Schneider, Lynne. How leading human resources organizations outperform their peers. The Hackett Group: September, 2013

Figure 3.1. Current Human Resources Department Organizational Structure



Source: TUSD, November 2013

Based on 2013-14 budget figures of $3,092,972 for central HR operations, the department has an HR Expense to Total Operating Expense of $1:$131[6] or 0.8 percent. Based on 2013-14 budgeted FTE, the department has an HR Expense per FTE of $474.36.

Recommendation 3-1: Reorganize the HR Department, creating a development team that will have no daily routine responsibilities but will instead be focused on the myriad of systems and procedural improvements that are needed in the department.

The HR Department is not optimally structured. Although the department and the district have diligently identified, documented, and analyzed a number of operational challenges in work flow processing, digitization, and process improvement, little action has been taken. The 2008 District Management Audit conducted by MGT of America, which made 11 recommendations overall for improving the HR Department, made a number of recommendations regarding these areas:

- Develop and implement a comprehensive human resources strategic plan according to a continuous improvement model to guide decision making and document accomplishments and results.
- Develop a plan for an integrated human resources and payroll management system.
- Conduct a study for an electronic document imaging and file management system, and convert all employee personnel files to an electronic format.
- Develop a comprehensive Web-based employee handbook that cross references key employment information, rules, and regulations related to various contract requirements, and contact information for all human resources departments.
- Develop a TUSD strategy and plan to simplify and standardize employee leave accrual, usage, monitoring, and accountability that can be the basis to revise Governing Board policy and to negotiate with employee bargaining units.

While progress has been made in some of these areas, five years later, none are complete. In 2012, TUSD completed a year-long project of business process mapping roughly 100 separate processes and sub-processes within the payroll, HR, benefits, and recruiting functions of the district. Of these, 46 were deemed to be "high-priority business processes," of which 19 were considered to be related to HR, seven were benefits-related, and six were recruiting-related. The executive summary of the 2012 report noted:

> *Department employees are more comfortable with paper, and therefore have done little to change the status quo with regard to how information travels throughout the district. Paper-based systems are hugely inefficient, as they require more energy to move, to manipulate, to analyze and to archive. Our estimate is that between 25% and 30% of*

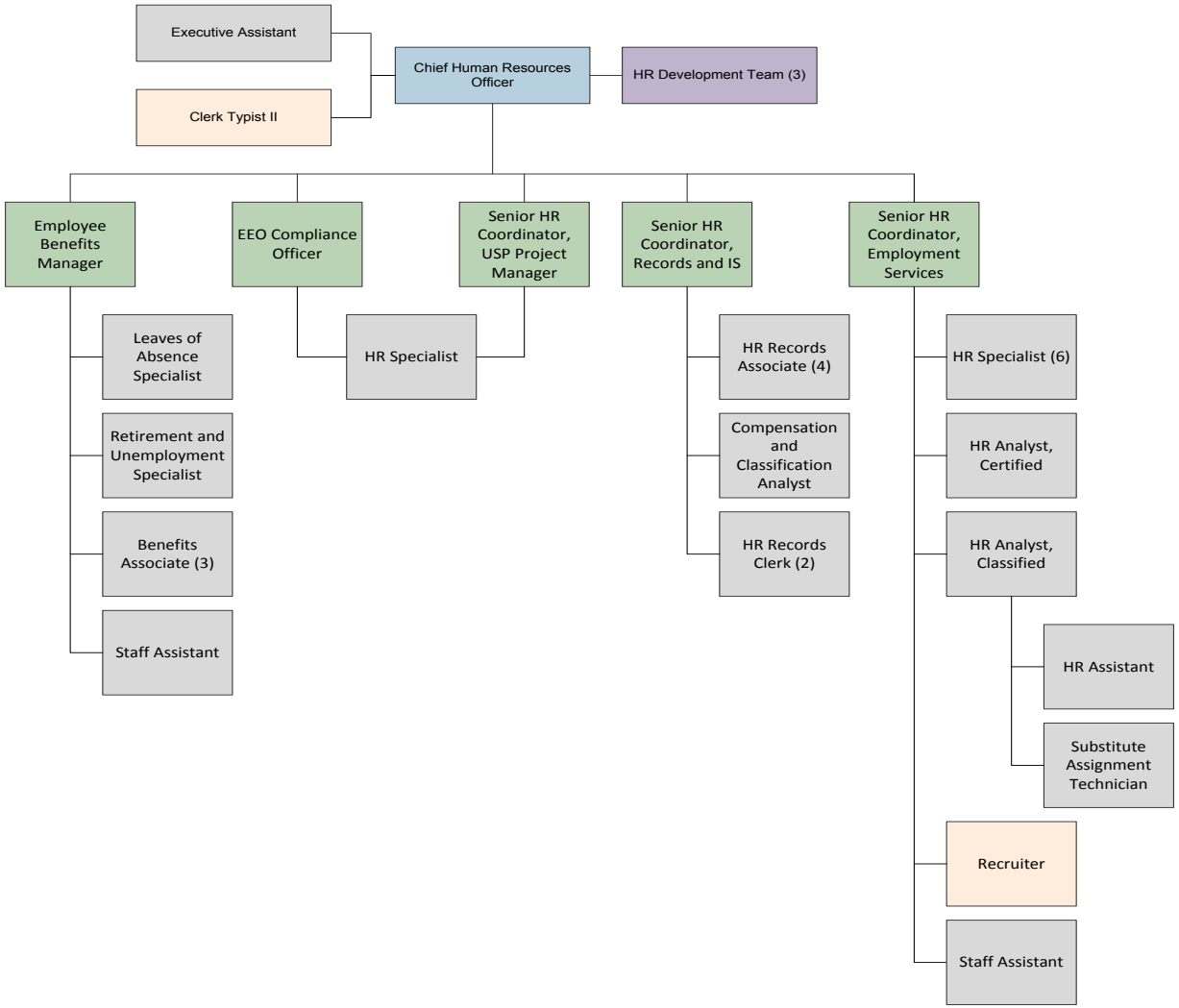
[6] Total Operating Expenses of $405,698,324 less capital expenditures of $15,256,364.

TUSD's administrative workload is wasted on the inefficiencies inherent in paper-based systems.

The report further identified the Personnel Action Form (PAF) and Recruitment Action Form (RAF) as being essentially tipping points for "almost every major inefficiency" and noted that "concentrating heavily on these recommendations will give us the leverage and time that we need to optimize the remaining processes." Yet, the review team found that little actual progress has been made in improving the PAF and RAF since the publication of report. There is a committee of 14 staff members assigned to work on development of the electronic version of the RAF (eRAF), but the work has not been completed.

In discussing the root causes for the district's slow movement on issues its own staff have declared to be "high priority", it appears that one cause is the lack of anyone in the HR Department having sole focus on strategic development. All current HR staff members have day-to-day, transactional responsibilities and are expected to layer strategic work on top of or around those tasks. This has not yielded sufficient progress on the efficiency initiatives. For that reason, the review team recommends the reorganization of the department shown in Figure 3.2.

Figure 3.2. Recommended Human Resources Department Organizational Structure



Source: Gibson Consulting Group, Inc., 2014

Key features of this reorganization include:

- *The creation of a three-person development team, to be staffed by a Senior HR Coordinator, the HSIS Analyst, and one HR Assistant or Specialist.* This team would have no daily, transactional duties but would instead be focused entirely on the implementation of recommendations made in this chapter, implementation of recommendations made in the 2012 process redesign study, and the 2008 MGT study. Although not a typical organizational unit within an HR Department, the review team believes it necessary if the district is ever to move from discussion and analysis to action and improvement.

- *The elimination of two positions that are currently vacant.* As the development team begins its work, the department may find it needs additional personnel in categories not yet defined, or with different skill sets than currently outlined in the two vacant positions. The review team recommends that those positions not be filled at this time so it will have the organizational flexibility to create any new positions that are needed in the future.

The current physical locations of the HR Department do not support development of an effective, efficient, cohesive unit. Team members are physically separated from each other. Ideally, all HR staff members should be more co-located. However, the review team recognizes this is likely not possible in the short term, given the layout of the TUSD central office. If renovation or relocation becomes a possibility, the HR Chief Human Resources Officer should oversee a better physical arrangement of the department that facilities a much higher level of interaction.

Nevertheless, physical accommodations should be made for the recommended development team. To facilitate the transition of development team members from their current focus on daily tasks to strategic development, the team should be relocated into the offices currently occupied by the recruiter and HR staff across the hall. This will place the team in the area immediately adjacent to the HR Director, but will remove them from the daily activity of transactional human resources functions.

Fiscal Impact

Not filling the two vacant positions will save the district approximately $84,243 per year (total department budget of $416,163 divided by 9.88 FTEs). This savings will likely be realized for at least two years. After that, the HR Department may identify a need for additional staffing, based on the work of the development team.

Recommendation 3-1	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Reorganize the HR Department.	$0	$84,243	$84,243	$0	$0	$0

Note: Costs are negative. Savings are positive.

Recommendation 3-2: Improve the hiring process in several areas.

The TUSD hiring process is lengthy, at least in part due to systems issues. The 2008 MGT study reported that almost none of the TUSD staff felt the recruiting and hiring process for teachers was effective. As noted in the report:

> *…a significant majority of teachers (97 percent), principals and assistant principals (80 percent), and central office administrators (91 percent) indicated disagreement with the statement "Our district has an effective process for staffing critical shortage areas of teachers." On a related survey question, the same respondents were asked their opinions on the following statement: "Our district has an effective teacher recruitment plan." Disagreement with this statement ranged from 90 percent for teachers to 61 percent for principals and assistant principals and 85 percent for central office administrators.*

Based on interview comments from current TUSD leadership, little progress has been made in this area to date. The district identified problems with the RAF as long ago as 2011, but has to date not effectively addressed them. The time to hire in the district is estimated to range from two to 12 weeks.

The review team identified several subareas within recruiting and hiring where improvements are needed.

Recruiting

The recruiting process could be improved. The 2008 MGT report recommended that the district "Develop and implement a strategic comprehensive teacher recruitment and retention plan designed to increase both the number and diversity of applicants, and to provide workplace enhancements to reduce the turnover rate." This has largely not been done yet. Meanwhile, the number of teachers leaving the district each year remains high (Table 3.1), making effective recruiting even more critical to the district.

Table 3.1. Number of Teachers Who Left the District by Year

Calendar Year	Number of Teachers Who Left
2005	196
2006	171
2007	363
2008	465
2009	851
2010	436
2011	333
2012	511

Source: TUSD Human Resources

The district does not have a program to encourage its own non-certified staff, such as teacher aides, to earn teacher certification. It does not analyze its success rates at each recruiting event. As shown in Table 3.2, results from recruiting fairs have been poor. In four years of fairs, only 10 teachers have accepted offers with TUSD. Given that the district hires hundreds of teachers a year (for example, 602 were hired in 2012-13), this is not an effective method of recruiting.

Table 3.2.Results of Recruiting Fairs

School Year	Results
2009-10	22 letters of intent issued 9 accepted
2010-11	3 letters of intent were issued 1 accepted
2011-12	6 letters of intent issued 0 accepted
2012-13	7 letters of intent issued 0 accepted

Source: TUSD

The district should:

- Improve recruiting by developing a realistic, workable strategy. This should include an effort to "grow your own" teachers from among current teaching aides and other staff, as well as high school students. This should also include having outstanding principals and senior teachers assist in recruiting efforts. More so that a recruiter, their enthusiasm and position in the district, can be highly persuasive to potential employees.

- Track and report on recruiting success explicitly. This should also include regular analyses of turnover by school to identify problem areas.

eRAF

The 2012 business process mapping project identified the development of the eRAF as a critical project for the district. That project also identified that the current paper-based RAF undergoes no less than four approval steps and spends between 17 and 41 days shuffling back and forth among departments and schools. Yet, in all this time, staff spends a total of less than one hour actually working on the RAF. The development of an electronic form, a reduction in the number of required approvals, and online approvals for those that must occur would significantly reduce the hiring time in the district.

The district should:

- Dissolve the current committee assigned to the development of the eRAF.
- Reassign development of the eRAF to the HR development team. Once a product is drafted, all affected departments and principals can be invited to provide input and suggestions for the final product.

Applicant Tracking

The district uses Sigma for applicant tracking. It is a locally developed product that staff members believe was never fully implemented. Moreover, staff estimates that only 40 percent of its capabilities are regularly used. Issues with the system include:

- Principals cannot log in to view applicants, requiring the HR Department to provide assistance.
- The district only accepts paper applications from applicants for temporary positions.
- Sigma does not interface with PeopleSoft, so staff members print out various items for rekeying into PeopleSoft.
- Sigma as a product is now part of NEOGOV. The version TUSD is using is not up to date.

The district should:

- Upgrade to the NEOGOV provide (or evaluate other options that may better meet TUSD needs) and purchase sufficient user licenses for principals to be able to review applications.
- Update the applicant tracking system to require all applicants, including ones for temporary positions to complete online applications.
- Assign the development team the tasks of creating an electronic bridge between NEOGOV and PeopleSoft, if the updated NEOGOV package does not already include one.

Position Control

Even though it currently exists only on spreadsheets and in schools' or departmental budget books, the TUSD position control (PC) system tracks information based on positions rather than employees which allows HR and Budget to create a framework of positions for all jobs in TUSD without regard as to

whether or not there is an incumbent in a specific job. Each position has its own unique position number (or ID) and is an entry separate from the incumbents in that position. Information about the position can be tracked over time regardless of changes to the incumbent's history, full-time equivalency (FTE) distribution, termination, or other elements which provides for position history separate from the changes within incumbents. Positions can be tracked when there are no incumbents to fit specific positions.

The basic premises of position control are:

- Schools and departments should not hire more individuals than they have funding for.
- Number of budgeted FTE's should equal the number of positions in the district.
- The PC identification codes for each position should match the employee's job codes.
- Vacant positions that schools and departments have that are not funded should be deactivated or re-classed to job titles for which there is budget.
- Schools and departments should use the availability of PC reports to identify what positions are assigned to their organization.

TUSD principals have their own school budget book that lists positions. The PC office has its own spreadsheets with positions. HR has access to neither. Both budget books and PC spreadsheets are updated manually which increases the potential for error.

HR leadership presented evidence to the review team showing that one of the delays in filling vacancies is caused by HR's inability to determine accurately where vacant positions exist and if they are funded. Currently the only methods to determine which schools have vacancies waiting to be filled depend on principals generating and sending forward through channels a RAF to declare the vacancy and start the recruitment process. Or, HR staff has to call the principal by telephone and ask about vacancies. At times, principals are not able to respond accurately.

More often than not, principals delay sending the RAF in a timely manner. At other times, principals intentionally hold vacancies to avoid the possibility of having to accept the placement of senior teachers who must be transferred because of a district-wide RIF (reduction in force) and/or subsequent recalls. Having to accept RIF mandatory placements by HR means that principals cannot fill vacancies from the applicant pool. With no direct access to PC data, HR cannot verify or double check position availability to prevent "game playing" related to school staffing.

Principals, when making their master schedules for the subsequent school year, may move several teachers from one teaching slot or grade level or subject assignment to another. Sometimes, high school and middle school principals decide to discontinue offering an elective course that does not have sufficient student interest. In effect, they are moving people, and often the new assignment is later found to be not funded in the district-wide budget. Since student enrollment or average daily membership (ADM) changes from one school year to the next, schools may lose budgeted positions, a

situation that normally means that the number of teachers at the school will have to be lowered. Sometimes, however, this reduction that occurs in PC is not necessarily communicated properly to principals. Conversely, positions may be assigned to a school but remain unfilled because the principal is not aware of the allocation. Generally, HR is left out of these staffing decisions and changes.

Ultimately, an online PC system that allows both the principals and HR to track vacant positions immediately will reduce the paper flow and prevent principals from submitting RAFs for positions that do not exist or that have no funding. Until then, a process that includes HR as a critical component in the PC operations must be established. There is no way to fiscally account for the amount of lost work time and subsequent administrative costs for the manual process of PC that is currently in use.

The district should (in the short term):

- Provide read-only access to PC spreadsheets for all principals and HR Department staff immediately.

Employee Onboarding

Currently, all new employees to the district must attend an in-person orientation session before beginning work. The HR Department holds at least one orientation session per week. The review team observed a portion of one orientation session. It largely consisted of a short introduction to employee-related topics by a staff member and the completion of various paper forms by new employees. The district should:

- Develop several professional quality videos for new employees to view that will give the employee an overview of the district, a review of the mission and goals of the district, and an overview of basic district expectations for employees.
- Develop online forms that can be captured electronically for use in the PeopleSoft and other HR systems.
- Require all new employees to complete onboarding online. Completion of video watching and submission of forms would signal to the department that onboarding is complete. The district should provide a dedicated computer within the HR Department for employees who do not have sufficient Internet/technical access elsewhere.

Finally, because the recruiting and hiring process was identified as a continuing problem area, the HR Department should develop and report weekly on explicit performance metrics in this area. These should include:

- Time to Hire
- Sourcing Channel
- Open Vacancies versus Positions Filled
- Offer to Acceptance Ratio
- Other metrics to meet the reporting requirement of the Unitary Status Plan

These should be posted on the webpage of the HR Department and reported in school board meetings.

Fiscal Impact

Development of the eRAF can be completed in-house with the resources of the recommended HR development team. The district's 2012 process mapping report estimated that $32,000 would be saved annually once this process was fixed (reference REC010 in that report), but did not calculate any savings or cost avoidance from not needing substitutes in vacant positions or from having qualified personnel in every position.

Purchase and implementation of an applicant tracking package will cost approximately $70,000 for initial installation, setup, and training, then $50,000 in licensing annually.

Online employee onboarding will have some internal development costs but will eliminate the hours that HR Department members currently spend every other week handling routine tasks in person.

Providing read-only access to the PC spreadsheets and development and reporting on performance metrics can be implemented with existing resources.

Recommendation 3-2	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Purchase and implement applicant tracking package.	($70,000)	($50,000)	($50,000)	($50,000)	($50,000)	($50,000)

Note: Costs are negative. Savings are positive.

Recommendation 3-3: Conduct dependent eligibility audit.

Exemplary benefits management, especially for self-funded medical coverage programs like those provided by TUSD, requires periodic audits to verify eligibility of health benefits plan dependents. No dependent eligibility audits have been conducted by TUSD Benefits to determine any payments are being made to ineligible persons. The district's health benefits plans cover not just TUSD employees, but their dependents as well. Such audits would ensure that overpayments due to claims by ineligible claimants are not being incurred. In interviews and other correspondence with the employee benefits manager, the review team was told that no dependent eligibility audit has been planned even though TUSD recognizes an audit as one of the most compelling means to obtain immediate savings and protect its health plan(s) from unnecessary and fraudulent claim expenditures.

HRAdvance, one of the business arms of the Society for Human Resources Management, that provides dependent audit services reports that in recent years its clients have found, on average, that 11 percent of dependents receiving coverage have been ineligible. According to the report, generally these included

dependents that were not enrolled as full-time students and not receiving their principle support from the covered employee.[7]

Historically, eligibility audits have required employees with covered dependents to provide proof of relationship, financial responsibility, and student status to prove eligibility. With the implementation of the *Patient Protection and Affordable Care Act* and subsequent modifications (March 2010), however, the eligibility age of dependents advanced to 26 and employees will no longer have to prove financial responsibility or student status for child dependents. As a result, HRAdvance predicts that the potential number of ineligible dependents that could be found in an audit will drop from 11 percent to about 8 percent. Nevertheless, HRAdvance contends, an audit will remain cost effective for employers to continue to find and exclude dependents age 26 or older, as well as other ineligible non-spouse/partner adults receiving coverage through a family plan.[8]

HMS, one of the major U.S. companies dedicated to healthcare cost containment for government-funded, commercial, and private entities, has found that in its own dependent auditing work for its clients, on average, 8.1 percent of dependents enrolled in plans are ineligible for coverage and should be removed.[9] HMS also reported that the average cost per member for medical and prescriptions is $3,000 per year. As of March 2014, TUSD had 4,653 employees enrolled in all tiers of its medical insurance plans. These employees claim 713 dependents.

Fiscal Impact

The district should contract with an external firm conduct the audit. Based on the size of the district, a one-time cost of approximately $72,000 would be incurred.

Using the typical ineligible rate of dependents audited of 8 percent, TUSD can expect to find 57 ineligible dependents. At an average cost of $3,000 per year, the approximate annual savings for TUSD would be $171,000.

Once the initial audit is completed, the district should include a review of dependents upon employment. The most progressive HR and benefits leaders leverage technology to launch the dependent audit as a logical extension of the hiring process. Such a real-time approach maximizes an employer's cost containment efforts by never allowing ineligible dependents to enroll. This approach also demonstrates a high level of adherence to ERISA (Employee Retirement Income Security Act) mandates.

[7] Stephen Miller. "Dependent Eligibility Audits Impacted by Reform Law." April 15, 2010. *www.shrm.org/hrdisciplines/benefits*

[8] *Ibid.*

[9] "Understanding Dependent Eligibility Audits: Straight to the Point." *www.HMS.com*

Recommendation 3-3	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Conduct dependent eligibility audit.	($72,000)	$171,000	$171,000	$171,000	$171,000	$171,000

Note: Costs are negative. Savings are positive.

Commendation 3-1: The TUSD Governing Board has directed TUSD staff to begin the work of resolving salary compression.

Over the past several years TUSD's employment and salary actions have created the unintended perception that pay is distributed unfairly, a belief which can have undesirable consequences. For example, a 10-year, high-performing TUSD employee would conceivably decide to start looking for a new job after learning that a recently-hired colleague, who has a great deal of potential and enthusiasm but considerably less relevant experience, has been hired also to perform the same job at the same pay level.

This example illustrates one form of salary compression - when the pay of a new employee is very close to the pay of more experienced employees in the same job. Another form of salary compression is when employees in lower-level jobs are paid almost as much as their colleagues in higher-level jobs, including managerial positions.

When salary compression and the policies that enable it are sustained over several years, it is demoralizing to the workforce and can lead to widespread dissatisfaction. Employers should be concerned because salary compression transforms the organization's single largest cost (i.e., compensation) from a motivator into a "demotivator."

Moreover, while salary compression is not illegal, it is often accompanied by pay inequities that often violate equal pay laws. In situations where salary compression causes *salary inversion,* where newer employees make more than experienced staff, it could create a pay equity problem if the experienced staff is a protected class.

The SHRM has developed a listing of the causes of salary compression (Figure 3.3). It is commonly used by organizations to determine if they are experiencing salary compression. Because fixing the problem is more costly than preventing it, the same chart can be used by TUSD as a primer to avoid future salary compression.

Figure 3.3.Causes of Salary Compression

- Annual budgets with salary increases have been modest for 20 years—somewhere between two and four percent has been the norm—yet candidates changing jobs or companies expect raises of more than two to four percent, and thus the salaries of new hires can exceed that of incumbents.
- Reorganizations change peer relationships and can create compression if jobs are not reevaluated.
- In some organizations, certain departments or divisions may be relatively liberal with salary increases, market adjustments, and promotions while others are not.
- Some employers have overlooked their HR policies designed to regulate pay, paying new hires more than incumbents for similar jobs under the mantra of paying what it takes to get the best talent.
- Because of the weak job market, many organizations have found it easy to hire people who had already done the same work for another organization, eliminating the need for training. Rather than hiring people with high potential and developing them for the long term, they have opted for people who could "hit the ground running," regardless of their potential.
- In the case of mergers and acquisitions, if the organizations have not been properly integrated, compression may exist in the newly combined organization.

Source: Jim Kochanski and Yelena Stiles. "Put a Lid on Salary Compression before It Boils Over." www.shrm.org

In July 2013, the TUSD Governing Board directed that work begin on resolving salary compression, a process that will require multiple years. The board has set aside $1 million in the 2013-14 budget to begin to address this issue. Recognizing the inequity of salary assignments and its effect on employee morale as well as taking steps to begin to correct it is commendable.

Commendation 3-2: TUSD employed a creative and highly collaborative effort to reduce the number of teacher vacancies in the fall of 2013.

The number of actual teaching vacancies that existed on paper on August 5, 2013, was greatly reduced through collaborative efforts of leaders in HR, representative principals, and the administrators of both elementary and second schools. For almost two weeks, these TUSD leaders, using actual student enrollment counts, met daily and manually combined classes to bring student enrollments closer to established class caps. This process entailed dissolving vacant positions advertised, stopping active recruitments, moving staff from one school to another and the generation of new positions at sites over projected enrollment.

The HR Department's interest and dedicated effort in implementing staffing guidelines in collaboration with other leaders outside of HR had never been attempted before. At the beginning of the process, there were 170 vacancies. At the end of the collaborative effort, the number was reduced by 62 to 108 vacancies, for a savings of about $4 million in teacher salaries and benefits.

Dedicating time and effort to manually re-schedule and re-assign faculty and students to reduce the number of teaching vacancies, to bring class sizes closer to actual class caps, and to reduce salary costs by $4 million is highly commendable. Moving forward, TUSD should complete the same process at the beginning of each school year, in July, when approximate course/class/school enrollments are known and again each September as enrollments are stabilized.

Recommendation 3-4: Implement needed changes in leave policies and procedures.

For the past two to three years both the TUSD Office of Benefit and Employee Relations, through employee agreement negotiations, have been committed to revising, revamping, updating, and attempting to make the employee leave policies and procedures uniform and equitable, and they have made good progress. Prior to recent recommendations and negotiated efforts, leaves for TUSD employees were often confusing because each employee group had somewhat different leave benefits. Currently, the contracts for each of the eight bargaining units have new provisions for paid leaves which are more equitable than before. The TUSD union negotiator and the benefits manager in conversations with the review team noted that efforts in the immediate future will be directed toward ending employee abuse of the leave provisions, especially in regard to long term leaves of absence.

Governing Board rules require that an employee who is absent from work for more than 10 days must request a leave of absence (LOA) even if the employee is using leave accruals (sick, leave, etc.) Currently in practice, however, TUSD permits MBU's (member of a bargaining unit) in certain employee groups to use all their earned paid leave time before an official leave of absence request is filed with the supervisor and subsequently approved by Governing Board. For example, if an individual has accrued 160 days paid leave by combining sick days with accrued personal days, he or she can be absent from work for 32 weeks without any district approval. After that paid leave has been exhausted, the employee may apply for and use in sequence four categories of leave which the district offers:

1. Medical/Family Medical Leave Act (FMLA) up to 12 weeks
2. Medical 30-day
3. Personal 30-day with a 15-day extension (some employee groups are permitted to use personal leave following a medical leave)
4. Governing Board leave (up to a year)

Theoretically, the example employee could be away from work for over two years and only the last year or so on leave with the district's full approval.

TUSD leadership needs to work with employee bargaining units or groups to remove from the employee agreements any inference to leave request rules and replace it with a districtwide governing board policy applicable to all employees that takes precedence. A sample policy which the TUSD benefits manager has been drafting is provided in Appendix C. This draft policy contains most of the needed and recommended changes which include offering only three types of leave to all employees:

- Medical – Either Family Medical Leave (FML) or 30-Day if employee is not eligible for FML
  - Length of FML: Up to 12 weeks
  - FML: Employee must use any accrued sick and/or personal time, reserving five days for later use
- Personal
  - Used only for personal employee and/or immediate family reasons
  - Employee must use leave accruals, reserving five days for later use
  - Cannot be used in conjunction with medical leave or medical condition of the employee or family members
- Governing Board
  - Eligible to employees with two or more consecutive years' service
  - To be requested after either medical or personal leave is exhausted
  - Requested approval for birth/adoption/foster placement of child or for child care
  - Requested approval for serious illness of employee or family member
  - Requested approval for serious illness of military service member

TUSD leave of absence monitors must insist that rules and regulations pertaining to leave of absence be strictly enforced. In some current situations, many employees request a leave or to request an extension of time for an already approved leave after the initial time of absence has already ended and the employee is expected back at work. Requests for leave or requests for extentions of leave should be filed with supervisor at least two to three weeks before the employee is expected to return to work or at most five days before the current leave expires. As well, TUSD supervisors and HR leadership should enforce the termination provisions of Governing Board Policy GCC, Unauthorized Leave, when absent employees, on authorized leave or not, do not respond to phone calls and direct mails about the status of the leave of absence.

Fiscal Impact

This recommendation can be implemented with existing TUSD resources. Bargaining unit negotiations will also be necessary.

Recommendation 3-5: Require all schools to use Subfinder in order to better control use of leave.

TUSD uses a substantial number of substitute hours each year. As shown in Table 3.3, there have been more than 100 substitute hours paid per teacher FTE for each of the last four years. However, not all of these hours are accounted for through the existing SubFinder system.

Table 3.3. Use of Substitute Hours

School Year	Number of Substitute Hours	Substitute Hours per Teaching FTE
2009-10	332,152.5	88.3
2010-11	450,339.4	127.4
2011-12	443,362.5	125.0
2012-13	484,612.5	140.8
2013-14 (as of January 1, 2014)	155,139.4	NA

Source: TUSD and TUSD 2012 CAFR.

SubFinder, one of the electronic products owned by CRS Advanced Technology, is a fully automated employee absence management and substitute placement system, providing both internet and telephone access. It is used by a considerable number of U.S. school districts. In fact, many districts utilize SubFinder districtwide as an employee absence reporting system, requiring all employees to report their absences through SubFinder even if a substitute employee is not authorized or needed. The payroll department of these districts uploads employee absences into their employee leave records.

TUSD has purchased the license for SubFinder and intended to use it as its method of supplying a substitute whenever a teacher is going to be absent. Teachers are supposed to report their absences to SubFinder and the program then finds and assigns an approved substitute teacher. Not only is the teacher's absence electronically recorded and reported but also there is a record for payroll showing the days that a substitute actually worked.

However, universal use of this effective substitute teacher call-out and placement system is not enforced in TUSD. Some schools use SubFinder as it is designed to be used; some teachers at some schools regularly use SubFinder as well; and, some schools do not use the automated system at all. The review team learned that some principals have told their teachers not to use SubFinder. At schools where SubFinder is not used, teachers themselves call their own substitutes, theoretically from a hard-copy list of approved substitutes regularly updated by HR. However, there are no controls in place to ensure that substitute teachers whose names have been removed from the list are not being called or that some substitutes are called whose names may not ever have be on the approved substitute teacher list. That also means that a teacher's absence is not currently being universally and automatically matched with a substitute teacher's assignment. In other words, teacher absences and substitute records at schools not using SubFinder may not be accurately correlated. A substitute teacher may be paid, but the teacher's absence may not be recorded in payroll.

Some principals and their teachers mistakenly believe that the SubFinder software does not allow a teacher to request a specific substitute or to pre-arrange a substitute for a multiple-day sub assignment. Not only does SubFinder allow these preferences, but it also allows teachers to voice record their lessons plans or other instructional activities for the substitute to hear.

In defense of their decisions not to use SubFinder, principals point to a provision in the teachers' bargaining agreement (*TEA Consensus Agreement – 2013-2014*) that says, "MBUs (members of

bargaining units) shall not be required to make more than one completed phone call to report an absence." These principals require that one phone call be made to the teacher's immediate administrative supervisor at the school. If the teacher communicates an absence to SubFinder either by telephone or by internet, these principals feel this constitutes two calls and thereby violates the terms of the bargaining agreement. However, in lieu of a personal telephone call from a teacher who is going to be absent, principals at schools using SubFinder accept the fax or email generated by SubFinder daily before classes begin, which not only lists all teacher absences for the day but also the substitutes assigned by SubFinder. In this way, they are notified of teacher absences without asking teachers to make two phone calls.

Attempts by HR administrative leaders to enforce use of SubFinder by all schools are not successful because no official written directive has been issued requiring it. A Governing Board policy that mandates all schools and all teachers to use SubFinder would provide sufficient support to the efforts of HR and payroll for more accountability in the system of reporting teacher absences and accurately paying substitute teachers for days worked. This policy should also require a positive match between a request for substitute pay and a teacher absence before the substitute pay is approved.

Finally, the HR Department should review SubFinder capabilities and develop the capacity for teachers to identify the reason for which a substitute is being requested, such as for professional development or personal leave. This will enable the HR Department to develop an understanding of patterns associated with substitute usage and may point to areas in which further improvements can be made to reduce substitute usage. (See related recommendation in *Chapter 5 – Financial Management* of this report regarding the integration of SubFinder and the district's payroll systems.)

Fiscal Impact

This recommendation can be implemented using existing resources. Moving forward, the district should include in its negotiations with TEA removing the provision in the current contract to allow MBU's to make more than one telephone call to report an absence. Ideally, the district should require teachers to telephone their immediate supervisor and request a substitute through SubFinder. There is research supporting the idea that teachers tend to be absent less often if they are required to notify their principal of impending absences by telephone,[10] so it would be preferable to have teachers do both steps.

Recommendation 3-6: Develop strategies to reduce employee absences on Mondays and Fridays.

Employee absences in virtually every school district in the U.S., especially among teachers, are higher on Mondays, Fridays, and the day before a holiday than any other workdays. Although data that would support or dispute this for TUSD were not available, TUSD adminstrative leaders believe the problem also exists in the district. Loss of work time that affects productivity among non-teachers and the

[10] Robert R. Freeman and Franklin D. Grant, "How We Increased Staff Attendance by 16 Percent and Saved $156,000," American School Board Journal 174 (2) (1987): 31

necessity to hire substitutes for absent teachers translate into mega-costs and measureable effects on overall student achievement. Nationally, administrative leaders in school districts are searching for strategies to reduce all absences but especially the preponderance of extended weekends.

Thirty-six percent of teachers nationwide missed more than 10 days of school during the 2009-10 year, according to an analysis of federal data by the Washington-based Center for American Progress.[11] The report estimates that teacher absences cost schools "a minimum of $4 billion annually" and cites research linking teacher absences to lower student achievement. Noting that teacher-absentee rates tend to be greater in schools with high percentages of minority students, the report adds that "it's plausible that [racial] achievement gaps can be attributed, in part, to a teacher attendance gap."

Table 3.4 shows the estimated TUSD costs for substitute teachers for the past three years and the first three months of 2013-14. While reducing the use of substitutes would mean that teachers would continue to accumulate unused leave time, the district could also realize a savings in a direct cost.

Table 3.4. Cost of Substitute Hours

School Year	Substitute Hours	Number of Days[1]	Cost[2]
2010-11	450,339.38	60,045.25	$4,503,394
2011-12	443,362.5	59,115.00	$4,433,625
2012-13	484,612.5	64,615.00	$4,846,125
2013-14[3]	155,139.37	20,685.25	$1,551,394

Source: TUSD data provided in HR-54

Notes: [1] Calculated at 7.5 hours per teaching day

[2] Based on lowest substitute rate of $75 per day

[3] Through November 26, 2013

The ability to find enough substitute teachers on Mondays and Fridays is a challenge that both SubFinder and teachers who call their own substitutes experience. On the Friday for which the review team was present, a small number of substitute needs simply went unmet, forcing other teachers or staff in the school to lose planning periods or other work time in order to cover classes for absent teachers.

Discussions of strategies among HR staff that would affect absenteeism on these days have already begun. One specific strategy that is getting serious consideration would require a new Governing Board policy and negotiated agreements that would charge an employee's leave balance, whether sick or personal, at a rate of 1.5 days if the employee is absent on a Monday or Friday or a day before or after a holiday unless the employee is on approved leave or presents a doctor's excuse for the absence.

[11] Raegen Miller, Teacher Absence as a Leading Indicator of Student Achievement, November 2012, www.AmericanProgress.org

Fiscal Impact

This recommendation can be implemented with existing resources and should result in either a reduction in the amount of leave teachers accrued and/or a reduction in the number of substitute hours paid. Estimated savings cannot be reasonably determined at this time.

Recommendation 3-7: Publish an online employee handbook, as well as detailed HR screens on the district's website to handle the top 10 most frequent calls to the HR Department.

TUSD does not have an employee handbook and there is little HR information available online. As a result, HR staff spend a great deal of time fielding many phone calls for basic requests, such as how to change one's name in the system after marriage.

The only HR-related handbook that TUSD provides for its employees on a regular basis is the benefits handbook, which describes in detail the various insurance and health-related benefits available as an employee of the district. Even though principals produce a faculty-staff manual at the school level, generally other supervisors of other departments in TUSD do not. The school handbooks rarely provide its readers with rules, regulations, and procedures in regard to HR functions. Neither do they communicate important state and federal laws in regard to employment or define the expectations of employees and management. An online employee handbook or manual for all employees would rectify this deficiency and provide a readily-accessible communications tool.

One of the recommendations from the MGT review of TUSD in 2008 reads, "Develop a comprehensive Web-based employee handbook that cross references key employment information, employment rules and regulations related to various contract requirements, and contact information for all human resources departments." Although the review team found some evidence of following-through on the recommendation, the project has never been finished.

Many school districts underestimate the value of an employee handbook. A well-drafted employee handbook provides written documentation of a division's policies and procedures. In addition, a well-drafted handbook includes critical policies based on state and federal labor and employment laws that require mandatory compliance. Some state and federal laws, in fact, require a policy based upon the statute to be included in any employee handbook. For example, all employers must comply with the Social Security Number Privacy Act, including having a statutorily mandated policy covering the act contained in their employee handbook if they have one. A well-drafted handbook is vital for reinforcing policies and allows employees to reference it often as situations arise in the organization. The value that a well-drafted employee handbook contributes is significant.

First, an employee handbook helps hold employees accountable for their conduct. The handbook should set forth the governing board's expectations and the consequences for employees that fail to comply. Second, a well-drafted handbook consistently applied and enforced sets the stage for defending an employer from potential liability. An example is where an employer's Equal Employment Opportunity policy requires an employee to file any complaint of discrimination or harassment internally. Filing an

internal complaint gives the employer the opportunity to investigate, address, and eliminate any discrimination and/or harassment that may be confirmed. If an employee fails to follow the employer's policy, the employer may use the employee's failure to do so as an affirmative defense in a subsequent discrimination and/or harassment lawsuit.

In order to be most accessible to employees and be easily updateable, the HR Department should publish an online employee handbook. It should contain all of the essential information, forms, and applications about any HR procedures, processes, or functions, thereby facilitating easy access by employees and reducing the time HR staff have to spend in copying, printing, collating, stapling, and distributing hard copies of individual documents needed and requested by employees.

Appendix D provides a sample table of contents for an online employee handbook recommended by the Society of Human Resources Management.

In addition to the handbook, the HR Department should significantly expand its webpage with resources for employees so that employees will begin to use the webpage as a first resource, instead of calling the HR Department for instructions on completing simple tasks, such as making a name change after a marriage. The current webpage has a limited number of entries in the FAQ section (five), and only seven forms in its forms section:

- Change of Address/Name/Emergency Contact Form
- Temporary Employment Application
- Request for Leave of Absence
- Intent to Separate (Retirement or Resignation)
- Notice to Rescind 'Intent to Separate'
- Short-Term Disability
- Sick Bank Donation

The newly created HR development team should be tasked with implementing this recommendation.

Fiscal Impact

This recommendation can be implemented with existing resources.

Recommendation 3-8: Discontinue printing hard copies of the TUSD benefits handbook.

Fort the first time, open enrollment for benefits in 2013-14 was conducted and completed totally online and was judged by TUSD leaders to be quite successful, a testament to the fact that employees are capable of conducting HR business totally online. Even though the complete benefits handbook was available online on the TUSD website, hard copies were also printed and distributed prior to open enrollment. Since employees can rely on benefits information online, there is little reason to print the 60-page benefits handbook.

Fiscal Impact

The HR budget manager reported that the total cost of printing the handbook for the past three years has averaged $6,566 per year.

Recommendation 3-8	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Discontinue printing hard copies of the TUSD benefits handbook.	$0	$6,566	$6,566	$6,566	$6,566	$6,566

Note: Costs are negative. Savings are positive.

Recommendation 3-9: Improve records processing and maintenance.

The district maintains a large amount of paper-based employee records. The records are kept in nearly 100 file cabinets in a basement room of the central office. The file cabinets are not fire-rated, but the file room is plumbed for heavy sprinkling. However, the file cabinets are not waterproof, so while the sprinkler system might save the records in the event of fire, the water will quickly ruin them.

Two full-time employees staff the records room. They file paper records sent to them, respond to requests for information that require records review, and remove files that are scheduled for destruction. They also provide free paper copies of records as employees ask for them. Staff estimate that four reams of paper are consumed each week in making paper copies. The review team estimates that at least 0.25 FTE are required to make all the paper copies requested.

The district has begun a pilot record digitization project. Working with three separate companies, the project covers benefits and payroll records. While the digitization work by the outside vendors is proceeding, it was envisioned by the project creators that TUSD would also develop the capacity to do its own scanning from that point on. This portion of the project has not started. So, while the vendors are digitizing historical records, the district continues to create new paper records.

The district should:

- Complete the digital imaging pilot. These funds have already been committed via purchase order and the vendors are apparently making satisfactory progress. It appears they will be able to support the district in developing an effective structure for digital recordkeeping.

- Start scanning in-house now. TUSD will not overcome its reliance on paper by one-time outsourced projects and should be concurrently developing the processes to: 1) avoid creation of unnecessary paper records in the first place, such as making hard copies of employment applications created online so that a copy can be placed in the paper files; and 2) scan, digitize, and destroy copies of paper records whose creation cannot be avoided, then organize and secure the digital files.

- Charge for making employee record copies.

Fiscal Impact

The estimated cost for an in-house digitizing system is approximately $15,000. This will ultimately be offset by a reduced need for records staff, who can then be redeployed within the HR Department to other tasks.

The district should adopt a procedure of charging current and past employees a fee for making any copies from their files. Based on the time and materials required for this task, the district should charge at least 25 cents per page. The district will realize some income from charging for records copies, but should also recoup staff time from a reduced number of copy requests. Copy income is estimated to be $10,000 including a factor for the volume of requests going down once payment per copy is required.

Recommendation 3-9	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Improve records processing and maintenance	($15,000)	$10,000	$10,000	$10,000	$10,000	$10,000

Note: Costs are negative. Savings are positive.

Commendation 3-3: The district has made improvements in employee bargaining unit relations and streamlined some aspects of the various agreements since the 2008 MGT study.

TUSD negotiates with a number of bargaining units, covering 5,972 employees (Table 3.5). Currently, the district negotiates eight agreements.

Table 3.5. Number of Employees in Each Bargaining Unit

Bargaining Unit	Description	Number of Employees Covered
WC1/CMB	TEA White Collar/Food Service	1,552
T55/T25/T70/T12/T45/T15/T35	Teacher Education Assoc	2,877
AD1	Admin E.L.I. Educ Leaders Inc.	138
CSP/CSF	Conf/Conf/Supv/Full/Part Time	165
ADE	Exempt Administrators	17
EXS	E.L.I. Exempt Research Elev	8
PSP/PSY	Psychologists Full/Part Time	39
BC1	AFSCME Blue Collar	889
SP1	Superintendent Cabinet	12
SC1	Supervisory/Professional	275
Total		**5,972**

Source: TUSD

The 2008 study recommended that TUSD, "Appoint a well-trained and experienced employee relations expert to conduct good faith Interest Based Bargaining (IBB), and be held accountable for negotiations and improved relations between unions and the TUSD." This has been accomplished. The district's Employee Relations Director and Chief Negotiator has been with the district in the same role for the past six years and has two employee relations assistants. The Director's focus has been on repairing the district's relationship with the various bargaining units and on smoothing out some of the differences between the agreements so that the district can better manage its operations. A key success in this area has been work in consolidating some of the prior leave plans, which were previously very different among the bargaining units. The Director estimates that the new consistency in the leave plans will save TUSD $5 million annually. In 2012-13, the Director estimates the impact of skilled negotiations resulted in a savings of $14 million, partially due to class size negotiations and partially due to the end of a salary increment credit that gave employees salary step increases for taking any class, regardless of whether the class would develop skills of use in the employee's job.

Another example of the success of this position can be found in the district's average benefits percentages by employee groups. As shown in Table 3.6, despite rising health care and benefit costs generally, TUSD has managed to keep its average benefits percentages nearly flat for the past five years.

Table 3.6. Change in Average Benefits Percentages Over Time by Bargaining Unit

Unit	2010	2011	2012	2013	2014	Percent Change
ADE	22.3%	23.0%	24.6%	23.9%	23.2%	3.9%
ADM	22.7%	22.6%	22.9%	24.7%	23.3%	2.6%
BCL	32.5%	33.2%	34.0%	35.2%	30.6%	-5.9%
CCS	26.6%	26.3%	26.8%	27.5%	24.9%	-6.6%
EXC	24.1%	24.6%	24.8%	26.0%	25.3%	5.0%
NON BGU	15.3%	14.8%	21.0%	16.4%	13.8%	-9.8%
OTPT*		23.9%	22.8%	25.2%	25.1%	
PSY	25.4%	25.6%	25.7%	26.2%	26.2%	3.1%
Retiree	9.7%	9.2%	9.0%	17.0%	16.5%	70.1%
SPT	23.2%	18.7%	20.5%	23.7%	20.7%	-10.7%
Sup Prof	28.2%	28.3%	28.3%	29.3%	27.0%	-4.4%
TCH	26.7%	27.0%	27.3%	28.5%	28.4%	6.2%
WHC	33.1%	33.4%	33.9%	35.1%	32.1%	-2.9%
EXM	24.0%	24.7%	25.4%	26.9%	25.7%	6.8%
All Employees	**27.2%**	**27.4%**	**27.7%**	**28.7%**	**27.3%**	**0.4%**

Source: TUSD (HR_53).

Note: *OTPT data not provided for 2010

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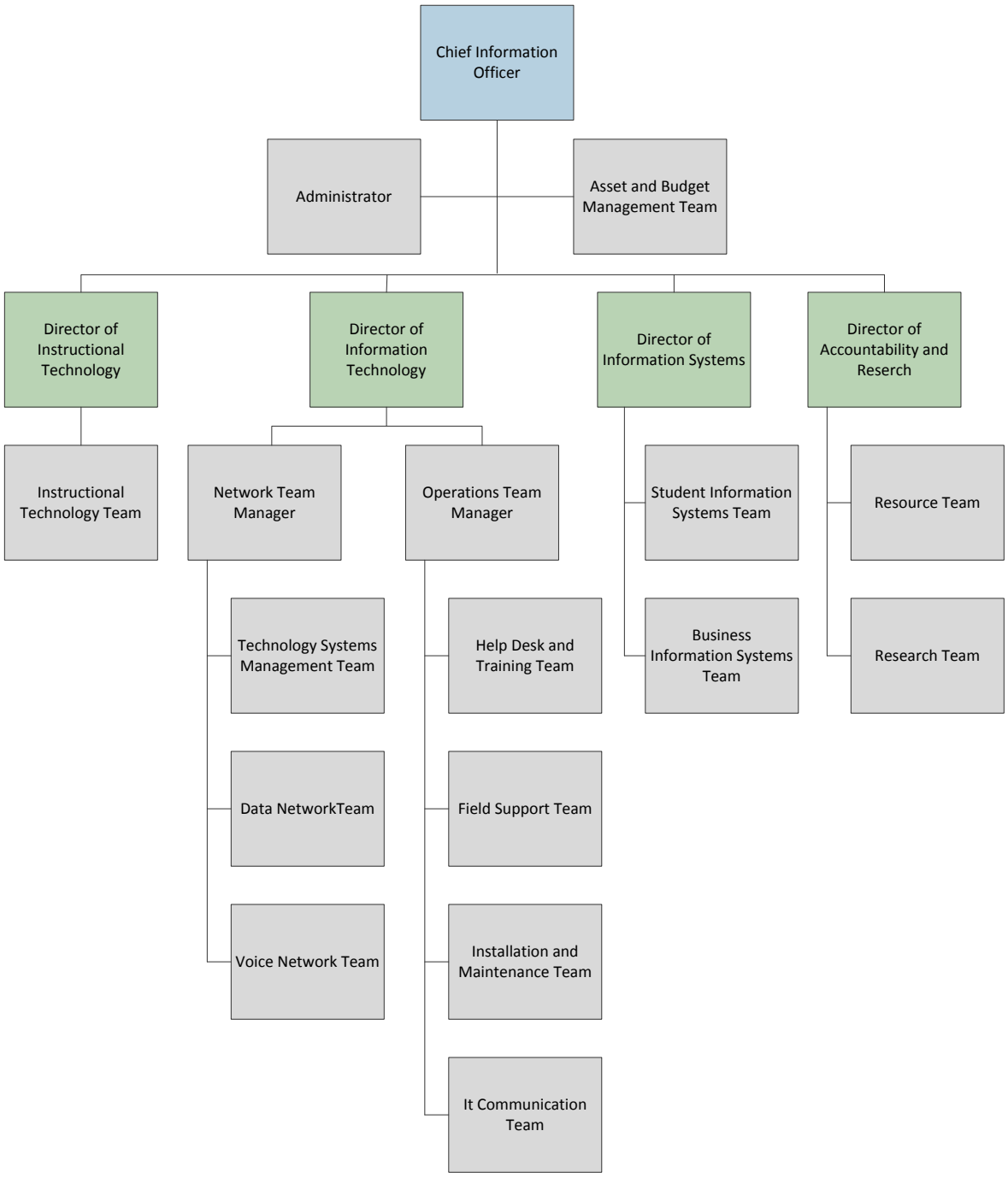
Chapter 4 – Technology Management

Technology plays an integral part in all aspects of school life, from its use to engage students, to being a vehicle to connect teachers from across the district, to streamlining administrative tasks such as payroll, to conducting assessment testing, and as an efficient way to communicate with parents and the community.

The Technology Services Department provides technology support and services for the students and staff in the Tucson Unified School District (TUSD). The department is headed by a Chief Information Officer who reports to the Deputy Superintendent of Operations. The department is organized into four sections: Instructional Technology, Information technology, Information Systems, and Accountability and Research.

Figure 4.1 displays the current organization of the TUSD Technology Services Department.

Figure 4.1. Current Technology Services Department Organizational Structure



Source: TUSD Technology Services Department 2014

According to 2013-14 TUSD budget, the Technology Services Department has 93.8 full-time equivalent (FTE) staff which is 7.8 FTEs less than the previous year. In 2013-14, the Technology Services Department's expenditures for all funds was $12,847,723. This represents an increase of $5,999,206

(88%) from the previous year's expenditures of $6,848,517 (all funds). However, this increase is largely attributed to capital fund expenditures of $5,261,105 (not incurred in 2012-13) and a $771,941 (293%) expenditure increase in desegregation funds. Due to increased use of remote access tools and a reduction in the average age of computers in the district, field service technician positions were decreased in 2013-14. The increase in capital spending was due to the district's multimillion dollar infrastructure project called the Information Technology Infrastructure Modernization Initiative (ITIMI). Table 4.1 shows both department FTEs and expenditures by funds for the last two years.

Table 4.1. Technology Expenditures, 2012-2014

	2012-13	2013-14	Difference
Operations and Maintenance (O&M) Fund	$6,584,730	$6,550,890	($33,840)
Desegregation Fund	$263,787	$1,035,728	$771,941
Capital Fund	$0	$5,261,105	$5,261,105
Total	**$6,848,517**	**$12,847,723**	**$5,999,206**

Source: TUSD 2013-14 and 2012-13 Budget Documents

TUSD has been behind in technology for many years. The district's technological gaps can be attributed to the frequent change in district and departmental leadership, funding issues with the federal e-Rate program, and lack of funding for technology. However, over the past two years, TUSD has made significant investments towards improving the technology in the district. In addition to replacing the districts aging computers and devices in schools, in 2012, the district started the ITIMI project. The primary objectives of the ITIMI were to:

- Upgrade and improve the district's local area network infrastructure and make wireless access possible in each site.
- Upgrade and improve the district's wide area network infrastructure and its speed.
- Upgrade and improve the district's aging telephone systems.

The ITIMI initiative is estimated to be completed in spring 2014.

While this initiative will bring much needed technology upgrades to TUSD, the district will still have significant challenges in the area of technology. The district is using an aging, home-grown student information system that has non-integrated and outdated modules to provide student information system functionality to the district, students, teachers, and parents. The district has two separate enterprise resource planning (ERP) software systems for finance and human resources functions. This not only makes the support of these applications extremely difficult, it also inhibits the district's ability to integrate and automate some of the key processes in finance and human resources.

The district has recently hired experts and consultants to guide the district in business process re-engineering and ERP selection, and has had a detailed departmental review conducted by a third party.

Following are recommendations to further assist TUSD and its Technology Services Department in improving technology within TUSD.

Recommendation 4-1: The district should use a requirements-based application selection process for identifying and selecting an ERP system and student information system.

In 2008, TUSD decided to procure a new ERP system to replace their existing human resource and finance system. According to TUSD staff and a previously published consultant's report, "TUSD Strategic ERP Evaluation Business Case", the decision to procure a new ERP system was primarily to automate the district's manual processes that the outdated and heavily customized old system could not handle. However, after implementing the finance and procurement modules in 2011, the district suspended the implementation of the new ERP system and remaining modules. The suspension was in large part due to the lack of functionality of the system, issues with overly complex district processes, and lack of effective project management both from the district and the ERP vendor. According to the "TUSD Strategic ERP Evaluation Business Case" report, some of the major issues with the selection and implementation included:

- TUSD did not conduct an ERP needs assessment prior to issuing the Request for Proposal (RFP) for software and services.
- TUSD did not invest in Business Process Reengineering prior to the ERP implementation.
- Lack of data driven analysis to make sound business decisions meant that major procurements, such as the RFP for software and services, were awarded based upon vendor presentations rather than an objective analysis of TUSD business needs.
- Lack of change management, planning, and documentation of business requirements resulted in difficulty in overcoming resistance to change.

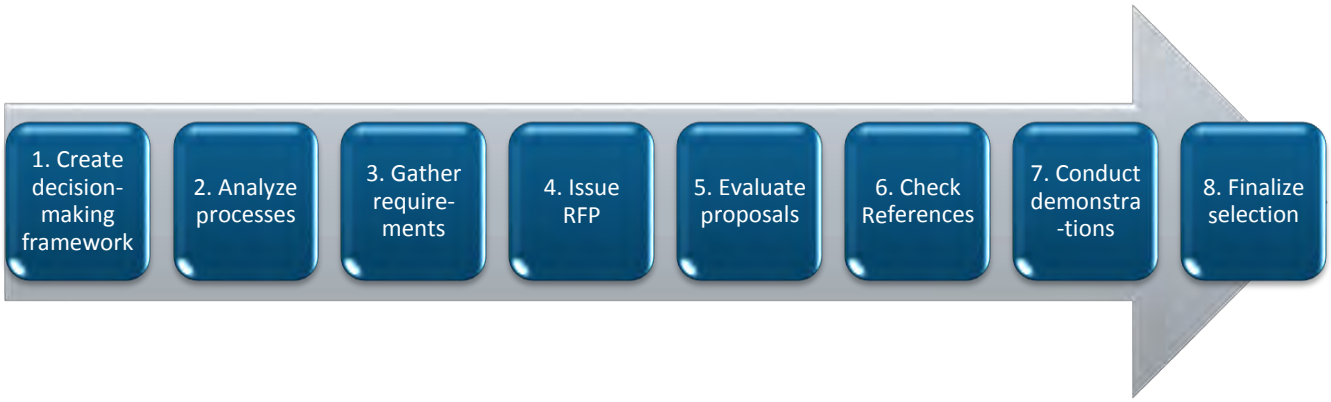
The district could have avoided most of these issues if they had utilized an application selection process that included analyzing existing business processes, gathering system requirements from district staff, and evaluating potential vendors against the district's critical requirements rather than the vendor's generic functionalities.

The district currently has two separate ERP systems that are not integrated. As a result, many of the district process are still manual and/or inefficient. The district is moving towards addressing its ERP system issues. In the process of addressing these issues the district has undertaken a large technology infrastructure project to upgrade its cabling wiring and connectivity infrastructure. In addition, the district has documented over 100 key human resources and payroll processes.

TUSD should use a requirements-based application selection process for identifying and selecting a new ERP system. The district's student information system is also outdated and consists of non-integrated modules that result in teachers having to make duplicate entries for student-grade reporting and not having the functionality they need. The district should use the same application selection process for the student information system and the ERP system.

Following are eight key steps to a sound application selection process (see Figure 4.2).

Figure 4.2. Key Steps for Selecting a districtwide System



- **Step 1: Create a decision-making framework.** This step may include creating committees and selecting staff to key roles for the project. Usually, there are two committees in a system selection project: (1) an executive committee, which consists of senior district leadership and is responsible for making high-level decisions, and (2) an operational committee, which consists of subject matter experts, who performs the day-to-day work related to the system implementation.

- **Step 2: Analyze processes.** The second step in the process includes capturing key "as-is" processes and reviewing the processes to identify how these processes can be changed so that they can be improved and or simplified.

- **Step 3: Gather requirements.** In this step, the district should interview key staff to identify functional user requirements for the new system. The district should also ensure that all state, federal, and district compliance and reporting requirements are captured. Additionally, any requirements gathered from the process analysis are incorporated into the final requirements document. Once user requirements have been captured, the district should prioritize each captured requirement in order to help distinguish between the responding proposers' systems.

- **Step 4: Issue request for proposals**. Step four is developing and publishing a competitive RFP. Prior to preparing the RFP, the district should identify and finalize the vendor evaluation and selection criteria, so that appropriate information is requested from responding vendors. The criteria should include cost, user requirement response scores based on priority, demonstration scores, references, and market information (such as number of installations in Arizona schools).

- **Step 5**: **Evaluate proposals.** Once all proposals have been received, TUSD should begin the evaluation phase of the selection process. This includes evaluating each vendor based on the evaluation and selection criteria developed by the project committees.

- **Step 6: Check references**. Once finalists have been determined, TUSD should perform reference checks for each finalist. The district should create questions for each reference call and, if possible, conduct site visits to referenced school districts.

- **Step 7: Conduct demonstrations**. Finalists should be asked to visit TUSD and provide a product demonstration for the committees and key users. The district should create demonstration scripts that include key and unique processes to their school district that vendors should include in their product demonstration. Score sheets should be created for staff to use for scoring each vendor during demonstrations. If possible, requesting a demo system, or sand box, for further review is recommended. All demonstrations should be recorded, as vendors tend to make representations regarding product capabilities during these sessions.

- **Step 8: Finalize selection**. As a final step, the district should finalize its selection and start the price and contract terms negotiations. TUSD should seek outside legal assistance to ensure that the contract adequately protects the district and holds the vendor accountable.

Fiscal Impact

The cost of implementing the above process for defining requirements, evaluating proposals and vendors, and selecting and contracting with a vendor can be accomplished with existing resources. The cost of new ERP and student information systems will not be known until the RFP process is completed.

Recommendation 4-2: Bring all technology-related staff and resources that are located in other departments into the Technology Services Department.

There are pockets of technology staff and resources that are outside the Technology Services Department in TUSD, which causes inefficiencies and also may potentially cause compliance issues and data loss. Table 4.2 shows some of the technology resources that work outside the Technology Services Department.

Table 4.2. TUSD Technology Resources Outside the Technology Services Department

Department	Software /Hardware	Type of Technical Work	Number of Technical Staff
Operations	▪ MapNet (bus routing system) ▪ MapCon Facilities (work order system)	▪ Web development ▪ Report development ▪ Programming	3
Exceptional Education	▪ TieNet	▪ Web development ▪ Report development ▪ Programming	1
Communications	▪ District Web pages	▪ Web development	1
Food Services	▪ Food Services application, ▪ Point of Sales devices, Servers and workstations	▪ Web development ▪ Report development ▪ Server & device support	2
Human Resources	▪ PeopleSoft Human resources Module	▪ Functional Analyst ▪ Report development	1
Purchasing	▪ Lawson Purchasing Module	▪ Functional Analyst ▪ Report development	1

Department	Software /Hardware	Type of Technical Work	Number of Technical Staff
Curriculum and Instruction	▪ ATI Galileo	▪ Web development ▪ SharePoint Development	1
Desegregation	▪ Unitary Status Plan reporting	▪ Web development ▪ Report development	1
*Accountability and Research	▪ Gradebook, Parent Portal, Assessments	▪ Web development ▪ Report development ▪ Programming	7

Source: Interviews with TUSD staff

Note: (*) The Accountability and Research group has recently been moved under the Technology Services Department. However groups of technology staff still work separately from the Technology Services Department's student information system group despite both groups working on the district's student information system.

There are several issues with having technology resources that are outside the control of the Technology Services Department:

- **Lack of documentation**: Technical staff that are outside the Technology Services Department spend less time documenting information because they are fewer in number and busy with actual work. This becomes a problem when specialized and dedicated technical staff leave the district as it may take a considerable amount of time for the replacement technical staff to bring himself or herself up to speed.
- **Lack of backup**: Technology staff that are outside the department may not recognize the importance of back-ups or may not have the skills necessary to provide the needed redundancy to the department's technology resources such as servers and applications.
- **Lack of standards**: Technology staff that are outside the department may not have standard communications protocols with the technology department staff or with each other. Since they are not part of the Technology Services Department, they cannot be held accountable for standards that are set by the department. As a result the organization may have different, and sometimes conflicting, technology-related processes or hardware and network configurations that may cause issues for the entire organization.
- **Lack of security**: Technology staff that are outside the department may not have the proper training or knowledge for maintaining a secure technology environment. Creating a sufficiently secure environment for the department's technology resources and applications depends on that department's technology staff's knowledge and capability. Like backup and documentation, the risk of not having security or not having security up to industry standards are common with these cases.
- **Lack of efficiency**: Usually technology operations that are outside the department are small and do not share resources with each other or the Technology Services department. As Table 4.2 indicates, each pocket of technology staff have their own servers, individual programmers, or

database administrators. This creates an environment where multiple staff and resources are used. Consolidating the technology needs may save the organization time and money.

Pockets of technology are usually born due to ineffectiveness or limitations of the technology department. Other departments in need of technology resources and staff stop relying on the organization's technology department and start acquiring their own technology resources because they get results faster.

Before consolidating these pockets of technology resources and staff under the Technology Services Department, the department leaders should meet with each TUSD department or group that has these pockets of technology staff and resources and assure them that the level of service they receive from these individuals will not change when they move to the Technology Services Department.

Since TUSD has several pockets of technology, a gradual consolidation of technology services is recommended. The department should start consolidating the Accountability and Research group first.

Fiscal Impact

TUSD can implement this recommendation with existing resources.

Recommendation 4-3: Use staffing formulas and service-level metrics to determine the number of staff necessary to maintain TUSD's computers and devices.

According to the 2013-14 TUSD budget, the Technology Services department has 26 field technicians, which is 7.8 FTEs less than the previous year. Eleven lead field technicians are providing support for the districts estimated 22,000 computers and devices in more than 87 schools and locations.

Interviews with the Technology Services Department and district staff indicated that TUSD is not using a formula and has not established a formal relationship between the number of support staff and the devices they support. This make it difficult for the district to know whether they have enough staff to provide services to the end users.

Based on 22,000 computers and devices with 37 field technicians, the district's device-to-technician ratio is 594 to 1. This ratio is slightly over the Michigan Technology Staffing Guidelines for school districts of 500 to 1, indicating fewer staff relative to the number of computers/devices. However, most school districts operate at much higher ratios (lower staff levels).

Many different formulas for calculating device-to-support-technician ratios exist. However, it is difficult to have one that fits all cases because there are environmental factors that affect each organization's support structure including:

- The organization's geographical size — buildings widely separated or not
- Building's age and the condition of its wiring
- The age and the quality of computers and devices

- Imaging capabilities
- Usage of remote access tools
- Vendor maintenance agreements for computers and devices

Fourteen years ago, The Michigan Department of Education developed the Michigan Technology Staffing Guidelines. According to these guidelines, TUSD needs one technician for every 500 computers. More recently, according to the Help Desk Institute's 2012 Desktop Support Practices and Salary report, organizations that have more than 10,000 end users have an 800 to 1 computers-and-devices-to-technician ratio. Table 4.3 provides information regarding devices-to-technician ratios from school systems that are similar in size to TUSD.

Table 4.3. Device to Technician Ratio, TUSD and Select School Systems

District Name	Student Enrollment	Number of Staff	Number of Schools	Number of Field Support Technicians	Number of Computers / Other Devices	Number of Devices per Technician
Katy Independent School District	64,408	7,741	57	20	50,000	2,500 to 1
Fort Bend Independent School District	69,123	7,943	74	25	52,000	2,080 to 1
Round Rock Independent School District*	45,588	5,661	51	*7	32,000	4,571 to 1
Mesa Public Schools**	65,000	10,500	86	17	28000	1,647 to 1
Tucson Unified School District	49,872	5,586	84	37	22,000	594 to 1

Source: Gibson Consulting Group, Inc.; TUSD 2013

Note: *Round Rock ISD has school-based instructional technology staff assist technicians part time

**Mesa Public Schools has 17 Education Technology Trainers that assist on curriculum hardware support

The district should develop and employ a formula for determining this ratio that is reviewed on a periodic basis as technology variables change. These variables include the amount of equipment to be maintained; the age and condition of equipment; the number of software applications that are installed and maintained; the number of staff required to handle smart boards, projectors, and other non-computer technologies; and the number of management support staff required to maintain efficient operations.

Before the district considers adding/removing technician positions to/from the Technology Services Department, TUSD should determine the device-to-computer ratio that fits their organization. The district should evaluate work-order-management reports to better understand workload and the efficiency of current technicians. Based on these management reports and the needs of the schools in

the district, the district should then make the necessary adjustments to the Technology Services Department's staffing.

Fiscal Impact

This recommendation can be implemented with existing resources.

Recommendation 4-4: Develop a project management methodology using industry standards and implement it throughout the department.

The Technology Services Department does not utilize a project management methodology including tracking expenditures, staff time, and project timeline. When a methodological way of managing a project is lacking, districts run a high risk of over-committing its resources and failing to deliver critical projects on time and on budget. Currently, each area of the Technology Services Department has their own project list. However, not all technology projects are documented and captured on this list. There is not one consolidated list of projects to show all the projects that TUSD as a whole or that the Technology Department staff are working on.

In addition to having a list, the department should have documented project information such as completion percentage, project priority, project budget, and project due date. Without detailed documentation about the projects, it is difficult, if not impossible, for the department leaders to inform district staff about the potential impact of a new project on the existing workload or on the status of an existing project.

The department should create a formal technology project list and project documentation in line with project management industry standards for all existing projects. The department should ensure that department staff follow industry standard project management methodology for all new projects.

Table 4.4 shows some of the key elements of a project management methodology.

Table 4.4. Project Management Methodology

Key Elements	Details
Developing common standard process and templates to formalize project management process.	▪ The department uses a formal project initiation, classification and approval processes. ▪ The department uses project charter template to initiate new projects. ▪ The department uses the status report template to notify project sponsors and participants. ▪ The department uses the post project satisfaction survey to get feedback from project sponsors and participants.
Capture information in writing	▪ Project sponsors ▪ Project requirements ▪ Project due date ▪ Project resources with roles and responsibilities ▪ Project priority ▪ Project status ▪ Project budget

Source: Gibson Consulting Group, Inc.

The Technology Services Department should adopt a project management methodology at minimum that includes the processes and components listed in Table 4.4 and use it for all current and future projects.

Fiscal Impact

TUSD can implement this recommendation with existing resources.

Recommendation 4-5: Update the Technology Services Department job descriptions according to current departmental needs.

Although there are job descriptions on file for all TUSD Technology Services Department staff, not all job descriptions are up-to-date. Current job descriptions do not accurately reflect job duties being performed by the department's staff members.

For example, according to the technology services field technician job description, the technician should be able to support Windows 2000 and Windows XP environments. These operating system environments are 12 to 14 years old. TUSD's computer environment consists of newer and different operating systems as well as other manufacturer's operating systems. There are also devices other than computers that could support TUSD, such as tablets and smartphones. Job description should reflect the current needs of the district.

In addition to updating current job descriptions so that they reflect the true needs of the district, the Technology Services Department should add new job responsibilities to current positions or create new

positions when new technologies that the district needs emerge. Virtualization of servers, desktop computers, and mobile device management functions are becoming critical for all technology organizations. TUSD's Technology Service Department should either create new job descriptions or add these functions to existing job descriptions so that the district can hire new staff or send their existing staff to training on these new critical technical areas.

Job descriptions should be updated on an annual basis to ensure that they clearly reflect current responsibilities. Once job descriptions are up-to-date, the district can better analyze the administrative and technical needs of the department and make informed decisions regarding any changes or adjustments needed for the department's staff.

Fiscal Impact

TUSD can implement this recommendation with existing resources.

Recommendation 4-6: Conduct a feasibility analysis to identify ways to have a data center that is on par with industry standards.

TUSD's data center has not only reached its maximum capacity and cannot accommodate further growth, but less than ideal environmental conditions make it very risky for the district to continue to store and operate their critical servers and network equipment. According to interviews with department staff, TUSD's current data center has experienced a water leakage problem. Also, the review team observed more than 10 portable fans in use to prevent servers from overheating. The data center's current cooling system is not sufficiently cooling the center, and TUSD is using multiple portable fans in attempt to keep the data center at the appropriate temperature. The location of these fans and cables creates a less than ideal environment for staff to operate in the data center. Lastly, the data center does not have a suitable fire prevention or suppressant system.

The Technology Services Department is aware of these issues with the data center and is looking for ways to address them. The department should conduct a feasibility analysis of having an industry standard data center. In this analysis, the department should compare costs, benefits, opportunities, and risks of the potential options. The options for consideration should include building a brand new data center; repurposing an existing school district location for a data center; outsourcing the data center to a private company; sharing data center resources with local governmental entities like City of Tucson, or the University of Arizona; repairing the current data center; and doing nothing. The analysis should include one-time related investments and at least five years of on ongoing expenditures.

The outcome of the study may result in substantial down time of district servers and services. As such, the department should communicate the results and the plan for mitigating these issues to the district in advance and prepare for contingencies.

Fiscal Impact

TUSD can implement this recommendation with existing resources.

Recommendation 4-7: Implement the recommendations from the Dell, Inc. IT Simplification Assessment.

In spring 2012, TUSD hired Dell, Inc. to conduct an IT Simplification Assessment project of the Technology Services Department. The goal of the assessment was to provide TUSD with a detailed analysis of its information technology operations and environment. The review report included a list of findings focused in the following four key areas:

1. Processes and documentation
2. Tools and automation
3. Employee care and training
4. Enterprise risk

Table 4.5 shows a summary of findings in each of these key areas.

Table 4.5. Summary of IT Simplification Assessment Findings

Key Area	Summary Findings
Process and Documentation	▪ Technology Services processes are not documented, integrated and available in a central repository. ▪ District does not have any formal change management processes in place. ▪ The help desk staff does not have a process in place for routing calls to internal support groups. ▪ No formal problem management is in place. ▪ License management in Tucson Unified School District is not formalized.
Tools and Automation	▪ Many processes are manual within Technology Services department. ▪ The ERP in TUSD is on mid-level introductory level storage that is not enterprise class and represents a single point of failure on this critical application. ▪ It is estimated that 91% of data stored in Tucson would be considered permanent and rarely or never retrieved. ▪ Technology metrics in TUSD are not automated and readily available on a central dashboard. ▪ There are no standard processes for tracking, reporting and analyzing operational level and service level agreements. (OLAs and SLAs not in place).
Employee Care and training	▪ Job descriptions within TUSD would be considered limited or partially defined in Technology Services. ▪ The approach to employee training across Technology Services would be considered minimal. ▪ Communication and communication plans are lacking. ▪ There is not a formal mechanism for communication between Technology Services and various departments. ▪ Customer satisfaction surveys are not currently being utilized to drive continuous improvement and provide employee feedback. ▪ Employees are not consistently receiving performance evaluations

Key Area	Summary Findings
Enterprise risk	▪ Physical access to the data center would be considered easily attainable for employees, contractors and guests. ▪ There is no formalized Disaster Recovery Plan in TUSD. ▪ Currently firewall services are disabled by the server team. ▪ TUSD is currently not using any network authentication solutions, but they are moving in that direction. ▪ The wireless in TUSD is WPA2 and everyone uses the same key. ▪ There are no ongoing internal security audit processes in TUSD. ▪ Backup methodologies for key data are not refined or standardized.

Source: Dell, Inc. IT Simplification Assessment, 2012

Based on the findings in Table 4.5, the report made the following recommendations for TUSD (see Table 4.6). The recommendations are listed in order of implementation priority outlined in the assessment report.

Table 4.6. IT Simplification Assessment Recommendations

Recommendations
1. Develop IT governance with formalized strategic planning and communication
2. Enhance the security environment by mitigating risks
3. Develop and implement a disaster recovery plan
4. Develop an industry standard service desk environment
5. Implement a services management framework
6. Develop a service catalog with defined service level agreements
7. Become performance driven by implementing comprehensive monitoring and metrics collection
8. Enhance the Use of Tools and Automation with emphasis on storage
9. Implement employee professional learning plans aligned with job descriptions
10. Become process oriented by enhancing documentation practices
11. Explore cloud readiness upon completion of the modernization project and enhance messaging

Source: Dell, Inc. IT Simplification Assessment, 2012

The review team had similar findings during the current study of the TUSD Technology Services Department and believes the district would benefit from implementing these recommendations.

Fiscal Impact

Some of these recommendations may require TUSD to invest in technology tools, hardware, software, or consulting services. However, without further detailed analysis and a potential RFP process, it is difficult to estimate what the total fiscal impact for the district would be at this time.

Chapter 5 – Facilities Use and Management

Introduction

School facilities should be designed and maintained to support the educational curriculum and to provide an effective learning environment that is educationally adequate to deliver the curriculum. Having suitable facilities requires good planning, which is made possible by accurate measurement of school capacities and enrollment projections. There must be good communication between facilities planning, design and construction, and facilities management. Finally, processes to enable feedback from the operations and maintenance of facilities to planning and design are important to enhance the quality of new and renovated schools.

Once schools are built, preventive maintenance (i.e., an ongoing plan for addressing annual maintenance and operations) and a long-term capital improvement program are critical. One of the most important aspects of maintaining facilities in the long-term is preventive maintenance. Through preventive and predictive maintenance, life-cycle costs are reduced and the serviceable life of facilities is extended. Beyond maintenance, an aggressive energy management program is critical to reducing operating expense and providing a sustainable building environment. In addition, adequate custodial and grounds operations are necessary not only to provide clean buildings and grounds, but healthy and suitable learning environments as well.

This chapter presents commendations and recommendations for facilities use and management for Tucson Unified School District (TUSD) and includes the following major sections:

- School Size and Configuration
- Facility Asset Management and Inventory Control
- Building Maintenance
- Maintenance
- Groundskeeping
- Custodial Services
- Energy Management

The departments reviewed as part of this study fall under the responsibility of the Chief Operations Officer and included: Facilities Maintenance, Buildings and Grounds, Architecture and Engineering, School Safety, Student Assignment (Planning), and the Business Office. The team conducted interviews, reviewed data and documents, assessed processes and visited school sites to support the analyses and efficiency evaluation.

Based on the date when the efficiency audit was conducted, TUSD active facilities included 49 elementary schools, 10 middle schools, 10 high schools, 13 K-8 schools, five alternative schools, and various administrative/support buildings. The total of school and administrative support space throughout the TUSD (including portable buildings) is approximately 9.2 million square feet. At the time

of this review, a number of schools had recently been closed and some were in the process of reopening as daycare facilities. There were a number of disparate databases with facilities data that had different building space values due to the dynamic nature of the facility activation/closures[12].

Table 5.1 presents a summary of the reported number, area, and current replacement value (CRV) of the TUSD facilities as of the date when the study was conducted.

Table 5.1. Summary of TUSD Facilities

Facility Category	Number	Area (gsf)[1]	CRV[3]
Elementary Schools	49	2,183,988[2]	$415 M
Middle Schools	10	983,629	$202 M
K-8 Schools	13	1,058,489	$217 M
High Schools	10	3,341,538	$718 M
Alternative schools	5	132,851	$25 M
Total Active Schools	**87**	**7,700,495**	**$1,577 M**
Support Facilities	26	391,237	$66 M
Closed Schools	21	1,074,969	$211 M
Total	**134**	**9,166,701**	**$1,854 M**

Source: TUSD, 2013

Notes: 1. Total school areas include portables.
2. It was reported that two of the listed closed schools have reopened as daycare centers.
3. Current Replacement Values (CRV) calculated based on the following standard unit rates:
   - Elementary schools - $190/sf
   - Middle schools - $205/sf
   - High schools - $215/sf

In general, leaders of the TUSD Operations organization have recognized the need for better planning, managing, and operating its school buildings. Several efficiency improvement initiatives had been identified and were in the early stages of implementation at the time of the site visits. There appeared to be consensus of the need and desire to implement changes, but concern regarding the availability of resources to implement changes in a timely manner.

This chapter offers recommendations that should be considered in order to improve the effectiveness and efficiency of the TUSD organization, as well as to enhance operations and maintenance and to reduce overall costs.

[12] Reference documents Fac_71 - Building Sqft, Fac_71 - Enr-Cap 2013 EA, Fac_75 School SF Table, Facilities Condition Index Master - SqFt-Yr, and Fac_77-105 - Any Facility Condition Evaluation Studies - FCI Main Sheet.

School Size and Configuration

School sizes and configurations within the district are developed following TUSD Educational Specifications (Ed Specs) and design guidelines. These guidelines were reported to be based on the Council of Educational Facilities Planners International (CEFPI) space standards and in accordance with Arizona Administrative Code Title 7 – Education, Chapter 6 – School Facilities Board, Article 2 – Minimum School Facility Guidelines.

The TUSD Operations Division has made significant progress in consolidating schools over the past few years to increase the utilization of space and decrease underutilized buildings and excess seats. While this is never an easy process, the results have substantially reduced operating and maintenance costs, as well as utility costs across the district. TUSD has reduced the total square footage per student from one of the highest in the state (about 174-175 sf/student) to state average levels (152 sf/student) through the closing of 19 schools.

While TUSD has made significant progress in consolidating schools over the past few years, there is still a substantial amount of excess capacity. Enrollment projections indicate the current enrollment of about 50,000 students will continue to trend down to about 45,000 students within five years and to 43,000 students within the next 10 years.

Trends also indicate that TUSD has gone from a school area to student ratio of 175 sf/student prior to the school closings to 151.2 sf/student overall. This is in line with state averages, but above Arizona peer district numbers. National median school district ratios of school area to student enrollment compared to TUSD ratios and targets are shown in Table 5.2.

Table 5.2. School Ratios of Area per Student

Facility Type	TUSD Actual	TUSD Target	National Average[13]
Elementary Schools	107.6 sf/student	105 sf/student	120 sf/student
Middle Schools	135.7 sf/student	110 sf/student	146 sf/student
High Schools	232.1 sf/student	120 sf/student	163 sf/student

Source: TUSD, 2013; Council of Educational Facility Planners International

The TUSD high schools appear to be the most underutilized facilities within TUSD. The specific high schools currently under capacity include: Catalina HS (68% of operating capacity), Palo Verde HS (46%), Sabino HS (54%), and Santa Rita HS (45%). There are also 11 elementary and middle schools with student to operating capacity ratios of less than 70 percent. Based on a review of school enrollment projections, percent of capacity rates, and school operational capacities, there are between 13,000 and 14,000 available (student) seats across all active schools.

[13] CEFPI Calculating School Capacity: Local, State & National Perspectives, October 2007.

In addition to the excess capacity of the schools, there are approximately 300 portables at school sites across TUSD. Approximately 131 of the portables are located at schools that are well under capacity. These portables are being cleaned, maintained, and using energy at a very high cost to the district.

Recommendation 5-1: Reduce the number of active portable classrooms.

There are 303 portable classroom units listed in the TUSD inventory. Based on a review of the capacity analyses and locations, TUSD could eliminate the use of about 130 portables (approximately 118,500 sf). The portables were reported to be owned (no leases) so the net savings would be due to reduced maintenance and repair, custodial services, and utilities. Portable units are less energy efficient and require more maintenance.

Fiscal Impact

The fiscal impact is based on shutting down 130 portable units and assumes a reduced budget will be required for ongoing operations (utilities, custodial, and maintenance). At 118,000 square feet and a savings of $4.21/SF, this yields a savings of $500,000. This is in comparison to the average plant ops cost of $5.42/SF.

Recommendation 5-1	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Reduce the number of active portable classrooms.	$0	$500,000	$500,000	$500,000	$500,000	$500,000

Note: Costs are negative. Savings are positive.

Recommendation 5-2: Continue to evaluate school capacities and consider further school consolidation.

Based on a review of the capacity analyses and available reserve seats, there is potential to consolidate up to nine elementary schools and one to two high schools. The capacity analyses should be expanded to include physical, operational, and programmatic variables. The analyses of the high schools should also consider function, program, and temporary capacity in addition to maximum and operational capacities. Program capacity takes into consideration total student seats, support facilities, schedule flexibility, program offerings, and utilization. Typical utilization rates for high schools are between 80 and 85 percent, while elementary school utilization rates are generally between 95 and 100 percent (tighter scheduling yields higher utilization).

Best practices in determining school capacities have been researched and reported by CEFPI. School capacity is defined as the number of students that can be reasonably accommodated by a school building and site. In determining optimal school capacities, it is important to consider physical, operational, and programmatic variables.

- **Physical variables include**: school size, areas by type, site size and amenities, support facilities (e.g., kitchens, cafeterias, multipurpose rooms, etc.), number and types of teaching stations, building infrastructure, building and life safety codes.
- **Operational variables include**: school utilization rates, efficiency of space use, operational policies, staffing levels, funding structures, space management and scheduling, specialty academic and program offerings, and operational budgets.
- **Programmatic variables include**: educational program offerings, specialty programs, schedules, extended use, community use, partnerships (i.e., off-site and distance learning), class sizes, and staff ratios.

Calculating accurate and suitable school capacities is critical to distributing the correct enrollment levels (correct number of students) in each school, as well as planning for schools to best accommodate projected enrollments. Optimizing utilization (the number of students enrolled to school capacity) will minimize operational costs to the district. Other impacts of the school capacity/planning process include: adjustment of attendance boundaries, minimization of overcrowding and underutilization, maximizing educational resources, improved life safety and security, and justification of school construction funding.

The TUSD Student Assignment Department calculates both design and operational capacities for each school. The design capacity is equivalent to a "maximum capacity" – the total number of seats available in a school facility. The operational capacity considers only teaching stations and the desired number of students per classroom. The operational capacity can vary within a school based on reconfiguration or reallocation of classroom space to resource rooms or other functional uses. Many of the TUSD schools appear to have reallocated space, thus reducing the operational capacity and increasing the utilization.

School utilization is the educationally appropriate percentage of the school day that teaching stations can be used for instruction. This may also be viewed as the ratio of unoccupied to occupied seats per teaching station per period of the school day. Typical average utilization benchmarks for schools have been reported as follows (CEFPI):

- Elementary schools – 95 to 100 percent
- Middle schools – 70 to 85 percent
- High schools – 80 to 85 percent

School utilization rates can be increased by appropriate scheduling and efficient use of school space. The tighter the scheduling of space, the better the utilization rate for the school. Utilization rates should be used in conjunction with design (maximum) capacities. TUSD should consider alternative approaches to looking at design capacity in conjunction with utilization rates. A closer look into space use and classroom reallocations to resource rooms should also be considered.

One final complication in the effective planning of school enrollments and capacity analyses is the TUSD open enrollment policy (School Choice). It was reported that up to 40 percent of students do not go to

their home school from a geographic school boundary perspective. This makes it more difficult to project enrollments on a school by school basis.

Fiscal Impact

This cost savings is based on closing nine elementary schools and two high schools. The estimated cost savings reflects TUSD's historical cost data for savings related to schools closing.

Recommendation 5-2	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Continue to evaluate school capacities and consider further school consolidation.	$0	$0	$7,500,000	$7,500,000	$7,500,000	$7,500,000

Note: Costs are negative. Savings are positive.

Facility Asset Management and Inventory Control

The topic of facility asset management is broad and can be interpreted in various ways. Recently published international standards define asset management as involving "the coordinated and optimized planning, asset selection, acquisition/development, utilization, care (maintenance) and ultimate disposal or renewal of the appropriate assets and asset systems."[14] The U.S. National Research Council defines facility asset management as a systematic process of maintaining, upgrading, and operating physical assets cost-effectively. It combines engineering principles with sound business practices and economic theory and provides tools to achieve a more organized, logical approach to decision making.[15] Asset management is the science of deciding when, where, and how to spend maintenance, facility preservation, and improvement resources in the most cost-effective way.

Each of these definitions incorporates the important functions of asset inventory, control, maintenance, and investments in renewal. For the purposes of this report, the inventory of assets (maintainable equipment), maintenance, and asset management standards and technologies will be covered in the Building Maintenance section of this chapter. This section addresses asset management as it relates to warehouse inventory control and facility asset management (i.e., school facility capital renewal and forecasting).

Inventory Control and Management

Current TUSD practices regarding warehousing of assets, materials, and supplies and supply chain management (SCM) are primarily overseen by the Business Office of the Operations Division Central

[14] International Organization for Standardization (ISO) 55000 – asset management.

[15] National Research Council (NRC), 2004, Investments in Federal Facilities: Asset Management Strategies for the 21st Century, National Academies Press, Washington, D.C.

Receiving & Distribution Department. There are several warehouses managed by the TUSD Operations Division. These include:

- 1940 Winsett Road Warehouse
- 2050 Winsett Road Warehouse
- 2110 Winsett Road Warehouse
- 480 Campbell Road Warehouse

These warehouses receive, distribute, and manage furniture, textbooks/bulk paper, records, technology, and maintenance/repair/operations inventory. There are also a number of storage warehouses not managed by TUSD Operations that include: the Clothing Bank/Warehouse, District Office Storage (temporary administrative records, HR, payroll), and two Food Service Warehouses.

The Warehouse Delivery Operations Supervisor receives assets and materials in the central warehouses, inventories and barcodes furniture and other assets over $1,000 in value. The maintenance, repair, and operations (MRO) inventory is recorded in the district's computerized maintenance management system (CMMS) – MAPCON. MAPCON is used to preorder materials and supplies, track maximum/minimum levels of stock, manage inventory, and record use of materials to work orders. The warehouse staff conducts annual inventory counts and periodic cycle counts.

High volume and bulky materials such as filters for HVAC systems are ordered and delivered directly to the schools in accordance with a predetermined preventive maintenance (PM) schedule. There are warehouse delivery workers that deliver stock and inventory to sites as needed.

There were a number of issues identified and reported that have led to less than optimum warehouse operating performance in the past. The current CMMS has limitations that make it difficult to restock inventory. The reordering process is cumbersome and the quality of inventory data is lacking. There were reported issues with inconsistent parts naming conventions, creating duplicate stock, discrepancies in actual versus recorded inventory, and storage of materials. There is a need for new CMMS functionality and processes to improve the quality of the inventory system.

There have also been past process deficiencies that have led to underperforming warehouse functions. The purchase ordering process was reported to be very cumbersome and time consuming. The limited usefulness of inventory data in the past has made it difficult to preorder stock for maintenance activities. Stock refill was previously done on an annual basis for many items. Recent inventory clean-up efforts and tracking determined that over 20 percent of the inventory had not been issued in over two years. A large amount of the inventory was reported to be obsolete.

Recent initiatives have been undertaken within the last six months to improve overall warehouse inventory control and to improve service to building maintenance technicians. The TUSD Operations Business Office Coordinator has initiated a number of process improvements related to inventory data quality, monthly cycle counts, reducing underused inventory, standardizing naming conventions,

incorporating just-in-time delivery practices, managing lead times for critical parts, and tracking critical warehouse performance measures.

There are also pilot programs recently initiated to evaluate the use of truck stock for plumbers to reduce time travelling between schools, shops, and warehouses or vendors to obtain parts. One of the common themes uncovered during the on-site interviews was a need to reduce "windshield" (or traveling) time. A majority of this lost efficiency was due to technicians not having the materials and parts needed on hand to complete work orders.

Recommendation 5-3: Continue to implement warehouse process improvements and overhaul the facilities purchasing process.

The reported inefficiencies in the facilities warehousing and purchasing processes are having a significant impact on the overall productivity of the facilities staff. These inefficiencies are also adversely affecting the safety of facilities and customer satisfaction. Various facilities leaders and staff reported substantial delays caused by waiting for parts, supplies, materials, and tools needed to accomplish their work tasks. The inability to take advantage of just-in-time delivery of materials and supplies is also negatively affecting facilities worker productivity and morale.

Central warehouses that support MRO activities with the right parts/materials in the right place at the right time drive the facilities organization's operational efficiency. The main objectives of the MRO warehouse inventory management should be to reduce repair cycle times and minimize inventory. To achieve warehouse operational excellence, managers must be confident the inventory is accurate.

Credit should be given to the current review and process improvements that have been initiated. The continued development of consistent naming conventions and data quality should be emphasized.

TUSD should implement a new CMMS to support warehouse MRO activities. Without adequate CMMS materials management module functionality it will be very difficult to continue to improve process and measure churn rates (parts turnover or supply turns), cycle times, and inventory requirements. Additional details and recommendations regarding CMMS are presented in the following section.

The continued evaluation of truck stock and use of virtual warehouse functionality in the CMMS to help track the truck/shop stock inventory is also recommended. Expansion of the practices to electrical and HVAC shops has been proven in other school districts by monitoring work order histories, material use, and problem and repair codes in a CMMS. This approach has been successfully used across many school districts with large geographic areas to significantly reduce windshield time.

In addition to the process improvement initiatives underway, there are additional best practices and MRO warehouse key performance measures that should be considered. First and foremost is the need to create an accurate and consistent database of related maintainable equipment and parts inventories. A successful PM program relies on accurate equipment inventories with parts attributes details such as motor specifications, parts replacement inventories, filter counts and sizes, and belt type/sizes. With

this information the warehouse can automate reordering of materials and generate PM kits through "pick tickets" to have supplies ready prior to technicians arriving at the warehouse to gather the supplies. The use of mobile carts with multiple kitting bins (bins or crates to collect and temporarily store materials for use by technicians for PM or projects) is often used for this purpose.

Additional best practices for MRO warehouses include:

- Organizing the warehouse space and staff for efficiency
- Focus on inventory standards and accuracy
- Perform routine cycle counts
- Properly slot parts based on use rates
- Use barcodes and scanners with a CMMS
- Build PM kits using pick tickets
- Create and monitor warehouse key performance indicators (KPIs)

The central warehouse should be considered a service provider to the TUSD Operations Division and school system. As such, performance measures should be developed and monitored. The following KPIs, in addition to the current metrics, are recommended:

- Inventory Annual Turns – (total value of stores use / total inventory value)
- Inventory Churn – (number of parts used / minimum parts levels)
- Inventory Accuracy – (cycle count adjustment / total cycle count)
- Warehouse Service Level – (# orders filled on demand / total # orders filled)
- Percentage of Stockouts – (# stockouts / total parts used)
- Percent Inactive inventory – (# parts inactive in a year / total # of parts)
- Percent Work Orders Awaiting Materials – (# WO on hold awaiting materials / total # WOs)
- Plant Replacement Ratio – (parts inventory value / school plant replacement value)
- Parts to Labor Ratio – (parts inventory value / maintenance labor cost)
- Growth in Number of Parts and Vendors/Suppliers

The purchase order and acquisition process also needs to be streamlined. The process of requesting and receiving non-stock items was reported to be a tremendous administrative burden. It was reported that it could take 15 to 20 days to receive some stock deliveries due to the cumbersome PO process.

Fiscal Impact

The direct measurable impact on future expenditures of the warehouse process improvement and purchasing recommendation will be difficult to accurately track due to a lack of current baseline data. However, it will have a significant impact on the effectiveness and efficiency of maintenance staff and reduction in material/part order costs.

Facility Asset Management

The financial constraints driving the need for efficiency improvements in TUSD are well understood. The combination of wrapping up the previous $230 million bond program, reduction in capital funding sources, loss of building renewal state funds, and declining enrollments will continue to stress the ability to adequately fund school maintenance and repair requirements. In addition, the average age of TUSD schools is about 40 years. Many building systems are reportedly beyond their expected useful life, and others have been reported to require replacement prior to their expected life cycle due to inadequate preventive maintenance in the past. A well thought-out, objective, and credible asset management plan (capital renewal plan) will be imperative to justify additional funding, obtaining grant funding for school renewal, or making the best use of existing funds.

TUSD has initiated facilities asset management and capital planning and budgeting through the completion of internal parametric facility condition assessments (FCAs). The FCA methodology is in alignment with best practices and cost-effective approaches. However, there are opportunities to continue to improve the asset management program through enhanced commitment, improved standardization, repeatable application, the identification of rational backlogs of deferred maintenance, and preparation of more encompassing capital expenditure forecasts.

The FCA methodology captures generalized condition ratings by building a system to create an overall facility condition index (FCI) by school. This is helpful in determining overall ranking of school conditions, but does not provide much information on the costs of deferred maintenance or capital renewal requirements. The foundation of the approach is sound; and the use of internal staff to conduct the assessments is cost-effective.

Typical industry accepted practices for good facilities stewardship suggest budgeting 2 to 4 percent of facilities current replacement value on maintenance repair. This includes operational routine maintenance and capital renewal. Breaking out the capital components suggest a minimum of one percent of the CRV should be budgeted for capital renewal on an annual basis. This would correlate to about $16 million per year in school renewal investments to maintain current levels of deferred maintenance and current school conditions.

Most school systems are funding capital renewal closer to a rate of 0.7 to 0.8 percent of the CRV. This still equates to over $12 million per year for TUSD schools.

Recommendation 5-4: Enhance existing facility condition assessment process though the incorporation of best practice procedures.

The topic of facility investments and capital planning for school facilities remains at the forefront of the educational facilities executive's world. School organizations across the U.S. are facing the largest collection of aging buildings ever encountered. Deferred maintenance backlogs continue to grow at unprecedented rates, while the toll it has taken on facilities is reaching critical levels. A wealth of

research and data are available supporting the need for better facility capital investments and asset management.

The benefits of facility condition assessments include the following:

- Obtaining objective and credible data to make the rational and informed facilities investment decisions by prioritizing needs.
- Streamlining facilities management processes and reducing the total cost of ownership.
- Improving the condition of facilities.
- Extending the life of assets through proper maintenance and repair funding and decisions.
- Minimizing safety and security risks at facilities.
- Minimizing the disruption to customers (passengers) and tenants caused by facility system failures by maximizing critical system reliability.
- Enabling optimal use of facilities and infrastructure in support of the agency/organizational mission.
- Improving overall stewardship of facilities and maximizing return-on-investment for stakeholders.

The most important factor for success in assessing the condition of school facilities is to evaluate needs without bias. Most public and private school systems generally use some form of facility condition assessment or life-cycle analysis to determine backlogs of maintenance and repair and assess their facility needs. Findings and recommendations of best practices in facilities asset management (and facility condition assessments) have been researched and reported by the National Research Council independent of the specific approach. Key components to a facilities asset management program include the following:

- Standardized documented process that provides accurate, consistent, and repeatable results.
- Detailed ongoing evaluation of real property assets that is validated at predetermined intervals.
- Standardized cost data based on industry-accepted cost estimating systems (repair/replacement).
- User-friendly information management system that prioritizes deferred maintenance (DM) and Capital Renewal (CR).

The goal of a facilities asset management program is to conduct facility condition assessments and create a facility investment plan that is rational, repeatable, recognizable, and credible.

An opportunity exists for TUSD to continue to build upon the established facility asset management program. While there have been excellent efforts to collect and maintain important facilities data, there are areas of potential improvement. These include consistency in data collection, identification and prioritization of a backlog of deferred maintenance, calculation of relative school facility condition

indexes, standardization of building system classifications and inventory nomenclature, positioning of facilities condition needs, additional training of staff regarding the importance and impact of the asset management program, enhanced equipment histories to support decision making, and enhancement of the quality and repeatability of asset management information.

Fiscal Impact

Outside consultants could typically be procured for $.12/sf to conduct the facility condition assessments. Multiplying $.12/sf times the district's total square footage (8.2 million sf) equates to approximately $960,000. An alternative parametric approach to identifying deferred maintenance is called Backlog of Maintenance and Repair (BMAR) and is based on using parametric estimates to produce a macro-level of deferred maintenance. It can be accomplished using internal TUSD facilities staff at a fraction of the cost and still produce the desired results.

This approach requires a facility walk-through by personnel knowledgeable in evaluating building system condition. Generalized condition levels of major systems, from new (5) to not operational or unsafe (1), are determined and repair costs are developed based on a percentage of the CRV. Site systems and site utilities are typically evaluated as separate systems.

The total replacement value for the facility is divided into major systems as a percentage. The major system percentage of facility CRV is then multiplied by the repair cost (as a percentage of CRV) as designated by the generalized condition level. The BMAR method is useful only in gaining a global understanding of deferred maintenance backlog numbers. It does not provide any useful information, nor was it ever intended to, regarding long-term facility capital investment requirements or specific projects.

Details of the approach are presented in Appendix E.

Building Maintenance

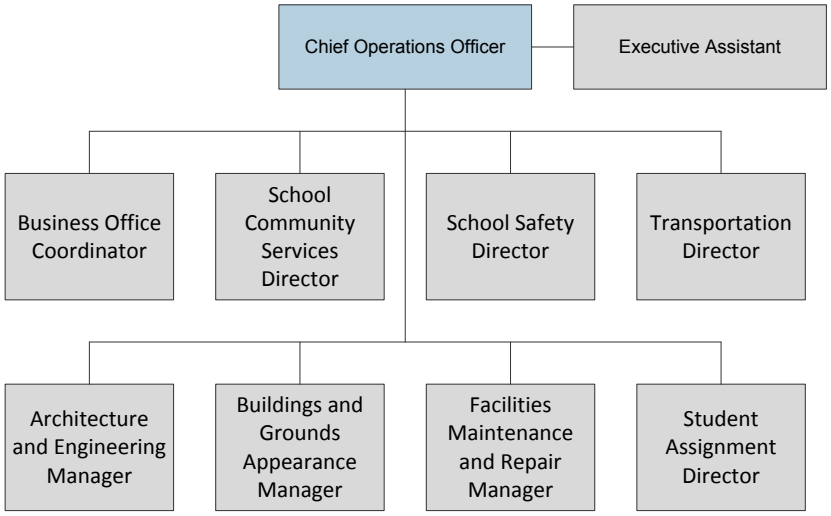
This section presents findings and recommendations for the improvement of building maintenance. Specific focus areas include facility organization and management (staffing levels and structure), policies and procedures, maintenance operations (including workflow processes, FM technologies, PM program, training, and maintenance performance measurement), grounds maintenance, energy management/sustainability, and school safety and security.

Organization and Management

The mission of the TUSD Operations Division is to provide facilities that are clean, safe, energy efficient, sustainable, comfortable, and conducive to efficient and effective educational and support activities, and to protect students, employees, grounds, and property. The division is organized by department to support the following functions and services: Architecture and Engineering, Student Assignment (facilities planning), Facilities Maintenance and Repair, Buildings and Grounds, School Safety, and the Business Office.

An organizational chart for TUSD Operations is shown in Figure 5.1.

Figure 5.1. Current Operations Organizational Structure



Source: TUSD 2013

The TUSD Architecture and Engineering (A/E) department is responsible for design and construction services for new school facilities; additions to existing schools; renewals (renovations) of existing school facilities; completion of capital improvement work orders; minor facility improvements; and the purchase, installation, and relocation of temporary classroom facilities. The A/E department provides project and construction management services and on-site inspection staff to guarantee quality assurance of TUSD projects.

This department also provides building evaluation and assessment services to coordinate the planning of construction projects for each successive school bond referendum to best support the educational needs of the students. The A/E department provides the necessary liaison between TUSD student assignment and master planning, and instructional programs, and the City of Tucson for all construction and development projects.

The Student Assignment department manages the processes and information necessary to ensure the efficient and effective accommodation of all students and educational programs. The Student Assignment department analyzes school enrollment projections by grade level and attendance area (school boundary) adjustment studies.

The Facilities Maintenance Department is responsible for routine preventive and corrective building maintenance services, facilities infrastructure repair and replacement, and energy conservation in the design and operation of TUSD facilities. The Facilities Maintenance Department is comprised of 51 employees and is responsible for operating and maintaining 87 schools totaling over 8 million square feet of area, plus other administrative and support buildings.

The Facilities Maintenance Department was recently reorganized to include centralized management and repair shops. The centralized shops include: facilities resource management, infrastructure and environmental management, planning and operations, energy management, and plant operations. Maintenance and repair of all mechanical, electrical, and structural equipment and systems is provided by technicians located at the maintenance facilities.

The Buildings and Grounds Department is responsible for exterior maintenance including landscaping, irrigation, pest control, site features, pavements, as well as custodial support to schools. The department has roofing technicians that conduct inspections and perform minor repairs. There are also carpenters, glaziers, and painters that perform maintenance and repairs of school exteriors and remove graffiti.

The Business Office provides three primary services for the Operations Division: financial (payroll and budgeting), warehouse management (central receiving, distribution, and mailroom services), and FM information technology (work order system and Functional Application Support Team – FAST). The Business Office also includes an energy manager that reviews utility bills and oversees energy conservation measure projects. Based on interviews, the Business Office Coordinator was also taking on initiatives to develop and implement process improvements impacting the entire Operations Division. These initiatives included, but not were limited to: FM IT upgrades, strategic plan development, policies and procedure documentation (i.e., Maintenance and Operations Plan – MOP), preventive maintenance, energy management, warehouse processes, staffing levels, facilities performance measures, asset management, and training.

A summary of staffing levels by department is shown in Table 5.3. The FTEs represent numbers reported at the time of this study and include funded and unfunded vacancies.

Table 5.3 Summary of Operations Division Staffing

Department	FTEs
Operations Division Managers	10
Business Office	28
Facilities Maintenance	51
Buildings and Grounds	75.5
Student Assignment	4
Architecture and Engineering	10
School Community Services	5
Total	**183.5**

Source: TUSD, 2013

A breakdown of the Operations Division staff by position is shown in Table 5.4. The table does not include the 79 FTEs in School Safety or the 397 FTEs in Transportation. These are largely officers, crossing guards, bus drivers, and bus monitors.

Table 5.4. Staff Levels by Work Category

Department	FTEs
Managers	11
Supervisors	12
Project Managers	6
Administrative	13
Foremen/Leads	5
Trades/Crafts	71
Custodians	17.5
Grounds	27
Inspectors/Planners	6
Warehouse/Workers	15
Total	**183.5**

Source: TUSD, 2013

The TUSD Operations Division has right-sized the facilities staffing levels by the introduction of more appropriate staffing models. With the inclusion of high-school-based site engineers, the overall TUSD maintenance staffing levels for front-line trades is approximately 109,000 sf/FTE. This is in line with best practices and representative maintenance staffing formulas.

The bond program is winding down and capital projects are being closed out. With this reduction in work, the A/E project managers will have more availability. There are a number of important initiatives to enhance the efficiency of the facilities organization that could use these project managers to lead these efforts.

During field visits and interviews widespread concern regarding the organizational structure and communication between Operations departments was found. There is a need to better integrate the departments under the Chief Operations Officer and increase the effectiveness of the facilities staff.

Two consistent and common themes arose out of interviews with managers and staff across the Operations Division:

1. There are organizational challenges. There is a need to better integrate workflow within and across departments. As an example, each department had a budget that was perceived to be controlled by the Business Office. The managers understood their responsibilities, but reported that they had little involvement with the development and control.
2. There also appears to be an opportunity to improve communication not only across the organization, but between levels of the division. Recent staff reductions have also placed stresses on overall morale and perceptions of a lack of control.

Recommendation 5-5: Utilize A/E project managers for contract management, quality assurance/quality control, FCI, support of technology projects, fire and life safety inspections.

The number of facility and process improvement projects required will be very difficult to successfully manage with existing resources in the Facilities Maintenance and Buildings and Grounds Departments. The potential for short- and long-term savings resulting from successful implementation are significant. Unfortunately, many such initiatives fail due to lack of internal resources to implement such projects.

The volume of work managed by the A/E project managers is diminishing with the closing of the final projects funded by the previous bond program. At the same time, recent staff reductions have left the Facilities Maintenance and Buildings and Grounds Departments with limited capacity to take on any additional work. The knowledge, skills, and abilities of the A/E project managers could be utilized for facilities contract management, management of technology projects, the EMCS integration project, implementation of FCA/asset management program, and quality assurance/quality control (QA/QC) and fire and life safety (FLS) inspections. It would be an effective use of skills to manage critical projects.

This realignment of project managers could also present a large boost to morale in providing help to overburdened managers and facilities staff.

Fiscal Impact

This recommendation does not result in annual savings. However, implementation of this recommendation would more fully utilize existing project managers and relieve facilities resources that are already stretched very thin.

Policies and Procedures

The TUSD Operations Division does have documented plans and policies across the various departments. The policies are generally well understood and followed. The division maintains a master plan, “Ed Specs”, design guidelines, financial, school capacity formulas, and staffing policies based on industry standard guidelines. The staffing guidelines have been recently evaluated and modified to be in closer alignment with industry standards. There have also been some recent efforts to document and improve work order processes.

While the policy and procedural documents reviewed were good, they were disparate and lacked coordination. The Business Office Coordinator also reported a need to develop a comprehensive facilities plan to help align and integrate the functions within the Operations Division. An initiative has been identified to create a Maintenance and Operations Plan (MOP), but has yet to begin.

Leaders of an educational FM organization must develop strategies and plans that are consistent, clear, and well thought out. Strategic goals, objectives, and tactical initiatives should be aligned to support the mission of the school system. These goals and objectives need to be well understood by department managers, supervisors and staff throughout the organization. The strategic plans must also be well-

documented, tracked, measured, and tied to improvement of facility management services for TUSD. Strategic plans for facilities should also be influenced by the district's overall strategic plan. TUSD does not currently have a strategic plan, and a recommendation to do so is presented in *Chapter 1 – District Organization and Management* of this report.

Recommendation 5-6: Develop TUSD Operations Division strategic facilities plan.

A TUSD School Master Plan has been developed to address overall financial, academic achievement, services, equity and diversity, and facilities plans (planning perspective). After TUSD develops a districtwide strategic plan, facilities management should develop a strategic facilities plan that addresses the optimization of performance of the existing schools and organization. The strategic facilities plan should document TUSD FM mission, vision, values, strategic objectives, and KPIs. A performance report aligning and integrating the strategic objectives and measures with the mission of TUSD should be created.

The strategic facilities plan should also describe how the TUSD Operations Division intends to create value to its stakeholders. The plan should also document how the organization will respond to both internal and external factors. External factors may include economic, political, and social concerns. Internal factors may include talent pool, organizational culture, and the availability of resources.

Day-to-day operational plans should be developed based on the strategic facilities plan using well-developed action items aligned with the objectives. Operational planning includes the plans necessary to define how the school facilities will be operated and maintained on a day-to-day basis to meet the needs of the TUSD. Examples of specific operational plans include: service requests, work control and management, workflow processes and standard operating procedures, inventory control, asset management, FCAs, planned maintenance, quality control inspections, energy management and sustainability operations, buildings and grounds operations, emergency preparedness and disaster recovery, safety and security procedures, regulatory and code compliance, hazardous communications, job safety, and communications processes.

Fiscal Impact

This recommendation can be implemented using existing resources.

Recommendation 5-7: Document facilities management policies, procedures, and workflow processes.

There is a need to more fully document and automate facilities management policies, practices, and processes. It is critical to have well-documented workflow processes prior to, or concurrent with, the implementation of a new CMMS.

One of the common themes heard during interviews at TUSD was a "need for better understanding what is expected" and more accountability. Desires to "better define work handoff and transitions" and

"a need to take away ambiguity and excuses" in the completion of maintenance activities were also noted.

A well-structured facilities organization coupled with efforts to improve processes will lead to the creation of generally effective and efficient operations and maintenance (O&M) processes. There is an opportunity to improve work coordination and transitions, as well as TUSD facilities staff's understanding of expectations. This is where the documentation of standard maintenance processes can really help. A number of efficiencies are typically gained through the training and communication of enhanced and documented processes. The benefits typically include:

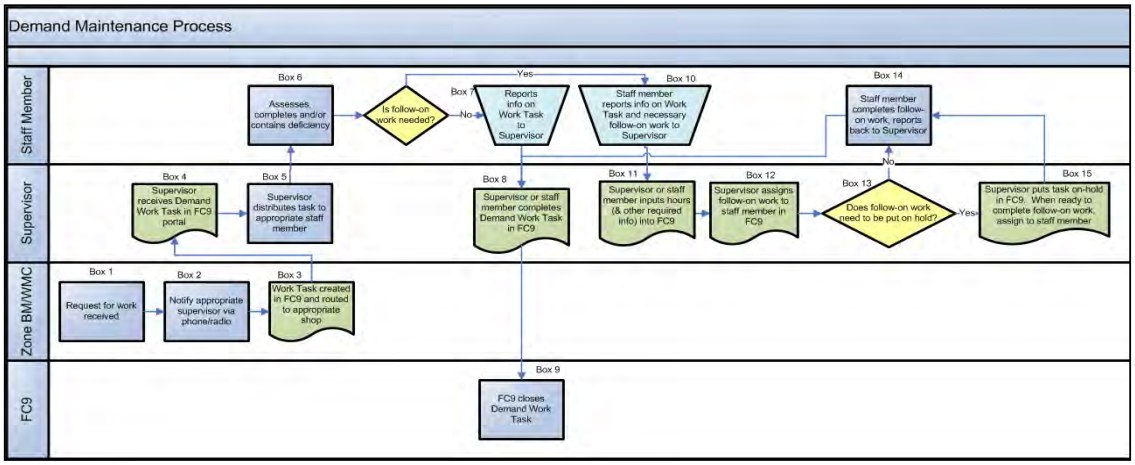
- Enhanced use of technology by identifying technology touch-points and requirements.
- Streamlined workflow – including automating processes.
- Understanding of better coordination and communication requirements between shops and between supervisors and staff.
- Better understanding of expectations and focus on achieving them.
- Ability to generate more accurate and meaningful performance measures by comparing apples to apples.
- Reduced training requirements due to reduction in the number of different ways things are done.
- Improved staff morale through fairer evaluations of performance.
- Creation of easier staff transition to other roles.

The need to improve documented processes appears to be due in part to the result of extensive experience and long tenures of many of the facilities supervisors and managers. The success of the informal processes that have served the Facilities Maintenance Department well in the past will be more and more difficult to achieve as experienced personnel retire. It is also important to take advantage of the current technologies available. The TUSD Operations Division should formalize and document facilities planning and maintenance procedures to ensure effective transfer of knowledge (and prevent the loss of institutional knowledge) of operation and maintenance of the facilities. TUSD should consider the development of process flowcharts for the following:

- Demand/corrective maintenance
- Service requests/reimbursable services
- Preventive maintenance
- Emergency response
- QC and life safety inspections
- Asset/equipment updates
- Materials management

A sample cross-functional process flowchart is shown in Figure 5.2.

Figure 5.2. Sample Workflow Chart



Source: Gibson Consulting Group, Inc.

Documented workflow processes increase the understanding of staff as to, “why” certain activities are performed. This understanding increases the consistency of processes and the accuracy of information resulting from the process. This in turn leads to confidence in the performance measures being used to evaluate overall performance.

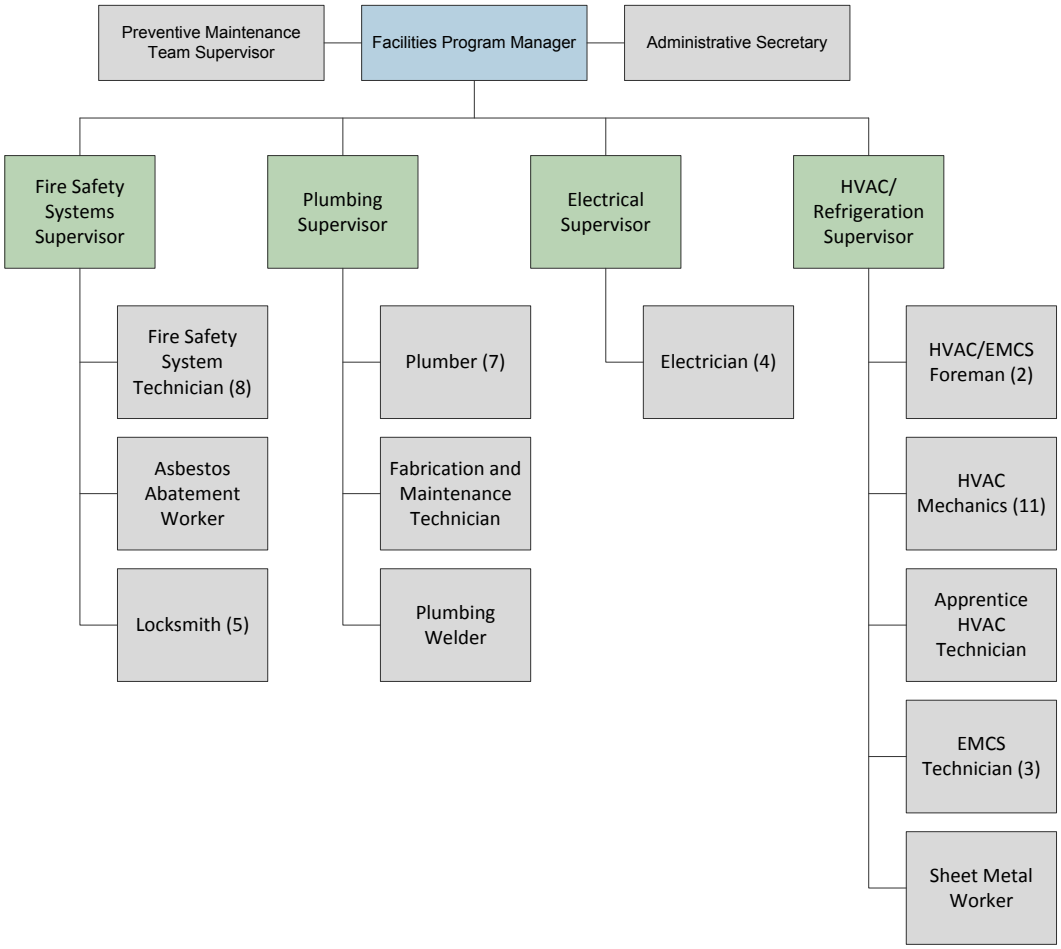
Fiscal Impact

The implementation of formal and documented processes for facilities management could result in significant cost avoidance and increased staff efficiencies coupled with the lean process improvements. This recommendation will require staff time and effort to document processes.

Maintenance Operations

The Facilities Maintenance Department is responsible for routine preventive and corrective maintenance, building and grounds services, facilities infrastructure repair and replacement, and energy conservation in the design, and operation of TUSD facilities. At the time of this study, the Facilities Maintenance Department was comprised of 51 employees spanning from the department manager/coordinator to the front-line trades/crafts. The Facilities Maintenance Department is responsible for operating and maintaining 87 schools totaling about 8 million square feet of area, plus other administrative and support buildings. An organization chart of Facilities Maintenance Department is presented in Figure 5.3.

Figure 5.3. Current Facilities Maintenance Department Organizational Structure



Source: TUSD 2013

The Facilities Maintenance Department is generally organized by trade shop and uses resources effectively. However, the building trades are distributed across both the Facilities Maintenance Department and the Buildings and Grounds department. Between the two departments there are 65 trades/crafts and six supervisors. There are also 10 building engineers at the high schools that report to the site-based school staff.

The overall staffing levels for building maintenance are about 109,000 sf/FTE. The trades/crafts to supervisor ratio is approximately 10:1, with a limited number of foremen and working leads. These values are in line with educational benchmarks but nearing the high end of the spectrum (i.e., limited resources and supervision).

There has been a significant reduction in the backlog of open work orders over the past year. At the start of 2012 there were over 4,700 open – emergency, Priority 1, and Priority 3 (corrective/demand) work orders. Currently, there are about 1,278 open work orders. This amounts to a 73 percent reduction

in backlog (94% reduction of emergency work orders, 91% of Priority 1 work orders, and 67% of Priority 3 work orders). The reduction should account for a noticeable improvement in response times.

While the Arizona Office of the Auditor General (AG) determines the overall costs of Plant Operations to be high on a cost per square foot (sf) basis, the review team's calculations indicate the current costs are consistent with school districts similar to TUSD. The AG report listed TUSD costs/sf at $6.52/sf; above the peer average of $5.91/sf. Based on a closer examination of the line item costs, these numbers appear to include some school-based costs for cafeteria security monitoring. Removal of these costs brings the cost per square foot for TUSD schools to about $5.42/sf, which is close to the national median of about $5.40/sf. In general, the custodial and grounds costs per square foot are appropriate, while the maintenance costs are below average and utility costs above average.

A review of the findings resulting from the evaluations of FM technologies, workflow processes, PM program, training, and performance measures are outlined in the following subsections.

FM Technologies (CMMS)

The current CMMS is insufficient to meet the needs of the facilities organization and is pervasively under-utilized. The current system (MAPCON) has limited functionality and reporting capabilities, is poorly configured, and lacks consistent and accurate data to provide credible facilities information to decision makers. There is also incomplete data regarding equipment inventories and maintenance histories. As an example, high school site operating engineers do not use the CMMS to track their time and materials. There is also a need to enhance and integrate technologies across the TUSD departments and within the Operations division.

The Business Office and Facilities Maintenance staff reported that they had to manually create business reports to review performance measures. The reports when generated were also reported to be questionable due to inconsistencies in the data and poor system configuration. There is also a substantial amount of reported lost time related to manual "double-entry" of data in the CMMS and the Lawson enterprise resource planning (ERP) system. One example is the need to manually re-enter parts data into each system. There are also separate stand-alone systems for key control, hazardous materials tracking and other maintenance functions. The use of several disparate spreadsheets with facilities data that could (and should) reside in the CMMS was observed.

Maintenance Workflow Processes

There were a number of facilities management process improvement opportunities identified. A substantial amount of non-productive time spent travelling to and from work sites based on ineffective processes was noted during the site visit. While there is no documentation recording excessive "windshield" time, the managers also believed this to be the case. Process improvement approaches could increase the efficiency of the facilities staff. This should begin with documenting processes, improving CMMS support and mobile technologies, fixing the equipment/asset inventories in the

CMMS, integration of shop and warehouse processes, and training of trades and supervisors on the streamlined processes.

Preventive Maintenance Program

Maintenance at the TUSD schools was reported to be primarily reactive. Overall, the amount of PM is reported to be around 11 percent of the total reported work efforts in 2012. TUSD Operations has recently implemented a limited PM program drawing on a rotation of shop trades staff from the Facilities Maintenance and Buildings and Grounds Department. The current PM program consists of manually generating general PM activities that are scheduled at each school on a quarterly basis. There is no link between equipment in the CMMS to PM procedures or histories.

There was also limited and incomplete documentation of procedures for testing and inspection of critical and life safety systems. The primary reasons for the low levels of proactive maintenance include a recent reduction of maintenance staff (eliminating the PM program) and the way the data are reported. There may actually be more proactive and planned maintenance being completed than actually reported.

Currently, there is no central PM group. In July 2013 the PM group of 15 FTEs was eliminated as part of an overall cost savings initiative. PM activities are now performed by rotating two-person teams drawn from the maintenance trade shops. Maintenance personnel rotate into the PM teams every three months. The specific PM tasks generally include HVAC filter changes, belt inspection and replacement, and inspection of exit lighting, emergency lighting, and backflow preventers (regulated assets). Contracted PM includes elevator and life safety system maintenance/testing/inspection, water treatment, pools, generators, boilers, chillers, and grease traps.

While the recent PM activities do provide critical and basic PM, they are far from a best practice PM program. Effective stewardship of the TUSD facilities requires implementation of a more proactive and comprehensive approach for school facilities.

Training

There is a need to enhance the existing training program. There was a consistent recognition of “bare minimum” training of building maintenance staff focused on regulatory and safety issues. There was also no readily available documentation regarding staff training histories and a lack of ownership of facilities professional development.

The aging facilities workforce requires consideration of a workforce succession plan. Adequate training is an important part of a long-term workforce strategy. There are many good training opportunities. It requires documentation to support career progression, gap analyses, prioritization and organization of the needs of TUSD Operations. Specific training needs include new equipment and new equipment technologies training for the technicians, safety and regulatory training, supervisor training, EMCS/BAS, workflow process training, and human resource training.

Performance Measures

There were limited facilities operations and maintenance KPIs being measured and tracked for the Operations Division. This was partially due to the lack of reliable CMMS data. The data and metrics reviewed generally came from multiple independent spreadsheets maintained by various managers throughout the Operations Division. As a result, it was difficult for the review team to reconcile data regarding the number, size, capacity, and cost of facilities in the various source documents.

Recommendations to achieve improved operations effectiveness and maintenance efficiencies are presented as follows.

Recommendation 5-8: Implement and integrate new CMMS to improve efficiencies and provide facilities data for better decision making.

TUSD lacks quality and organization of its facilities data as well as access to the information. The district does not make good use of the current facility management information technology (CMMS), making it difficult to track performance and obtain good data to make decisions on a school-by-school basis. The lack of use of the current CMMS to automate and manage work processes also limits the ability to track performance and obtain pertinent data to make informed decisions. The implementation of cost-effective CMMSs will help districts with the organization and tracking of critical data and support the improved effectiveness and efficiency of facility operations management.

CMMSs have become increasingly web-based, affordable, and easy to use. They also include more functionality to support space management, community use (central reservation systems), and contract and rental management. Their purpose is to automate and manage work requests as efficiently as possible and provide the basic information districts need to make informed and timely decisions. The benefits of automation continue to increase and include the following:

- Better data management
- Increased efficiency
- Better tracking of asset/equipment histories
- Organized FM data & information
- Expedited decision making
- Improved maintenance quality/labor tracking
- Improved communication
- Reduced operating costs
- Enhanced use of facility space

TUSD should implement a new CMMS to help organize, streamline, and document operations and maintenance efforts. Based on the review of the current CMMS, the quality of the data, and system configuration settings, it will be more cost effective to replace the older system with a new web-based CMMS. Such a system will help minimize redundant effects, better track assets and inventory, support maintenance decision-making, and provide data for facilities performance indicators.

The Business Office has already begun the process of evaluating needs of the Operations Division and available CMMS vendor applications that may best meet those needs. At the time of this review three potential CMMS solutions were being considered. Each of these CMMS applications is widely used in educational facilities. They are suitable for use within the TUSD Operations Division if properly implemented. Unfortunately, a majority of CMMS implementations fail to adequately meet the needs of end users.

The reasons for a lack of successful implementation are less related to the software than key process considerations. Many fail due primarily to:

- Inadequate implementation planning. Lack of careful thought about what the user wants to get out of the system.
- Lack of data standards and improper configuration to generate consistent/reliable reports.
- Poor understanding of processes the CMMS is to support.
- Lack of buy-in and training of staff to follow processes, correctly enter data, and maintain records.

TUSD should develop a prioritized and phased implementation plan that includes:

1. Identification of KPIs to be generated by CMMS data.
2. Development of clear data standards including: location, nomenclature, asset/equipment taxonomy, equipment attributes, building and equipment classifications, equipment granularity and grouping, etc.
3. Configuration of CMMS hierarchies and codes to properly generate metrics including: location hierarchies, shop codes, work type/category codes, priority codes, status codes, problem and repair codes, etc.
4. Enhancement and documentation of workflow process maps and standard operating procedures linked to the CMMS configuration codes.
5. Collection, scrubbing, and migration of asset and equipment data.
6. Incorporation of PM/Reliability Centered Maintenance program tasks linked to major maintainable equipment and systems.
7. Implementation and transition from MAPCON to new CMMS using development, testing, and production databases.
8. Training of users to include strategic considerations, workflow processes, software navigation/environment, data maintenance, and performance measurement.

Details of these CMMS and data standards recommendations are presented in Appendix F.

Consideration should also be given to hiring student interns from Arizona University or Arizona State University's FM program to support data collection and migration. Student interns can be a cost-effective approach to collecting valuable facilities data.

Fiscal Impact

State-of-the-art web-based CMMS systems for school districts are typically charged based on an annual usage fee related to student populations and desired modules. For a school district the size of TUSD, the fiscal impact would typically include an annual fee of $4,000 and a one-time implementation and training fee of $45,000 for both a web-based work order and preventive maintenance module.

Recommendation 5-8	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Implement and integrate new CMMS.	($45,000)	($4,000)	($4,000)	($4,000)	($4,000)	($4,000)

Note: Costs are negative. Savings are positive.

Recommendation 5-9: Improve preventive maintenance program.

TUSD's maintenance program is insufficient to provide the long-term stewardship needed to preserve the district's facilities. It consists mainly of breakdown maintenance, corrective actions, responding to demand work requests, periodic HVAC inspections, and filter replacements. The Facility Maintenance Manager reported most of the department's work was in response to requests and corrective in nature. The Maintenance Department appears to operate generally in a reactive mode. There was very little evidence of completed preventive maintenance on any equipment beyond the packaged HVAC equipment. Continuing to neglect an investment in a formalized maintenance program will result in inordinate expenditures and a shortened useful life of building systems and schools. The Business Office Coordinator also reported a sense of too many premature equipment replacements due to a lack of PM.

With few exceptions, preventive maintenance has been considered the most effective way of maintaining building systems and extending the service life of equipment. Most PM programs are based on the assumption that there is a cause and effect relationship between scheduled maintenance and system reliability. The primary assumption is that mechanical parts wear out; thus, the reliability of the equipment must be in direct proportion to its operating age.

Research has indicated that operating age sometimes may have little or no effect on failure rates. There are many different equipment failure modes, only a small number of which are actually age or use-related. Reliability Centered Maintenance (RCM) was developed to include the optimal mix of reactive-based, time- or interval-based, and condition-based maintenance.

RCM is a maintenance process that identifies actions that will reduce the probability of unanticipated equipment failure and that are the most cost-effective. The principle is that the most critical facilities assets receive maintenance first, based on their criticality to the mission of the facility or organization

dependent on that asset. Maintainable facilities assets that are not critical to the mission are placed in a deferred or "run to failure" maintenance category and repaired or replaced only when time permits, or after problems are discovered or actual failure occurs.

One of the toughest challenges TUSD's maintenance staff face is effectively executing a proactive maintenance program to support the educational mission with very limited staffing resources. This task may also present the facilities organization with one of the best opportunities to enhance efficiency through the use of proven Predictive Testing and Inspection technologies. These technologies can be integrated into the existing program at a relatively low cost and level of effort to optimize the program. In some cases, PM levels of effort have been reduced by 15 percent to 20 percent by eliminating unnecessary tasks or reducing PM frequencies based on empirical condition data.

The district should implement a formal and documented comprehensive PM/RCM program. A comprehensive maintenance program includes the right mix of PM, predictive maintenance, and reactive maintenance (i.e., passive monitoring) components.

To develop a comprehensive PM/RCM program, TUSD facilities management staff should begin by identifying systems and components, prioritizing maintenance activities, developing job plans, and estimating job plan completion times. Each activity is further defined below:

Step 1: Identification of Systems and Components – Comprehensive maintenance programs begin with a facilities assessment to identify the various assets' systems and maintainable components. All pertinent information should be collected (i.e., manufacturer, serial #, model #, capacity, size, etc.), and a determination of the present condition made, to establish a baseline. Knowing the age and condition of equipment is a prerequisite for maintaining it properly. For more about facilities asset identification and assessments, see recommendation related to facility asset management planning.

Step 2: Prioritizing Maintenance Activities – Once the facilities data has been compiled, a logic tree can be applied to help determine to what level each piece of equipment should be maintained. Equipment to be included in the maintenance program should be selected based on the cost of performing advanced maintenance weighed against the cost impact of deferring the maintenance. This includes the performance of an impact analysis or failure modes and effects analysis.

Step 3: Developing Job Plans & Estimating Completion Times – Once the failure modes and effects analysis or impact analysis is complete and the appropriate maintenance methods are established for each type of equipment and by location, maintenance tasks for all equipment types should be compiled.

Maintenance tasks should be based on manufacturer's recommendations and/or job plans developed by industry standard publications such as R.S. Means, General Services Administration (GSA), or Whitestone, and adapted based on experience. Detailed tasks, performance times, and frequencies by equipment type should be developed. Care should be taken to format the tasks in a mean and method for future uploading into a CMMS.

In addition to specific tasks, standard performance times, and frequencies, the job plans should also describe a process for resolving maintenance problems and the specific tools and materials needed. Some problems will be simple and the appropriate corrective action can be included among the other information in the task list. Other problems may not have an obvious solution, and in these cases the responsibility and process for addressing the problem should be clear.

Once a comprehensive list of maintenance tasks is developed, it may be necessary to again look at the prioritization of items or adjust the frequency of tasks to fit staff availability. Because resources are finite, the Facility Maintenance Manager and the Business Office Coordinator will need to use some judgment about which tasks are most important. When setting these priorities, it is important to keep in mind the criticality rankings previously determined, so as to not overlook and reduce maintenance on mission critical systems.

Fiscal Impact

The fiscal impact of creating a comprehensive preventive maintenance program is limited to the internal allocation of resources to inventory and set up the job plans. Data collection should be able to be accomplished using internal staff and could be worked into the routine maintenance schedule to avoid a lot of extra effort, providing good internal training regarding the location and type of equipment that should be serviced.

Details of the implementation of an enhanced PM/RCM program are presented in Appendix G.

Recommendation 5-10: Enhance operations and maintenance training program.

TUSD has a limited maintenance trades training program and no specific line-item reported in the operations budget for training maintenance staff. Very little outside training appears to have been completed or documented, and historical training records could not be located.

The TUSD Facilities Department has used alternate resources for some regulatory and safety training for maintenance and custodial staff. The management firm for TUSD's Workers' Compensation provides the safety training.

Districts initiate comprehensive training programs by developing individual training and professional development plans to minimize possible on-the-job-accidents, staff inefficiencies, repeat work, and also to ensure that maintenance personnel are knowledgeable in current O&M procedures and techniques.

Best practices show that 4 to 6 percent of a facility department's overall operating budget should be spent on training and development. Although most organizations do not spend to this level, this best practice indicates the importance of training. Not investing in ongoing training can result in increased on-the-job accidents, inefficient staff, and required repeat work. Adequate and continuous training is a key step in the development of individual performers and also aids in retention of staff.

TUSD should develop a facilities workforce professional development plan that takes into consideration succession planning, on-boarding training, internships, and certifications and credentials.

Training typically refers to learning opportunities specifically designed to help an employee do his or her job better. "Professional development" has a broader meaning, which includes expanding a participant's knowledge and awareness to areas outside their specific job duties, yet still related to the overall well-being of the organization.

Training is the opportunity to educate employees in the most effective way to utilize the available resources and to ensure that people understand the environmental rules and regulations regarding facilities and grounds. Information can be shared not only about the facilities and spaces but also about the larger district environment and the industry in general.

Managers must think creatively about how to provide high-quality training opportunities in the face of time and budget constraints. *The Planning Guide for Maintaining School Facilities* makes the following suggestions:

- Share training costs with other organizations on a collaborative basis (e.g., training may be sponsored by several neighboring school districts or jointly by the school facilities department and the public works department in the same community).
- Hire expert staff or consultants to provide on-site supervision during which they actively help staff improve their skills while still on-the-job.
- Develop training facilities, such as training rooms in which equipment and techniques can be demonstrated and practiced.
- Offer tuition reimbursement programs that provide educational opportunities to staff who might not otherwise be motivated to improve their knowledge and skills.
- Build training into contracts so that vendors are obligated to provide training at either an on-site or off-site training center as a condition of the purchase of their products.

Additional suggestions include:

- Utilize current staff to perform training with respect to their expertise.
- Compound the effects of training by having employees who have attended training provide internal training to other staff who were unable to attend due to resource restrictions.

Figure 5.4 identifies the types of training typically included in a comprehensive training program, as well as indications of how such training is generally delivered and who should receive it.

Figure 5.4. Training Recommendations

	Director of M & O	Maintenance Supervisor/Lead	HVAC Mechanic	Electrician	Plumber	Carpenter	Maintenance Generalist	Painter	Ground Crew Leader	Grounds Worker	Clerk		Online	Video	Peer Delivered	Outside Provider
Asbestos Awareness	x	x	x	x	x	x	x	x				Regulatory	x			
Bloodborne Pathogens Safety	x	x	x	x	x	x	x	x	x	x	x		x	x	x	
Combustible & Flammable Liquids	x	x	x	x	x	x	x	x	x	x			x	x		
Confined-Space Entry	x	x	x	x	x		x						x	x		
Hazard Communications	x	x	x	x	x	x	x	x	x	x	x		x		x	
HAZ-MAT Spill Prevention & Contro	x	x	x	x	x	x	x	x	x	x			x			
Lock-Out/Tag-Out	x	x	x	x	x		x						x		x	
Materials Handling, Storage, Use &	x	x	x	x	x	x	x	x	x	x	x		x			
Alcohol-Free Workplace	x	x	x	x	x	x	x	x	x	x	x	General Training	x			
Back Injury Prevetion	x	x	x	x	x	x	x	x	x	x			x		x	
Building Evacuation & Emergencies	x	x	x	x	x	x	x	x	x	x	x				x	
Emergency Response	x	x	x	x	x	x	x	x	x	x	x				x	
CPR Academic	x	x	x	x	x	x	x	x	x	x			x		x	x
Disaster Preparedness	x	x	x	x	x	x	x	x	x	x	x		x		x	
Electrical Safety	x	x	x	x	x	x	x						x	x	x	
Eye Safety	x	x	x	x	x	x	x	x	x	x			x	x	x	
Fall Protection	x	x	x	x	x	x	x	x					x	x		
Fire Extinguisher Safety	x	x	x	x	x	x	x	x	x	x	x		x	x	x	
Fire Prevention Safety	x	x	x	x	x	x	x	x	x	x	x		x	x		
General Contruction Safety	x	x	x	x	x	x	x	x					x	x		
General First Aid	x	x	x	x	x	x	x	x	x	x	x		x		x	x
Golf Cart	x	x	x	x	x	x	x	x	x	x	x			x	x	
Forklift		x	x	x	x	x	x	x	x	x				x	x	
Bucket Truck		x	x	x	x	x								x	x	
Job Specific Equipment		x	x	x	x	x	x	x	x	x				x	x	
Hand & Power Tool Safety	x	x	x	x	x	x	x	x	x	x			x	x	x	
Hearing Conservation	x	x	x	x	x	x	x	x	x	x			x	x		
Ladder & Scaffolding Safety	x	x	x	x	x	x	x	x	x	x	x		x	x		
Office Safety	x	x	x	x	x	x	x	x	x	x	x		x	x	x	
Cultural Differences	x	x	x	x	x	x	x	x	x	x	x				x	x
Personal Protective Equipment	x	x	x	x	x	x	x	x	x	x			x	x		
Sexual Harassment	x	x	x	x	x	x	x	x	x	x	x					x
Slips, Trips, & Falls Prevention	x	x	x	x	x	x	x	x	x	x	x		x	x		
H.S. Diploma/GED	x	x	x	x	x				x		x	Certification/ Licenses				x
College Degree	x															x
Technical Degree		x	x	x	x											x
Electrical -Master/Journeyman				x												x
Plumbing -Master/Journeyman					x											x
HVAC Certificate			x													x
On-the-Job						x		x		x						x
Department Procedures	x	x	x	x	x	x	x	x	x	x	x	General Personnel Practices			x	
Work Practices - Time Management/Organization	x	x	x	x	x	x	x	x	x	x	x		x			x
Supervision	x	x							x							x
Employee Relations - Counseling, Performance Evaluation	x	x							x							x
Work Order System	x	x	x	x	x	x			x		x		x		x	x

Source: Facility Engineering Associates

This monitoring can serve multiple functions: first, to track the effectiveness of the training; second, to be able to lobby for more money to do more training when the results are good; and third, to help identify areas where further training may be required.

Clear documentation of training should be referred to and reviewed periodically to insure that consistent and updated training is provided and to measure safety improvement practices.

The facility management staff should document all safety-related training conducted and that these documents should be stored at a designated document center for easy access and reference for management and employees alike. When possible, any training provided to the facility organization should be recorded for future reference and training opportunities.

Finally, ongoing evaluation of training efforts, including all aspects of the experience, should be built into the program for educating employees about the facilities and grounds. Good training is timely, informative, and effective; and it keeps teachers, staff, students, and visitors healthy and safe.

Fiscal Impact

The fiscal impact resulting from this recommendation is based on providing training primarily for maintenance staff. For TUSD's 51 FTE maintenance staff, this would result in approximately $100,000 per year in training costs (51 FTEs x $40,000 salary + 30 percent benefits x 4 percent).

Recommendation 5-10	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Enhance operations and maintenance training program.	$0	($100,000)	($100,000)	($100,000)	($100,000)	($100,000)

Note: Costs are negative. Savings are positive.

Recommendation 5-11: Formalize and improve operations and maintenance performance measurement.

TUSD has not developed adequate performance measures to effectively evaluate its facilities and maintenance operations. The district maintains limited data for the development of operations and maintenance performance measures. Thus, it is very difficult to show the successes of the Maintenance Department or "tell the FM story."

The development of data information standards and automating processes enhances facilities performance measurement and the accuracy of KPIs. The objectives of automating work processes are, after all, to enhance and measure facilities performance, and provide better information to make the best decisions regarding facilities.

The current performance measurement at TUSD is limited in scope and requires time-consuming manual data generation through the use of multiple spreadsheets. The performance measurement data provided to the review team included general budget information, school district target data, and some details regarding work order histories. The data also included benchmark information regarding operational costs and capital expenditures per square foot. However, there was a reported lack of

confidence in the data. TUSD has a great opportunity to improve facilities performance through the development of more specific KPIs aligned with the mission and vision of the district.

Measuring facilities operation's performance in today's environment is the route to credibility. The focus must be on prevention, not cure, and there must be recognizable goals and achievable prioritized objectives. Metrics provide essential links between strategy, execution, and ultimate value creation.

There are many ways of identifying and developing metrics and KPIs for use in school facilities management performance measurement. It is also easy to find samples of hundreds of potential facility maintenance metrics. However, it is not easy to identify and implement the right metrics to link facility operations and maintenance to strategy. The right KPIs should focus on those services that have the most prominent place in TUSD's strategic plans. The right mix of KPIs should consider all three aspects of facilities performance:

- **Inputs**: Indicators that measure the financial, staffing, portfolio condition, and operating impacts from limited budgets/resources, churn and construction and renovation activities.
- **Process**: Indicators that measure how efficiently the department is performing its key process.
- **Outcomes**: Indicators that provide a measure of how successfully the facilities function is performing at the enterprise level.

Educational organizations at the forefront of their industry have developed best practices by using a balanced scorecard approach to KPIs. The balanced scorecard is an approach that integrates financial and non-financial performance measures to show a clear linkage between the institution's goals and strategies. Most balanced scorecards consider four perspectives: customer perspective, process perspective, learning and growth perspective, and a financial perspective. The framework set by the balanced scorecard approach provides an excellent methodology to measure overall performance as facilities managers.

It is recommended that KPIs be developed a set at the time of (or prior to) the implementation of a new CMMS. A recommended listing of potential KPIs is presented in Table 5.5.

Table 5.5. K-12 School Key Performance Indicators

Type	KPIs
Input Measures	▪ FCI of building inventory (% DM/CRV) ▪ Maintenance staffing levels (# of FTEs) ▪ Operations funding ($/GSF) ▪ Baseline energy utilization index (EUI) /school ▪ Capital project funding ($)
Process Measures	▪ Work orders by type ▪ Top 10 work order problem codes ▪ Staff utilization (productivity) rates ▪ PM completion rate (%) ▪ Proactive maintenance (PrM) WOs generated ▪ PM / CM mix (%) ▪ Utility cost/GSF ($/GSF) ▪ Re-work percentage (%) ▪ School safety inspection findings ▪ Work order turn-around time (days) ▪ Annual building inspections completed (%)
Outcomes	▪ Cost of operations ($/GSF) ▪ Custodial inspection scores (#) ▪ Change in FCI (%) ▪ Trend in EUI per school ▪ Customer satisfaction (%) ▪ Budget performance (%)

Source: Facilities Engineering Associates

TUSD's Operations Business Office Coordinator should develop a limited number of key performance indicators to measure performance and show stakeholders areas of improvement and accomplishments. This task should be done in coordination with the Operations Director and other department coordinators to ensure alignment with the mission and strategic objectives of TUSD.

Fiscal Impact

This recommendation can be implemented with existing resources.

Grounds Maintenance

The grounds are maintained by a roving grounds crew, a central grounds crew, and site specific personnel. The roving grounds crew is responsible for landscaping at elementary schools and support sites. The central grounds crew is responsible for a broader spectrum of services including irrigation system maintenance, equipment repair, equipment operation, hardscape, pest management, moving, and pruning. Both the roving and central grounds crews report up through the Grounds Supervisor. There are additional site specific grounds maintenance staff at the high schools and middle schools, however they report directly to the school principals. These staff members perform such tasks as paper pick-up, lining the football fields, weed eating, tree trimming, and raking.

The current staff breakdown is summarized in Table 5.6.

Table 5.6. Grounds Maintenance Staff Breakdown

Grounds Maintenance Crew	Assigned Employees	Comments
Roving Grounds	1 Forman 12 Technicians + 1 Vacant	Landscaping at elementary schools and support sites
Central Grounds		
Irrigation	1 Forman 3 Technicians 1 (Vacant)	
Repair Mechanic	5	
Equipment operators	2	
Fence and equipment repair (includes playground equipment)	2	
Cement finishers (sidewalks, asphalt, stucco)	3	
Pest technicians (external pest control, tree pruning)	3	
Site Based		
Grounds maintenance, high schools	14.5	9 high schools, report to principals
Grounds maintenance, middle schools	6.5	18 middle schools, report to principals

Source: TUSD, 2013

The district has an estimated 1,400 acres of turf, 900 acres of which is irrigated. The high schools have 355 maintainable acres at the high schools and 319 maintainable acres at the middle schools. During mowing season (7-8 month duration), two equipment operators are assigned to mow the high schools and three equipment operators are assigned to mow the middle schools. Assuming 900 acres of irrigated turf, to provide maintenance at the lowest APPA service level for ground maintenance at 13.5 acres per person (Level 5), the district would require 67 personnel (APPA Grounds Maintenance 2011). Maintenance is assumed to include mowing, fertilizing, weeding, edging, shrubs, seeding, and aerating. With a total grounds maintenance crew of 55 personnel, the district appears to be operating below the lowest APPA benchmark level.

Recommendation 5-12: Repair/replace outdated equipment.

The roving and central grounds crews appear to operate well; however, their effectiveness is hampered on a daily basis by non-working equipment. Equipment such as dump trucks and brush trucks are 30-40 years old and in need of replacement. It is estimated that as much as a half hour is wasted each day in identifying and securing working equipment before crews can be dispatched on their assignments.

Additionally, irrigation technicians reportedly perform primarily emergency work with an estimated 80 percent reactive maintenance and 20 percent preventive.

Outdated, non-working equipment can cause delays and wastes time. The equipment should be repaired or replaced.

Fiscal Impact

The direct cost of this recommendation is difficult to determine and would require a review of specific equipment needs. The district should conduct an analysis to determine the equipment needs. Implementation of this recommendation will result in increased staff efficiency.

Custodial Services

The custodial services function is generally a source for cost savings in a school district. This is not the case at TUSD. TUSD has a very lean custodial function, too lean when compared to industry standards. Based on visits to TUSD schools during this project, the review team was impressed with the amount of cleaning coverage expected of the custodians, and most school administrators that were visited reported satisfactory levels of service – even after significant staff reductions.

The TUSD custodial services function is a $9 million operation, down from $12 million three years ago. After briefly considering outsourcing the function, TUSD decided instead to significantly reduce staff to achieve similar savings – far below what industry staffing standards would dictate. To place this staff reduction in its proper context, most school systems operate a custodial function with a productivity ratio of 19,000 to 22,000 square feet per custodian (including day and night shift). In 2013-14, TUSD's overall productivity ratio was 34,587 square feet per custodian.

To maintain its current cost levels, TUSD has relaxed its cleaning standards and lowered the related expectations of its customer base, namely the schools. The district has not made the appropriate investments in custodial cleaning equipment.

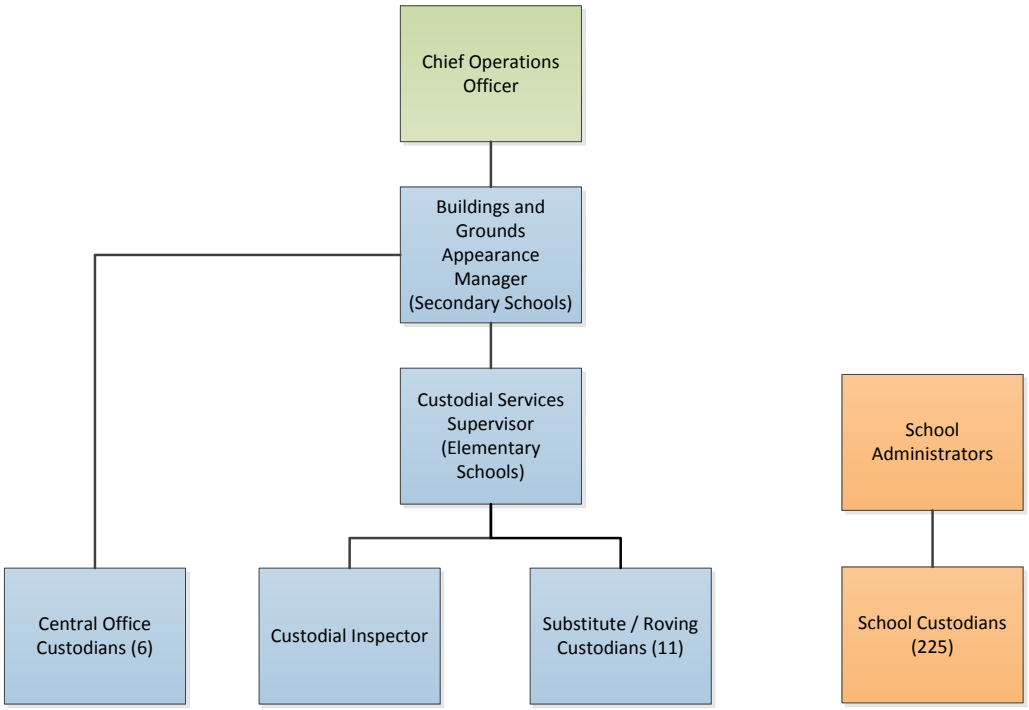
In order to provide a higher standard of cleaning at the current $9 million annual cost, TUSD should again consider outsourcing this function. Based on prior research conducted by TUSD, third party firms were found to have lower salaries and benefits, enough to offset the needed higher staff levels. However, if district leadership decides to maintain this function in-house, several investments will need to be made and a different management approach should be applied. The remainder of this section discusses these investment and management recommendations.

Recommendation 5-13: Implement more centralized management approach to custodial services.

Custodial services at TUSD operate under a hybrid organization structure whereby site custodians report directly to school administrators and a central office custodial function provides technical assistance and staff support. Figure 5.5 depicts the current organization structure for custodial services at TUSD. The

central office custodial function reports to the Chief Operations Officer through the Manager of Building and Grounds Appearance.

Figure 5.5. Current Custodial Services Organizational Structure



Source: TUSD Operations Area Org Chart 2013-14.pdf

The central office custodial function oversees central office custodians, a substitute pool of custodians who serve the entire district, and a custodial inspection position. The Building and Grounds Appearance Manager oversees custodial services, grounds support, irrigation, paint and glass maintenance, pesticide, the sign shop, and graffiti abatement. This position also serves as a custodial services advisor to the secondary schools, and supervises the central office custodial staff. A Custodial Services Supervisor position provides a similar advisory role over elementary schools, and oversees the substitute/roving custodians and the custodial inspector. In their advisory role, custodial services management in the central office provides input on staffing, cleaning frequencies and standards, equipment, supplies, and quality assurance. Custodial staffing, supplies, and equipment are included in the respective school operating budget.

The current decentralized approach to custodial management at TUSD has two primary shortcomings. First, it does not provide effective supervision over school cleaning activities. School administrators are not custodial specialists, and are not in the best position to provide technical oversight to this function. Second, custodial equipment is outdated at TUSD and inconsistent across schools. Because school administrators decide on equipment purchases as part of their school budgets, custodial equipment is often at the bottom of the priority list.

Some school systems have a dual reporting system. Under this approach the custodial supervisor reports administratively to the principal (attendance, discipline matters), while reporting functionally to a custodial leadership position in the central office. In other school systems, the principal serves as the customer of the custodial function, not the line supervisor, providing important customer feedback that influences the evaluation of the custodial function.

Custodial services should fall under the responsibility of TUSD Chief Operations Officer with a dual reporting role to the school principals for administrative purposes. A centralized approach would improve the consistency of cleaning processes and oversight, provide better support for supply management programs, and improve methods of cleaning and work assignments.

TUSD should create zone supervisor positions to oversee and be accountable for custodial services at the schools. All lead custodians (or designated head custodian) should report to a zone supervisor, who would conduct their annual performance evaluation. School administrators should provide input to the custodial zone supervisors on custodian performance and be surveyed throughout the year to evaluate ongoing work quality.

As part of this recommendation, the Chief Operations Officer should update the performance measures and targets for custodial services. The fiscal accountability for this function should also be changed. Custodial staff and related expenditures can be recorded in the accounting system as "school-based" but all costs should fall under the budget of the Chief Operations Officer.

Fiscal Impact

TUSD should create eight FTE zone supervisor positions beginning in 2014-15. With average pay of $35,850 (based on current custodial inspector salary) plus benefits of 30 percent, the annual staff costs would be $372,840. The current custodial inspector should be converted to a zone supervisor, resulting in nine total supervisors. Additional travel cost of $1,000 per zone supervisor, or $8,000 in total, is expected. The total annual cost is projected to be $380,840 starting in 2014-15.

Recommendation 5-13	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Implement more centralized management approach to custodial services.	$0	($380,840)	($380,840)	($380,840)	($380,840)	($380,840)

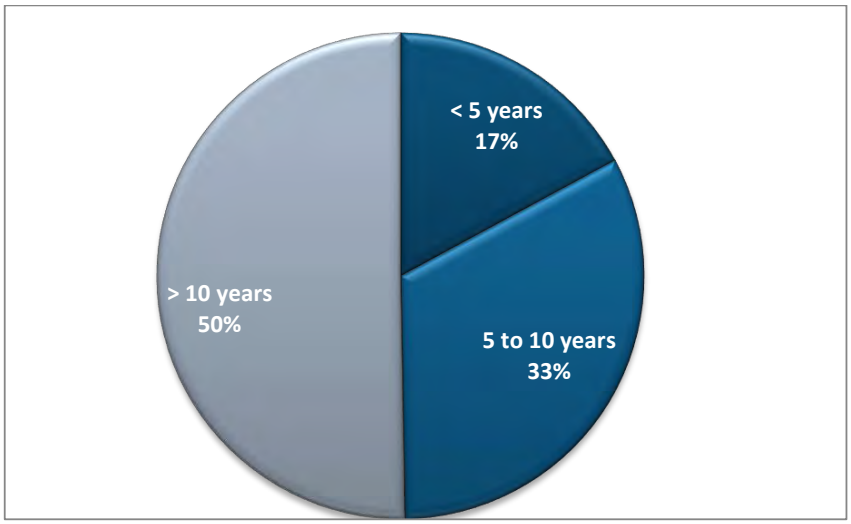
Note: Costs are negative. Savings are positive.

Recommendation 5-14: Invest in updated cleaning equipment to improve efficiency through reduced work demands.

TUSD maintains a centralized inventory of custodial equipment, but the decision to purchase equipment is made at the school level. This approach has led to the use of old, outdated equipment that limits the

ability of custodial staff to maximize their efficiency. Figure 5.6 shows the distribution of custodial equipment by age for the 181 pieces of equipment costing $1,000 or more. Approximately 50 percent of the equipment is more than 10 years old; less than 18 percent is less than five years old.

Figure 5.6. Age Distribution of TUSD Custodial Equipment



Source: TUSD EQUIPMENT Custodial Asset 20140115.xlsx

The TUSD custodial equipment inventory contains very few pieces of the newer, higher efficiency equipment such as auto-scrubbers (floor cleaning) and outdoor vacuum sweepers. The district has only five auto-scrubbers and no outdoor vacuum sweepers. Both of these tools support more efficient cleaning by custodial staff. Based on information obtained during school visits, one of the auto-scrubbers is used only during the summer deep cleaning procedures.

Fiscal Impact

If TUSD continues to operate its custodial services in-house, it will need to invest in equipment to maximize the efficiency of a highly lean custodial staff. The current cost basis of the district's custodial equipment (excluding vacuum cleaners) is approximately $650,000; however much of this equipment was purchased more than 10 years ago. The district should make an initial investment of 50 percent of this amount ($325,000), and continue to sustain a level of equipment replacement annually of 10 percent of the amount ($65,000).

Recommendation 5-14	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Invest in current cleaning equipment.	($325,000)	($65,000)	($65,000)	($65,000)	($65,000)	($65,000)

Note: Costs are negative. Savings are positive.

Recommendation 5-15: Increase custodial staffing after management change and equipment investments.

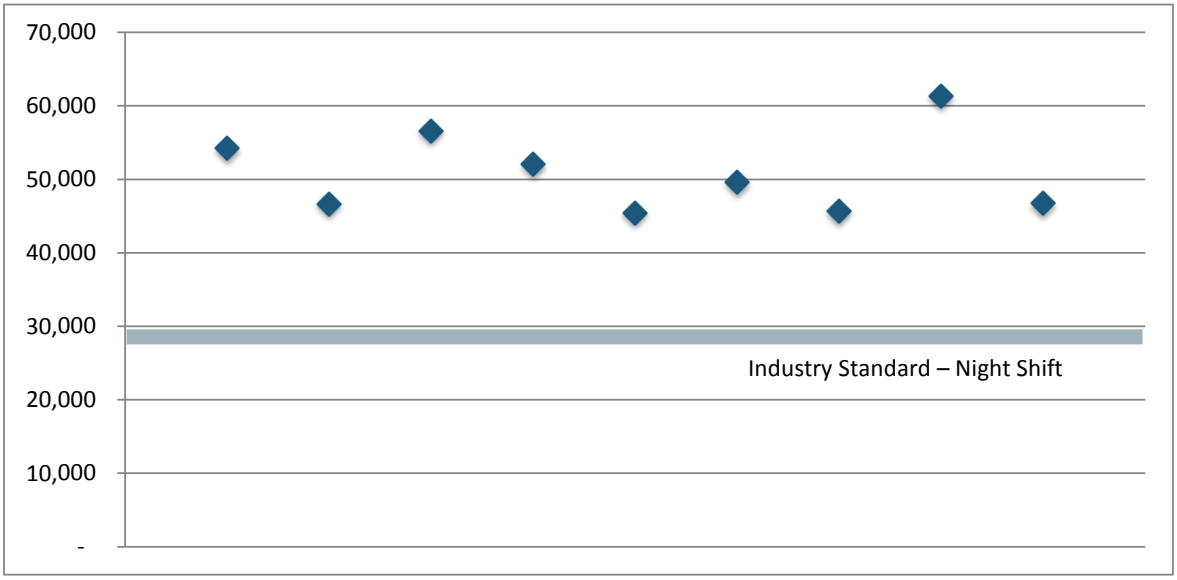
The Planning Guide for Maintaining School Facilities[16] contains recommended cleaning standards for school space. These standards relate to night shift productivity, where cleaning time is uninterrupted. Additional custodial staff resources are needed during the day for cleaning selected areas, inspection, lunch period cleaning, and special requests. Below are the various standards for school cleaning included in the planning guide. Most school facilities are subject to Level 3 cleaning.

- Level 2 cleaning is the uppermost standard for most school cleaning, and is generally reserved for restrooms, special education areas, kindergarten areas, or food service areas. A custodian can clean approximately 18,000 to 20,000 square feet in an eight-hour shift.
- Level 3 cleaning is the norm for most school facilities. It is acceptable to most stakeholders and does not pose any health issues. A custodian can clean approximately 28,000 to 31,000 square feet in eight hours.
- Level 4 cleaning is not normally acceptable in a school environment. Classrooms would be cleaned every other day, carpets would be vacuumed every third day, and dusting would occur once a month. At this level, a custodian can clean 45,000 to 50,000 square feet in eight hours.

TUSD's custodial productivity is far above these standards. Figure 5.7 shows a scatter diagram where each point on the graph represents the productivity measure (night shift gross square feet per FTE custodian) for each TUSD high school. All TUSD high schools far exceed the low end of the night shift cleaning productivity standard (28,000 gross square feet).

[16] Planning Guide for Maintaining School Facilities, School Facilities Maintenance Task Force, National Forum on Education Statistics and the Association of School Business Officials International, February 2003

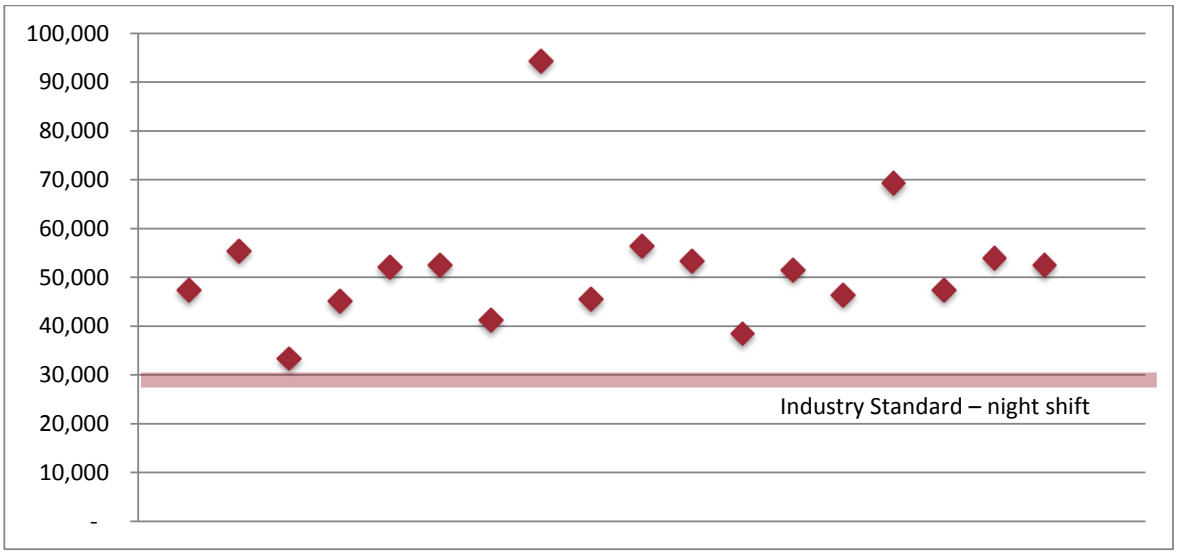
Figure 5.7. Gross Square Feet of Coverage per Custodian – Night Shift, TUSD High Schools, 2013-14



Source: TUSD Staffing 2013-2014 Shifts.xlsx

TUSD middle schools and K-8 schools show a similar relationship to the industry standard. Figure 5.8 shows each school's productivity measure against the industry standard for night shift productivity. Two schools showing unusually high productivity levels represent smaller middle schools that allocate more staff time to the day shift (so that no less than one FTE is at the school during the day).

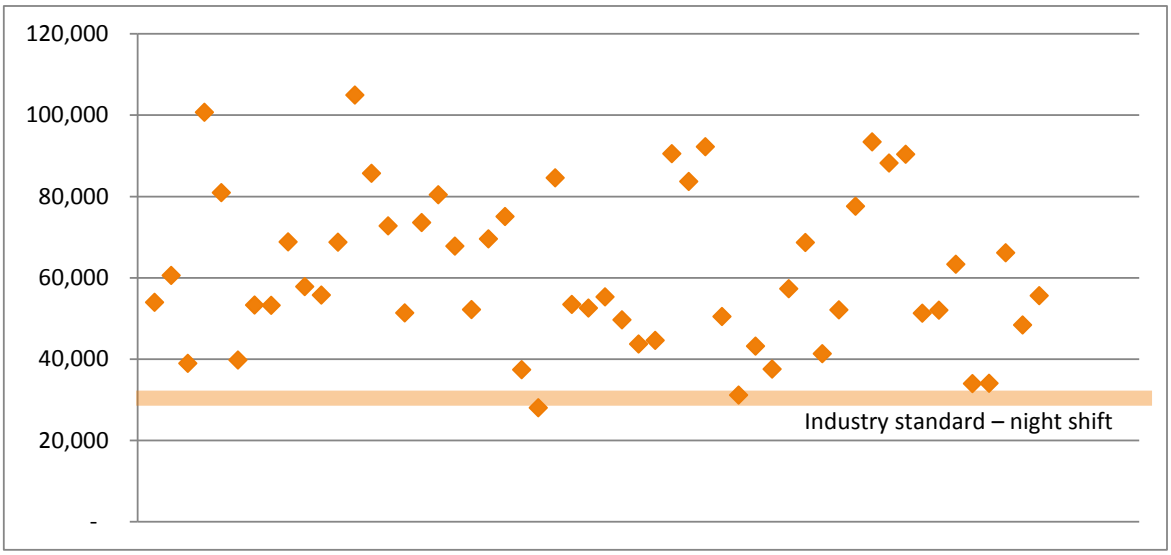
Figure 5.8. Gross Square Feet of Coverage per Custodian – Night Shift, TUSD Middle Schools and K-8 Schools, 2013-14



Source: TUSD Staffing 2013-2014 Shifts.xlsx

At the elementary schools, the impact of smaller schools is more pronounced. In order to have no less than one FTE at the elementary schools during school hours and sustain an overall productivity ratio, many of the schools have less than one FTE to support the night shift. This results in very high productivity for elementary school night shift custodians. Figure 5.9 shows night shift productivity of the elementary schools compared to the industry standard (28,000 gross square feet).

Figure 5.9. Gross Square Feet of Coverage per Custodian – Night Shift, TUSD Elementary Schools, 2013-14



Source: TUSD Staffing 2013-2014 Shifts.xlsx

TUSD applies some effective practices to maximize staffing efficiency. Less than one-third of the custodial staff works during the school day; two-thirds works the night shift when the students are not there and cleaning time is more productive. Further, the use of part-time positions helps achieve target staff productivity ratios at smaller schools.

The impact of the TUSD's low staffing levels is twofold. First, cleaning frequencies have been reduced to standards that more closely resemble a Level 4 cleaning standard whereby many items are cleaned every other day instead of every day. Second, this has led to lower expectations by school staff or in some cases resulted in the purchase of additional push brooms and other equipment for teachers to use/share in their classrooms. In essence, the current approach is asking schools to tolerate lower cleaning levels or to have school staff clean areas themselves.

TUSD should increase staff levels to achieve a higher standard of cleanliness and the commensurate expectations from students and staff at the schools. Before staffing "to the standards," TUSD should first evaluate the impact of the other two recommendations in this section – changing the management approach and investing in new equipment. The district may find that it can sustain an acceptable level of cleaning frequencies and cleaning quality above industry productivity standards.

Fiscal Impact

The fiscal impact of this recommendation assumes moving towards the night shift productivity standard of 28,000 square feet per custodian, and results in a need of an additional 40 FTE custodial positions. Based on the average starting pay for a Custodian 1 position of $21,255 and 30 percent benefits, the annual cost of this recommendation will be $1,105,260.

Recommendation 5-15	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Increase custodial staffing.	$0	($1,105,260)	($1,105,260)	($1,105,260)	($1,105,260)	($1,105,260)

Note: Costs are negative. Savings are positive.

Energy Management

Facility managers and operators, as stewards of the built environment, are challenged to integrate the principles embraced by their organization to run their facilities efficiently. TUSD has actively pursued conservation efforts. The district has established an energy conservation policy whose goal is "to help reduce energy consumption and utility costs, to optimize capital investment for energy efficiency, and to reduce emissions and conserve natural resources." Additionally, TUSD monitors energy through the use of Utility Manager Pro which reviews utility bills, and tracks energy consumption and cost on a monthly basis. Energy use in the district consists primarily of electricity and natural gas use; data for over 140 electricity meters and nearly 130 natural gas meters is contained within the Utility Manager Pro system.

Over the last five years, the district has spent over $14 million annually on energy (refer to Table 5.7).

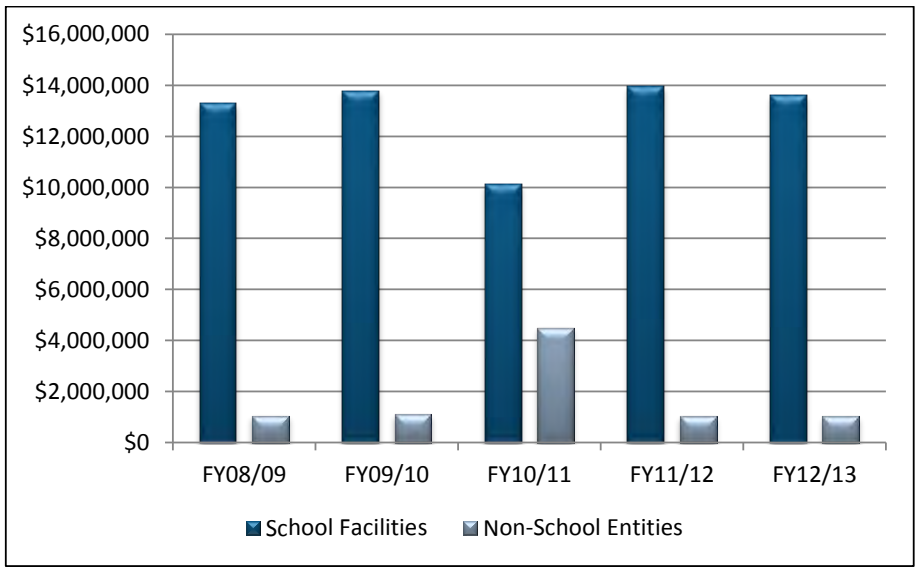
Table 5.7. Summary of Energy Expenditures by Fiscal Year (FY)

Fiscal Year	Energy Expenditures
FY 2009	$14,337,854
FY 2010	$14,874,687
FY 2011	$14,597,956
FY 2012	$14,965,948
FY 2013	$14,627,296

Source: TUSD, 2013

School facilities account for 84 percent of the gross square footage. According to meter data provided, these same facilities account for the majority (over 90 percent) of the energy expenditures in a given year with the exception of FY 2011. Given the steadiness of trend of the other four years, the FY 2011 expenditure split appears to be an anomaly.

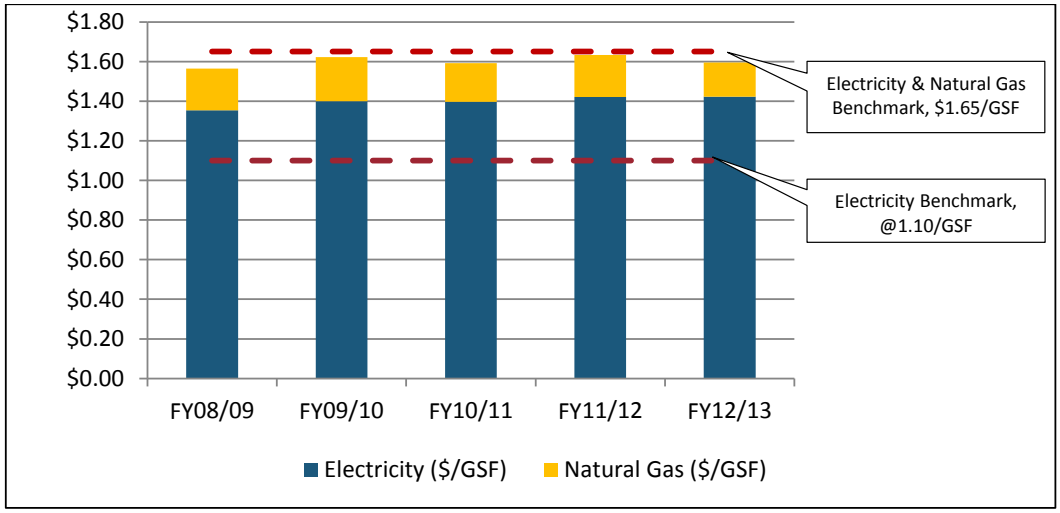
Figure 5.10. Energy Costs of School Facilities and Non-School Entities



Source: TUSD, 2013

Over the last five years, the district has spent an average of $1.56 to $1.63 per gross square foot (GSF) for energy utilities. The majority is for electricity which ranges from $1.35 to $1.42/GSF. The benchmark for education facilities is $1.65/GSF ($1.10/GSF for electricity, $0.55/GSF for natural gas) [17]. In reviewing the average costs for energy at the schools, total energy costs are very close to benchmark values; however, electricity costs are well above the benchmark. Figure 5.11 compares TUSD facilities costs to industry standards.

Figure 5.11. Education Facilities Benchmark Cost for Electricity and Natural Gas



Source: International Facility Management Association; TUSD 2013

[17] International Facility Management Association, *Research Report #32, Operations and Maintenance Benchmarks*, 2009.

While this comparison suggests district costs are in line with industry based on benchmarks, several facilities were noted to have much higher costs. It should be noted that approximately one-half of the facilities are demand-metered. In other words, the cost of electricity is based on both the amount consumed on a monthly basis as well as the peak demand reached in that month. This can be significant in an energy management program because demand charges can account for as much as 40 percent of the electricity cost. Table 5.8 summarizes the top 10 meter locations registering electricity costs on a per gross square foot basis.

Table 5.8. Top 10 Highest Energy Expenditures, Gross Square Foot Basis, Fiscal Year 2013

Meter Name/Location	Electricity	Natural Gas	Total
Finance	$ 9.46	$ 0.12	$ 9.59
Facilities-Property Control	$ 7.32	$ 4.98	$ 12.30
Booth/Fickett Magnet K-8	$ 5.44	$ 0.77	$ 6.22
Howenstine HS	$ 3.17	$ 0.47	$ 3.64
Transportation East	$ 2.85	$ 0.37	$ 3.22
TAPP MS/HS & STARR Center	$ 2.67	$ 0.14	$ 2.82
Davidson ES	$ 2.55	$ 0.29	$ 2.84
Food Service	$ 2.47	$ 0.30	$ 2.77
Gale ES	$ 2.42	$ 0.25	$ 2.67
Miller ES	$ 2.39	$ 0.27	$ 2.67

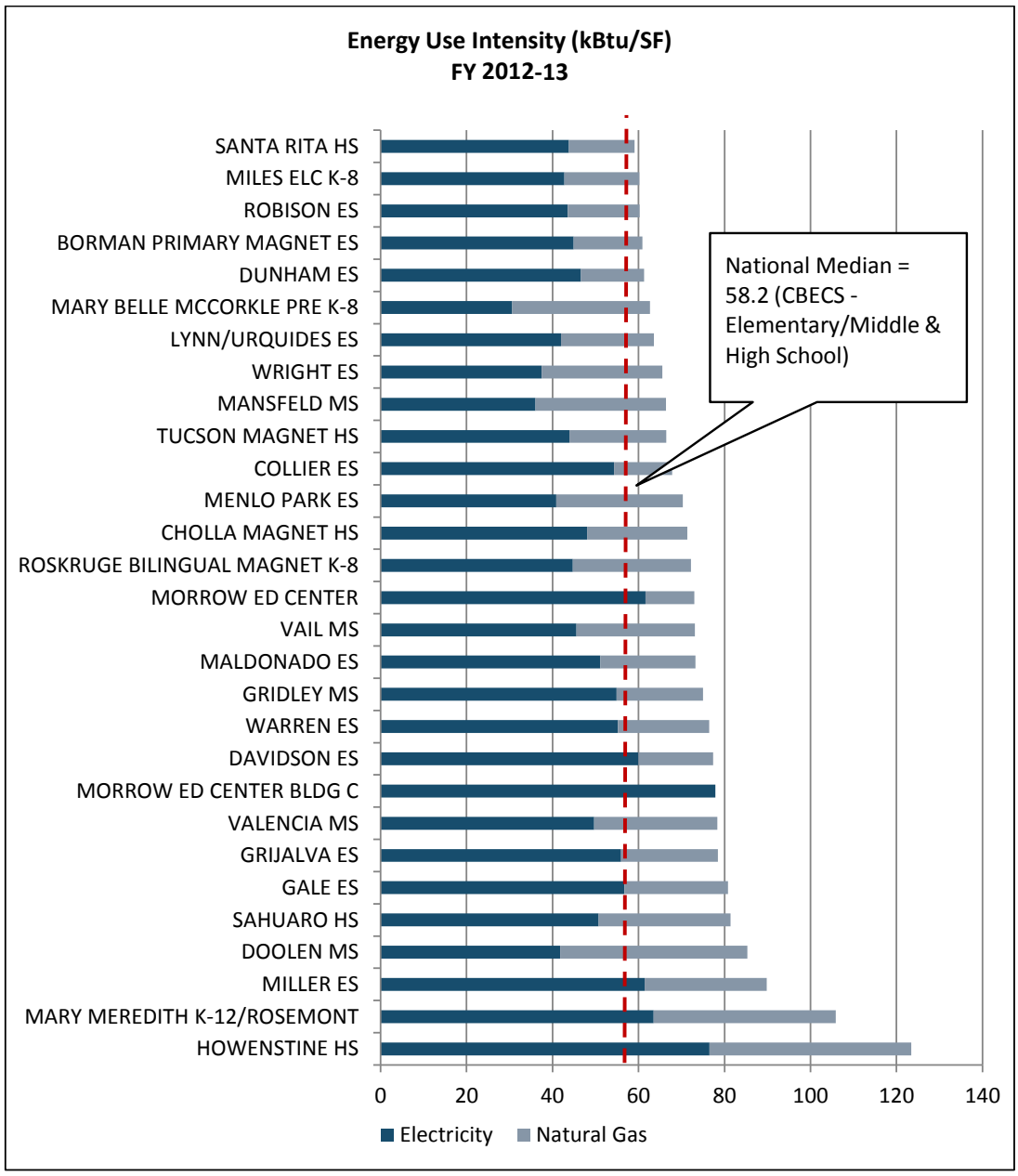
Source: TUSD 2013

Based on interviews with district personnel, the finance facility contains a server room which increases overall energy use for the building. Both the Facilities-Property Control and Transportation East facilities are reportedly relatively uninsulated, thermally inefficient buildings. The cause of the high cost per square foot for the remaining facilities is not readily apparent.

In order to obtain an understanding of a building's energy performance and to determine if a building is operating efficiently, it is important to compare a building's energy use to similar buildings. A good way to compare the energy use of similar buildings is calculation of the building's Energy Use Index (EUI). EUI is the average energy use per square foot over the course of a year for that building. The review team received monthly energy consumption and cost data spanning a five year period from FY 2009 through FY 2013 for over 140 electricity meters and nearly 130 natural gas meters. In reviewing the EUI of the school facilities, there are 29 schools that in FY 2013 exceeded the national median of 58.2 kBtu/GSF[18] (Figure 5.12).

[18] Commercial Building Energy Consumption Survey (CBECS) 2003 survey.

Figure 5.12. Schools with Energy Use Intensity Exceeding National Median



Source: Commercial Building Energy Consumption Survey; TUSD 2013

In 2012, the district performed an energy audit analysis which reported rising cost of utilities as well as decreases in overall energy use between FY07/08 and FY11/12. Specific recommendations were identified which included behavioral practices, maintenance practices, policies, and training needs.

A subsequent document, *Tucson Unified School District Energy, Water, and Waste Strategies,* summarized several initiatives which resulted in a reduction of energy expenditures, specifically $120,000 in electricity costs and $330,000 in natural gas costs. The reduction was attributed to the

performance of school energy audits, employee education and outreach, changes in behavior, and improvements in equipment/building controls.

In addition to the analysis and initiatives already identified, TUSD is implementing the following:

- Specifying master meters
- Implementation of a space temperature policy
- A Board policy for new construction to be LEED "Certified" level
- Annual goal to perform one energy audit per year
- Engaging students in performing energy audits
- Photo-voltaic array[19]
- Energy Management Control Systems (EMCS) are present at several locations. Current efforts are underway to link these systems together with a common interface.

Recommendation 5-16: Implement energy management plan.

Based on the data provided, many of the sites have opportunities for energy savings. Approximately one third of the schools spend over $1.80/SF in energy costs. This represents approximately 5 percent of the total annual energy bill for TUSD. Table 5.9 shows the top 10 locations with the highest energy costs per square foot. While a few of these areas are support facilities, the majority are school facilities. Figure 5.12 shows 29 school facilities whose EUI is above the national average for education facilities. Energy audits are recommended to identify building-specific opportunities for energy savings. The locations noted in Table 5.9 and Figure 5.12 should be used to prioritize the order in which facilities are reviewed. The district has a goal to perform one energy audit per year. The procurement of the services of an energy savings company is also reportedly underway. Both will help advance energy management goals. However these efforts need to be tied together in a cohesive energy management plan.

The building blocks of an energy management plan include:

- Establishing baseline performance
- Benchmark performance and prioritize facilities
- Identify opportunities for improvement
- Set goals
- Program development and implementation
- Measure and report

Through energy conservation practices, it is well within reason to achieve a 5 to 15 percent savings. Recommended energy conservation and management practices include:

[19] The district will be implementing an 11MW photo-voltaic array which is estimated to meet approximately 80 percent of the energy needs at 40 sites. TUSD has negotiated a 20-year fixed electricity rate of $0.1382/kWh for the power provided by the array. This is comparable with Tucson Electric Power's currently published summer rates on a GS-10 rate schedule, and is anticipated to result in significant energy cost savings as standard utility electricity rates otherwise continue to rise.

- Continue to conduct energy audits in schools and perform energy audits in support facilities. Audits in the schools are reportedly conducted by students. Energy audits typically identify low cost/no cost energy conservation measures which result energy and cost savings.
- Continue to install Energy Management Control Systems (EMCS) in schools, particularly those with more complex mechanical systems and high overall utilization.
- Implement energy management guidelines which incorporate system schedules, setpoints, minimum efficiencies for HVAC equipment, purchasing guidelines for plug load equipment (computers, printers, monitors, copiers), and personnel practices.
- Perform retro-commissioning in schools and larger support facilities.
- Utilize controls system to setback systems during off hours.
- Upgrade/integrate building controls systems (this effort is reportedly in progress).
- Install occupancy sensors for lighting and single-room HVAC units.
- When mechanical equipment has reached the end of its useful life, replace with high efficiency models which meet ASHRAE Standard 90.1 minimum efficiency ratings.

Additionally, the following should be considered:

- *Outside air* – district personnel noted quantity of outside air is a concern. Outside air is expensive to condition and, depending on the system type, areas of the building may be under or over-served. When outside air is insufficient, this can lead to a perception of stuffiness, build-up of odors, and generally poor overall indoor air quality. However when too much outside air is provided, it can over-tax mechanical equipment, and increase energy costs. One of the most common failures in mechanical equipment is outside air damper actuators. The function of dampers should be checked ideally on a quarterly basis, at a minimum on an annual basis. The quantity of outside air provided is recommended to be checked every five years, upon change of space use, or upon completion of mechanical system reconfigurations/renovations. The initial functionality of equipment dampers and outside air quantity could be checked by the energy savings company contractor should TUSD proceed with that procurement and wish to incorporate it into the scope of work.

- *Installation of occupancy sensors* – occupancy sensors are recommended for areas of the building which have prolonged occurrences of non-use such as conference and meeting spaces, private offices, single restrooms, and storage areas.

- *Portable units* – portable units are more expensive to heat and cool. Eliminating units (refer to Recommendation 5-1) will decrease overall energy expenditures.

A variety of guidelines exists for energy management in public schools including the following:

- Technical Reference: ENERGY STAR Score for K-12 Schools in the United States
- ENERGY STAR Building Manual, Chapter 10: K-12 Schools

- Guide to Operating and Maintaining EnergySmart Schools, U.S. Department of Energy, Energy Efficiency & Renewable Energy

Fiscal Impact

TUSD should develop an energy management plan across the portfolio, either in-house or with a third party to identify the specific energy conservation measures, implementation costs, and potential energy savings needed to reach these potential cost savings. Estimating costs of energy measures' implementation is difficult until the entire portfolio has been assessed.

Based on the work that has already been completed and the results that have been achieved, there is additional potential for energy cost savings across the portfolio if investments in personnel and capital projects is made. Appendix H shows the average energy cost ($/sf) and average energy intensity (kBtu/SF), for the various schools in FY 2013. Those schools with low EUI ratings represent the best potential for energy improvements and energy cost reductions.

An analysis of the schools was performed and the review team looked at the potential energy savings available. Assuming a target EUI of 58.2 kBtu/GSF, the potential energy cost savings of all of the schools with an EUI exceeding 58.2 kBtu/GSF is $1,300,000 (based on average rates for electricity and natural gas). Using a more conservative estimate of 5 percent annual energy savings yields an estimated $750,000.

Energy conservation measures can be identified through a variety of methods. The district is currently in discussions with an energy services contractor (ESCO) in which case a third party firm will identify energy saving projects, develop an implementation plan, and provide financing for needed investments in energy conservation measures. In these types of contracts, project costs incurred by the ESCO are typically paid by the subsequent energy savings. Alternately, retro-commissioning may be performed in which either district or third party personnel test building energy consuming systems to ensure that the buildings and systems are operating in accordance with the district's operating requirements. Energy conservation measures are developed in response to identified deficiencies as well as identified opportunities for operational improvement.

Assuming a third party retro-commissioning model, it is estimated that the cost of performing retro-commissioning at all of the schools with an EUI greater than 58.2 kBtu/GSF is $540,000 using an estimated cost of $0.20/sf. Paybacks in retro-commissioning programs are typically less than two years. Using the previously identified 5 percent annual energy savings estimate and corresponding $750,000 annual savings, and a capital investment of $1,500,000 in the 2014-15 school year, savings may begin as early as the 2014-15 school year. In this scenario, by the 2017-18 school year, the payback will have been achieved and savings will continue.

Recommendation 5-16	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Conduct re-commissioning and develop energy management plan.	($540,000)	$0	$0	$0	$750,000	$750,000

Note: Costs are negative. Savings are positive.

Chapter 6 – Transportation Management

Introduction

The Tucson Unified School District (TUSD) Transportation Department is responsible for transportation between home and school for general education students and special needs students attending public schools. The department also provides student transportation for pre-kindergarten, after school activities, summer programs, educational field trips, and extracurricular activity trips. The department is responsible for vehicle maintenance for the fleet of school buses and the district's general service vehicles. The core mission of the Transportation Department is to transport TUSD students to and from their centers of learning in a safe, timely, efficient, and academically supportive manner[20].

This chapter provides commendations and recommendations in the following areas of transportaton management: organization and management, routing and scheduling, fleet maintenance, and fleet replacement.

Eligibility for Student Transportation

According to Governing Board Policy for Student Transportation in School Buses (Policy EEA[21]), students who reside in TUSD's school district boundaries and meet one or more of the following criteria are eligible for student transportation between home and school:

- Students attending an elementary school or K-8 school who live 1.5 miles or more from school.
- Middle school students or sixth grade students who are assigned to a junior high school and who live at least 2.5 miles from school with no public bus service.
- Junior high school students who live at least 2.5 miles from school with no public bus service.
- Senior high school students who live at least 2.5 miles from school with no public bus service.
- Students who require specialized transportation in connection with any educational program, class or service as required by a student's individualized education program (IEP) based on special needs (Arizona Revised Statute §15-764). TUSD Transportation refers to these students as "exceptional education students."

The Transportation Department implements Governing Board Policy EEA using the following guidelines:

- High school students (other than exceptional education students) will utilize the City of Tucson Sun Tran public transit services and not receive yellow bus service if the student's home address

[20] Transportation 133 Routing Guidelines
[21] http://www.tusd1.org/contents/govboard/SectE/EEA.html

is within a walk to stop distance of 0.5 miles of a Sun Tran route and the route to school does not require more than one transfer.

- Students who "open enroll" as part of the Unitary Status Plan (USP) program and attend a school outside of the same geographical grouping as the geographical school of attendance (the "residence school") are eligible for transportation. Open enrollment includes students who attend a magnet school outside of the same geographical grouping of the student's residence school.
- If a student who is experiencing homelessness is temporarily residing beyond the established school attendance boundaries, the school district will provide that student with transportation to and from the school of origin (McKinney-Vento Act, 42 USC 11433, 2001).
- Students with temporary physical conditions can arrange to ride student transportation for short periods.

After-school routes provide students transportation from school to home following afternoon school-sponsored activities. The Transportation Department also transports general and exceptional students for summer programs, sporting events, extracurricular activities, and field trips.

Although TUSD's school enrollment is declining, the number of students eligible to use student transportation is increasing. TUSD's school enrollment decreased from 51,542 in 2012-13 to 49,872 in 2013-14, or a loss of 3.2 percent enrollment. At the same time, students eligible to use student transportation increased from 22,642 to 23,890, or an increase of almost 6 percent in one year. The Director of Transportation said the increase in eligibility is due to school closures. The district assigns students from schools that are closed to other schools located beyond the walk-to-school zone. Another reason that more students are eligible for student transportation is because the district is sponsoring more featured academic options as part of the USP program, thus encouraging open enrollment and attendance at schools of choice.

Table 6.1 documents the number of TUSD students eligible for transportation between home and school in 2012-13 and 2013-14.

Table 6.1. Students Eligible for Transportation

Category	2012-13	2013-14	Change
Student enrollment	**51,542**	**49,872**	**-1,670**
Students not eligible for student transportation	**27,863**	**25,962**	**-1,901**
Regular student riders eligible	20,784	22,100	1,316
Exceptional student riders eligible	1,858	1,790	-68
Students eligible for student transportation	**22,642**	**23,890**	**1,248**
Students eligible as percent of enrollment	45%	48%	
Eligible who decline student transportation	- 3,449	- 3,381	-68

Category	2012-13	2013-14	Change
Remaining students eligible for student transportation	19,193	20,509	1,316
Students eligible for transportation on school bus routes	**16,099**	**18,524**	**2,425**
Students eligible for buses as percent of enrollment	32%	37%	
Students eligible for Sun Tran passes	**3,094**	**1,985**	**-1,109**
Students provided Sun Tran passes as percent of enrollment	6%	4%	

Source: TUSD

Student Riders

Although 22,642 students were eligible for home-to-school transportation in 2012-13, TUSD reported 3,449 students or parents declined the service, leaving approximately 19,193 students eligible for transportation. Of the 19,193 students, 16,099 were scheduled to ride school bus routes, and 3,100 were eligible for Sun Tran passes. The Transportation Department reported transporting 9,062 daily student riders on school bus routes and providing passes for another 2,250 students to use Sun Tran public transit. A total of 11,312 students, or 59 percent of the 19,193 eligible students, used student transportation or Sun Tran in 2012-13. Table 6.2 presents students scheduled for school buses or Sun Tran compared to student riders.

Table 6.2. Students Scheduled for School Buses or Sun Tran Compared to Student Riders

Student Category	FY 2013
Students that are scheduled for school buses	**16,099**
Regular program student riders (less open enrollment)	5,491
Students transported for open enrollment	1,578
Exceptional education (special needs) student riders	1,390
Homeless student riders	603
Total student riders on school buses	**9,062**
Student riders as percent of students scheduled	56%
Students that are eligible for Sun Tran passes	**3,094**
Students issued Sun Tran passes	**2,250**
Sun Tran riders as percent of eligible	73%

Source: FY 2013 Arizona Department of Education and TUSD Transportation Department

The Transportation Department did not have data or anecdotal information to explain the difference between students eligible for transportation and the number of actual daily student riders on yellow buses or public transit. Table 6.2 documents the eligible students that are scheduled for school buses as compared to the actual student riders. The Transportation Department schedules all students who are eligible for school bus transportation (16,099 students) although 9,062 students (56 percent) actually ride the bus on the average school day.

One explanation for a lower percentage of student riders could be the length of routes. The school district is large in geographic area and number of schools, over 229.5 square miles and 87 schools. The department provides transportation for students who travel a significant distance to attend a school of choice rather than their neighborhood "residence" school, for students attending magnet schools throughout the district, for exceptional students with IEP approved specialized transportation requirements, for students eligible for transportation to a home school under McKinney-Vento, and for students attending alternative schools for behavior concerns. Routes are designed to provide capacity for all students who are eligible to ride the bus and who do not decline the service; however, on the average day, actual student riders are about 56 percent of students eligible for transportation on school bus routes. To schedule buses more efficiently, TUSD operates a transfer system for students attending schools of choice. Students transfer from bus routes serving a residence school to a different bus route that serves the destination school of choice. The impact of long distance travel for students participating in the district's many choice programs is discussed further below.

Transportation Facilities

The Transportation Department operates from three facilities that house transportation operations and vehicle maintenance throughout the district's geographical area. The Central transportation facility serves as the base for the 146 school buses. The Transportation Department uses Central as an administrative facility and as the location for the auto shop for general services vehicles. The newly constructed West facility opened in 2013 and is designed to maintain up to 250 buses. The current number of buses assigned to the West facility is 94 buses. The East facility is home to 92 buses. Each of the facilities is larger than required for the currently assigned bus parking and vehicle maintenance functions. This gives the Transportation Department some flexibility in assigning vehicles to distribute the workforce and reduce the non-productive miles from the bus parking facility to/from the end of each route ("deadhead" miles). However, the East facility is limited by the condition of equipment in the maintenance building; for example, vehicle lifts were not in working order in January 2014. Equipment that is not in working condition limits the type of tasks and the efficiency of work at that particular garage.

Use of Technology

The department also uses technology to help improve operating efficiency and to collect accurate data. For several years, the Transportation Department prepared bus routes and schedules using an automated routing and scheduling system. Use of an automated system should improve the efficiency and effectiveness of the routes. However, the department's software has been in service many years and relies on maps that are not the most current or most accurate. The department plans to solicit proposals for a new routing and scheduling software this year. Recently, the district purchased a geographical positioning system (GPS) for all school buses. GPS reports the exact position of the bus at all times. The department uses the GPS devices to monitor service and to verify that the most efficient route is traveled each time a driver operates a school bus.

Budget for Transportation

The 2012-13 expenditures for the Transportation Department were $23.7 million for operations, including all vehicle maintenance, and almost $1 million for capital purchases and debt repayment. Of the total expenditures for operations, 71 percent was for salaries, wages, and payroll-related expenses; 13 percent for fuel of all types; 10 percent for purchased services, parts, and supplies; and 6 percent for purchased transportation (Sun Tran bus passes and purchased Handicar transportation for exceptional education students). Table 6.3 shows the budget and actual expenditures for 2012-13 and the adopted budget for 2013-14.

Table 6.3. Budget, Expenses, and Project Savings for the TUSD Transportation Department

Budget Category	2012-13 Budget	2012-13 Actual	2013-14 Budget	Change 2012-13 Actual to 2013-14 Budget
Salaries and Wages	$9,657,072	$12,268,164	$8,207,632	-$4,060,532
Payroll Benefits	$4,626,701	$4,481,973	$2,481,595	-$2,000,378
Purchased Transportation	$1,244,097	$1,497,698	$1,318,000	-$179,698
Purchased Services	$573,544	$725,806	$860,100	$134,294
Parts and Supplies	$2,014,500	$1,743,905	$1,707,500	-$36,405
Fuel	$2,410,300	$2,986,957	$2,450,000	-$536,957
TOTAL Operations	**$20,526,214**	**$23,704,503**	**$17,024,827**	**-$6,679,676**
Capital		$992,845	$651,127	
TOTAL Operations and Capital	**$20,526,214**	**$24,697,348**	**$17,675,954**	

Source: TUSD Online Budgets; TUSD Operations Business Office

The increase in actual expenditures in 2012-13 over budget was in part due to an increase in management staff in the Transportation Department. The added positions are listed in the discussion of Organization and Management below. In 2012-13, the cost per student to use Sun Tran bus passes was less than the cost per student rider for TUSD school bus transportation.

The adopted budget for 2013-14 is $17 million for operations and $651,000 for capital outlay. The operations budget is $6.7 million below 2012-13 actual expenditures. The Director of Transportation and the office coordinator for the Operations Business Office provided a partial explanation for expected savings:

- The district leadership team negotiated changes in the Memorandum of Understanding for Blue Collar Employees (effective July 1, 2013 through June 30, 2015), and the changes are anticipated to reduce wages and related payroll benefits for bus drivers and monitors by $1,138,000 in 2013-14. The changes in the labor agreement include the following:
  - Vacation days were reduced to a range of 10-20 days depending on years of experience
  - Reduction in paid personal days from 14 to eight days effective July 1st, 2014

  - Eliminate December in-service day
  - Paid breaks only if the driver or monitor works a shift with a minimum number of hours
  - Fuel buses every other day (rather than every day)
  - Guarantee drivers six hours per day minimum for a morning/evening route assignment (the previous minimum was four hours)
  - Guarantee drivers eight hours per day if a midday run is added to the morning/evening route assignment
  - Discontinue the practice of paying drivers of pre-kindergarten routes on Wednesday because they do not attend school on Wednesdays

- In the budget assumptions for 2013-14, the implementation of GPS was expected to save $714,000 to $1,180,000 in wages and related payroll benefits for bus drivers and monitors based on route efficiencies and more accurate driver schedules. The estimate of savings assumed a reduction of the average paid hours for drivers by 5 to 10 percent and a reduction of the average paid hours for monitors by 5 to 10 percent.
- The new West facility is expected to reduce deadhead miles and save the district $500,000 in fuel expense.

These possible savings in 2013-14 are a maximum of $2.8 million (assuming 10 percent GPS savings) of the budgeted $6.7 million below 2012-13 actual expenditures. Neither the Director of Transportation nor the Office Coordinator for the Operations Business Office could confirm the budget assumptions that will provide an additional $3.9 million in savings. As of December 2013, approximately 57 percent of the budgeted operating dollars for 2013-14 were expended.

The GPS savings may not be realized due to the negotiated changes in the guaranteed minimum hours per day in the Memorandum of Understanding for Blue Collar Employees (effective July 1, 2013 through June 30, 2015). The estimate of savings for the West facility was based on an assumption that miles equal to the distance from the Central facility to the West facility would be saved for every route now operating at the West facility. In actual practice, some routes are closer to the beginning/end of each route and some routes may be a longer distance for either the beginning or the end of the route. The estimate of miles saved and therefore reduction in fuel costs may have been optimistic.

Sun Tran Bus Passes

The TUSD Transportation Department spent $1,323,712 during the 2012-13 school year to purchase Sun Tran bus passes for 2,250 students at an average annual cost per student of $588. This compares to TUSD variable operating costs $20,858,562 during the same school year to transport 9,062 student riders on school buses at an average annual cost per student of $2,302[22].

[22] Source: www.ade.az.gov 2012-13 TRAN 55-1 Reports

Peer Comparison

The purpose of a peer comparison is to understand the TUSD school transportation program as compared to another, similar school district. Mesa Public Schools (MPS) is a unified school district located in the Phoenix urban area. The MPS school district is 186 square miles in land area with an enrollment of about 60,000 students attending 85 schools. MPS provides school bus transportation between home and school for students attending neighborhood schools, students with special needs whose IEP dictates transportation is required, and homeless students who need transportation to their school of origin. The MPS walk zones for neighborhood schools are smaller than TUSD policy. The MPS walk zones are one mile for elementary schools (K-5) as compared to TUSD's one and a half miles; one and a half miles for junior high students as compared to TUSD's two and a half miles; and two miles for high school students as compared to TUSD's two and a half miles. MPS and TUSD both have an open enrollment policy; however, MPS does not provide transportation to students that choose to attend a school that is not the neighborhood school. Table 6.4 compares key characteristics for MPS and TUSD for 2012-13.

Table 6.4. Peer Comparison Mesa Public Schools and Tucson Unified School District

2012-13	MPS	TUSD
Total number of schools	85	89
Enrollment (approximate)	60,000	50,500
Land area (square miles)	186	230
Student density (enrollment/square mile)	**323**	**220**
Average enrollment per school (students per school)	**706 students**	**567 students**
Total school bus fleet	536	322
Annual route miles	6,042,000	5,105,000
Other miles (activity, extracurricular, summer)	420,000	145,000
Total miles	6,462,000	5,250,000
Annual miles per school bus (total fleet)	**12,100**	**16,300**
Daily route miles	34,000	28,000
Eligible students riding the bus daily	18,259	9,062
Daily route miles per student rider	**1.86**	**3.09**
Annual route miles per student rider	**335**	**556**

Source: www.ade.az.gov 2012-13 TRAN 55-1 Reports; MSP number of schools, enrollment and land area from http://www.mpsaz.org/

In fiscal year 2012-13, MPS expended about $24.1 million for student transportation, transported 18,000 daily student riders, and operated 34,000 daily route miles. MPS operated a school bus fleet of 536 vehicles. The primary fuel for the MPS school bus fleet is diesel (88 percent). MPS spent less than $25,000 for 261 students to use public transit.

In fiscal year 2012-13, TUSD expended about $23.7 million for student transportation, transported 9,100 daily riders, and operated about 28,000 daily route miles. TUSD operates a fleet of about 322 vehicles. The primary fuel for the TUSD school bus fleet is diesel (78 percent). TUSD expenses included $1.2 million for Sun Tran bus passes for 2,250 students.

The significant difference in the two districts is that MPS does not provide transportation for students that open enroll for a school that is not the assigned neighborhood school. TUSD operates more miles per bus and more route miles per student rider because of the policy to provide transportation for students that open enroll and attend a school outside of the same geographical grouping as the student's residence school. TUSD's miles per bus (total fleet) were 35 percent more than MSP, and TUSD route miles per student rider was 66 percent more than MSP for the 2012-13 school year.

Organization and Management

TUSD contracts with a private company, TransPar Group, to provide transportation management services. The Transportation Department struggled to provide reliable, on-time services during fall 2011. TUSD issued a request for proposals for transportation management services and selected TransPar Group for the assignment beginning January 2012.

TransPar Group provides the Director of Transportation support to assist in school start-up plans, route analysis, fleet replacement planning, negotiating the collective bargaining agreements, and other types of technical assistance.

The Director of Transportation is responsible for the TUSD staff of approximately 500, who work in four functional areas: bus operations, fleet maintenance, routing and scheduling, and communications.

The largest functional area is bus operations. Each of three managers is responsible for operations at one of the three TUSD transportation facilities. The manager at each facility oversees supervisors, dispatchers, drivers, and monitors. The supervisors are in the field during peak service periods to be on-hand to address in-service problems. The dispatchers are responsible for checking in drivers and monitors for duty, arranging for assignments to be filled by substitutes when required, and then managing operations at all times by radio communications. One supervisor is designated as the training supervisor, and is assigned to the Central facility. Three supervisors and four dispatchers are assigned to the Central facility; three supervisors and two dispatchers are assigned to the West facility; and two supervisors and two dispatchers are assigned to the East facility. On average, each supervisor is responsible for 38 drivers and 16 monitors. Supervisors and dispatchers cover all hours that route buses are in operation, from early morning until the last activity bus returns. The supervisors and dispatchers assigned to Central work at other facilities when required due to employee absences or vacancies. The number of drivers employed by TUSD was 306; however, 10 drivers are out for long-term leave and so 296 drivers were available to fill 271 peak bus assignments. Seventeen drivers are designated as stand-by to fill vacancies due to driver absences. Standby drivers are typically new drivers just completing training and waiting for a permanent route assignment. The Transportation Department recently began designating an additional group of eight experienced drivers as full-time "super subs" to fill in for absent

drivers. The experienced substitute drivers are better prepared to operate any route than new drivers with limited field experience. As of January 6, 2014, the number of monitors employed by TUSD was 130. Four monitors are out for long-term leave.

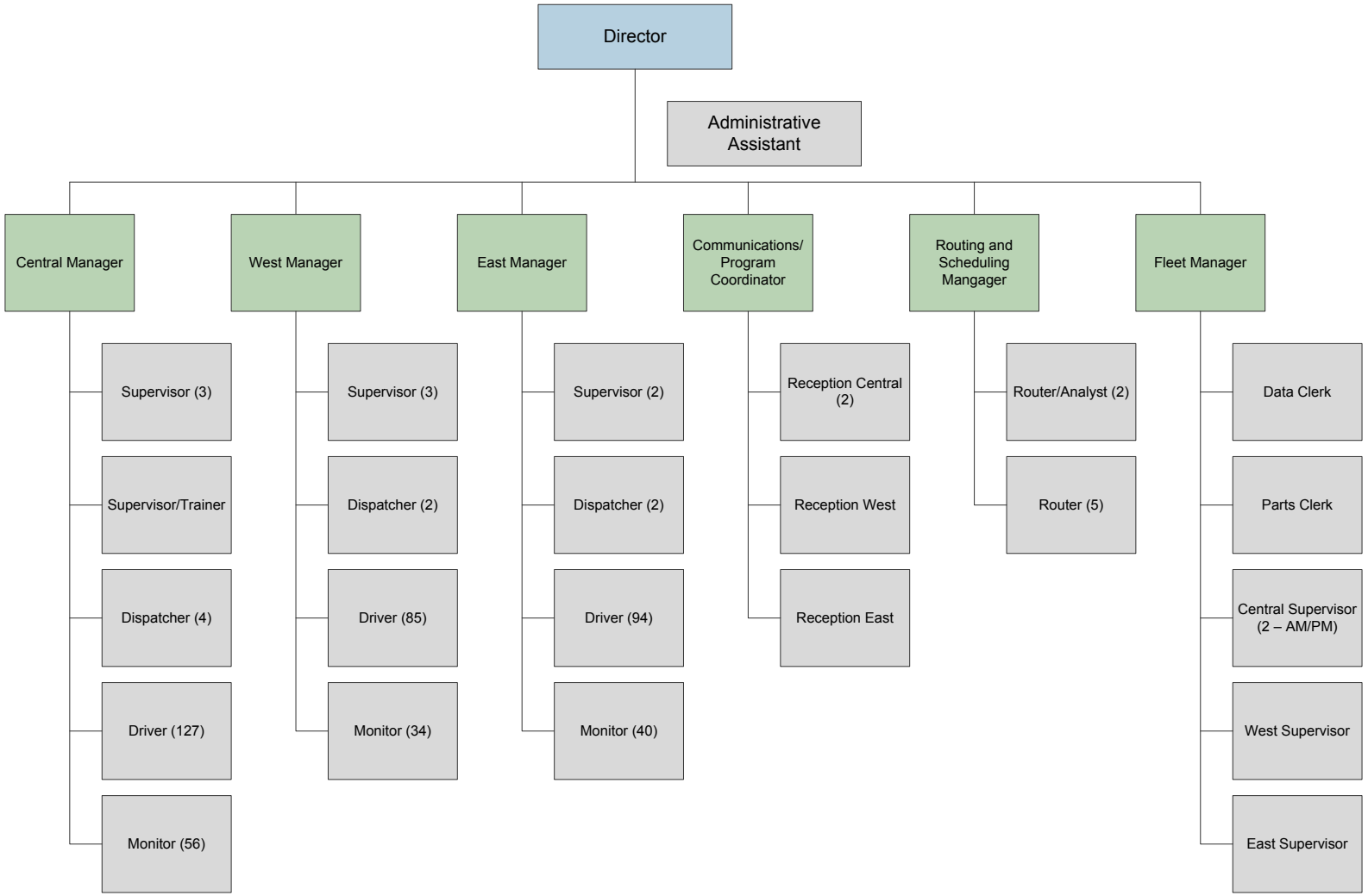
The second largest functional area is fleet management (sometimes referred to as the “auto shop”). The fleet manager is responsible for vehicle maintenance for school buses at each of the three TUSD transportation facilities and vehicle maintenance for the general services white fleet at the Central facility. The fleet manager assigns a supervisor to each facility and the supervisor oversees mechanics, lube technicians, and upholsterers. A second supervisor recently hired for the Central facility will oversee a second shift beginning in afternoon. The number of mechanics and technicians employed by TUSD was 15 of the 21 budgeted positions. The department was interviewing to fill the remaining vacant positions. A data clerk and two parts clerks also report to the fleet manager.

Staff in the routing/scheduling functional area manages the department’s student data, bus routes, route tiering, and prepares changes to the routes weekly as requests dictate. The routing manager’s expertise is information systems. The staff includes two router/analysts and five transportation routing technicians (routers). The router/analysts have skills using GIS and work with the automated routing and scheduling software to develop bus runs. Each router focuses on one type of service or geographic area of TUSD to maintain the databases and update routes. One router is responsible for exceptional education transportation.

A program coordinator leads the functional area for communications. Communications is responsible for answering telephone calls from parents, school administrators, and the department’s employees. A receptionist is assigned to each facility (two receptionists at Central). Receptionists are part of the department’s effort to improve customer service. Each receptionist sits in or near the dispatch area and fields phone calls during the busiest parts of the day. The receptionist logs requests for information or complaints into a database and refers the inquiry to the appropriate person to respond. The Transportation Department sets up a phone bank and employs temporary receptionists to receive phone calls and respond in a timely manner to requests for information during the first month of each school year.

Figure 6.1 is an illustration of the organizational structure and staffing levels for the Transportation Department.

Figure 6.1. Current Transportation Organizational Structure



Source: TUSD 2013

Based on the recommendations of the Director of Transportation and the TransPar Group, the district added 19 budgeted positions over the last two years to increase supervision and improve communications across the department. The 19 positions are included in the organization chart in Figure 6.1. The new positions include:

- 8 transportation supervisors
- 1 transportation supervisor/trainer
- 1 fleet manager
- 3 vehicle maintenance supervisors
- 1 manager routing and scheduling
- 2 router/analysts
- 1 program coordinator
- 2 receptionists (additional receptionists are part-time)

Commendation 6-1: Surveys show improved transportation performance.

Each semester, the Chief Operations Officer for TUSD conducts a transportation survey to measure customer satisfaction. All department leaders, principals, assistant principals, office managers, and attendance clerks are asked to complete the survey. The survey asks respondents to rate the Transportation Department on a scale from 1 to 10 (worst to best) in seven categories: buses on time, phone access to staff, follow-thru by staff, routing info availability, students routed timely, courtesy of drivers, and overall experience. The percent of very satisfied responses (8-10 out of 10) increased in each category from October 2011 to October 2012, with the greatest improvement in the ability to reach the Transportation Department by phone. The most recent survey results from October 2013 indicate the department is maintaining high customer satisfaction in all seven categories – with the highest rating for driver courtesy. Of all respondents to the survey, 67 percent rated the courtesy of drivers in the 8-10 range (very satisfied). The Director of Transportation recognizes there are still areas for improvement. The results of the November 2013 customer satisfaction survey show 50 percent of respondents were very satisfied (rating 8-10) with on-time performance for school buses.

Recommendation 6-1: Reduce the number of monitors for non-IEP routes.

The Transportation Department employs 130 monitors that are guaranteed six hours pay each day (four are currently on long-term leave). The monitors are assigned to routes that require a monitor based on the student's IEP, pre-kindergarten routes, and other routes to monitor student behavior or otherwise assist the driver. The ratio of monitors to drivers available for work is almost 1:2. The Director of Transportation did not know exactly how many monitors are required for the IEP of exceptional education students and pre-kindergarten routes. The department does not have criteria to determine which routes warrant a monitor based on student behavior or other reasons. The facility manager makes the assignments with input from transportation supervisors and dispatchers. Monitors are paid for a minimum of six hours per day. Including monitor wages and payroll benefits, the typical cost of a monitor per day is $108 ($13.82 per hour x 6 hours + 30 percent payroll benefit).

The Transportation Department should establish criteria for assignment of monitors to routes in other than those required by a student's IEP or for pre-kindergarten routes. The department should define performance measures to determine the benefit of additional personnel assigned to a school bus. A monitor should be assigned to a route only if data can show the second paid employee is warranted by measurable positive results (for example, reduced incidents of student discipline on the bus). The department should reduce the number of monitors by attrition to the minimum required.

Fiscal Impact

The Transportation Department employs 130 monitors. Assuming 80 monitors are required for student IEP and pre-kindergarten, approximately 50 monitors work as a second employee with the driver on regular route buses. The department should set a goal to reduce the number of monitors by at least five each year until the department employs not more than 105 monitors, the number required for IEP plus approximately 25 monitors that can be assigned to assist a regular route driver if required. The savings each year for each monitor is $19,440 ($13.82 per hour x 6 hours + 30 percent payroll benefit x 180 days). Savings each year for five monitors is $97,200 ($19,440 x 5).

The fiscal impact for this recommendation includes a savings in labor costs for the reduction of five monitors each year for five years, a total reduction of 25 monitors. Most of the reduction in staff is expected through attrition.

Recommendation 6-1	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Reduce the number of monitors for non-IEP routes.	$0	$97,200	$97,200	$97,200	$97,200	$97,200

Note: Costs are negative. Savings are positive.

Recommendation 6-2: Eliminate position classification for router and increase the number of router/analysts.

The routing and scheduling functional area of the Transportation Department consists of a manager, two routers/analysts, and five transportation routing technicians (routers). The five router positions are blue-collar and filled by staff with experience as drivers or monitors. The router/analysts are skilled personnel that work with the manager to resolve complex routing problems, tier routes, run scenario tests, conduct bell time analysis, etc. Router/analysts are integral to the work of the Transportation Department to create and maintain efficient routes and route tiers.

The classification of transportation routing technician (router) no longer matches the needs of the department for more highly skilled personnel. TUSD should eliminate the job classification for transportation routing technician and reduce the staff in that position. The current personnel may qualify to return to positions as drivers or monitors, or may qualify to apply for open dispatcher or receptionist positions.

The demands of the routing and scheduling function require personnel with analytic skills and computer skills. The current two positions are not sufficient for the size of the district and the responsibilities for routing and scheduling complex bus runs and routes. It is recommended that TUSD hire an additional two router/analysts.

Fiscal Impact

The fiscal impact for this recommendation includes a savings in labor costs. The first part of the recommendation is to eliminate the transportation routing technician classification and terminate the five staff in that classification. Assuming an average router salary of $38,069 per year plus 30 percent payroll benefits, savings are $247,449 annually ($38,069 + 30 percent payroll benefits x 5 routers).

The fiscal impact also includes additional costs router/analysis positions. Assuming an average router/analysis salary of $39,187 per year plus 30% payroll benefits, increased costs are $101,886 annually ($39,187 + 30 percent payroll benefits x 2 analysts).

The net fiscal impact for this recommendation is a net annual savings of $145,563.

Recommendation 6-2	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Eliminate classification for router.	$0	$247,449	$247,449	$247,449	$247,449	$247,449
Add 2 router/analysts.	$0	($101,886)	($101,886)	($101,886)	($101,886)	($101,886)
Net Fiscal Impact	**$0**	**$145,563**	**$145,563**	**$145,563**	**$145,563**	**$145,563**

Note: Costs are negative. Savings are positive.

Routing and Scheduling

The Transportation Department operates more than 1,200 bus runs to transport eligible students every school day. A bus run is the route pattern and time to pick-up students and to deliver them to the destination school. A bus route consists of one, two, or three bus runs tiered together each morning, afternoon, and each midday, if required. The router/analysts in the Transportation Department create a bus route for each driver/bus for the morning, afternoon, and in some cases for the mid-day (for pre-kindergarten and exceptional education students). Table 6.5 highlights how the district's 1,237 bus runs are combined into 586 bus routes requiring 271 buses at peak periods.

Table 6.5. Bus Route Summary by Facility

Category	West	Central	East	Total
Bus runs for all service	364	514	359	**1,237**
Bus routes (tiered sets of bus runs)	168	246	172	**586**
Average runs per route	2.17	2.09	2.09	**2.11**

Category	West	Central	East	Total
Buses required in peak service	78	113	80	**271**
Average routes per bus (morning, afternoon, midday)	2.15	2.12	2.10	**2.12**
Approximate daily route miles	5,161	6,610	4,739	**16,510**
Approximate daily miles	10,513	7,504	8,677	**26,694**
Average daily miles per peak bus	135	65	106	**98**

Source: Transportation Department, home to school transportation on January 7, 2014

In March 2012 the Transportation Department revised the "Transportation Routing Guidelines, Procedures, and Strategies". The stated objective of the guidelines are:

- Standardize the routing practice via adopting best practices.
- Define and communicate factors for satisfactory service.
- Fill up the buses without creating late or excessively long service.
- Minimize the number of short and "less-full" runs.
- Achieve the customer service objective of routing exceptional education students within four days of a request, homeless within three days, and regular students within five days.

The process to prepare for the beginning of a new school year begins when the Transportation Department works with TUSD administration to determine the impact of any policy or practice that will impact bus service the next academic year (for example, expanding open enrollment, opening a new magnet program, changes in bell times, or closing a school). The Director of Transportation said the Transportation Department could influence bell times for individual schools based on the impact on school bus routing efficiency. Once the department is aware of the planned changes, routing and scheduling staff begin preparing for the next school year. Students are asked to declare open enrollment choices by May for the following year. Students and parents are also asked to declare if an eligible student will not use student transportation. In 2013-14, almost 23,900 students were eligible for student transportation (either school bus or public transit) and about 3,400 decided in advance to opt out of student transportation. The TUSD policy is to schedule service and provide the capacity for every student who is eligible and did not opt out, to either ride a TUSD bus or receive a Sun Tran pass.

The Transportation Department drafts bus runs to provide the capacity for every student who is eligible to ride a school bus (16,099 in 2012-13 and 18,524 in 2013-14). The automated routing and scheduling software is capable of matching students to bus runs for approximately 90 percent of all students. The TUSD policy is to schedule every eligible student to a bus run. The remaining 10 percent are manually placed on bus runs by the routers and route/analysis. The next step, after developing bus runs, is to manually build driver assignments by tiering bus runs into routes of one, two, or three runs in the morning and again in the afternoon. The resulting driver assignments are posted for drivers to pick assignments based on seniority. The district mails letters to parents at least two weeks prior to the start of the school year. Routing and scheduling staff produce updates to a portion of the more than 1,200 bus runs each week. Typically, updates are implemented the Monday of each week. The Transportation

Department issues notifications for the updates to the affected students, parents, school administrators, drivers, and monitors.

The Transportation Department uses technology to improve operating efficiency and to collect accurate data. Several years ago, the district transitioned from an outdated routing and scheduling software to Trapeze Mapnet software. Mapnet allowed the Transportation Department to begin implementing efficiency changes to routes, bell times, and route tiers. In fall 2013, the district began installing GPS units on each school bus and the department is now working to integrate the new GPS capabilities into work processes. One of the primary purposes of the GPS implementation is to assist managers, supervisors, dispatchers, and routers to evaluate route compliance and actual time worked. These units will enable department staff to review route consistency with schedules, evaluate time when the vehicle is not carrying students ("slack time"), and conduct other analyses as needed.

The Transportation Department recently issued a request for interest (RFI) to software vendors for a new automated routing and driver scheduling system, which should result in additional efficiencies once the software is procured and implemented. The current software used by the district was a large improvement over the previous software; however, the current tools still do not allow routers/schedulers to run scenarios with route tiering or conduct other creative "what if" analyses for changes in bell times, for example.

The following sections summarize the Transportation Department's services based on routes as operated at the time of this review and the most recent actual ridership counts from November 2013. Table 6.6 includes information about the characteristics of bus runs by school level and route type. The types of bus routes generally match eligibility characteristics. "After School" runs serve students attending after school programs that need a ride home afterward. "Exceptional Education" routes primarily serve students with special needs and a related IEP "Explorers" is a specialized pre-kindergarten program organized for children with and without special needs. "Pre-kindergarten" are routes for pre-kindergarten students who do not have special needs. Regular routes serve students attending regular school programs at their residential area school. "Transfer" routes are bus routes operated to connect students attending educational programs a long distance away; students using transfer routes typically ride another bus route to the point of transfer. The "Combo" designation denotes the routes that serve students from many programs all traveling to similar destinations. The "Combo" routes and transfer routes are designed to serve several categories of students. Elementary schools require the most bus runs. Middle and high school bus runs report a lower ridership as compared to eligible students.

Overall, the average TUSD bus route has about 32 students assigned to each run and about 24 students actually ride the school bus. Table 6.6 demonstrates that the Transportation Department schedules service to meet the demand if every student who is eligible and does not opt out will ride the school bus. This results in capacity that exceeds the actual number of students who do ride the bus. Most buses have capacity significantly more than the number of student riders. On average, about 39 percent of school bus capacity is used.

Table 6.6. Bus Routes and Students by School and Route Type (2013-14)

School Level / Route Type	# Bus Runs	Avg Bus Capacity	Avg Assigned Students	Avg Actual Riders (Nov '13)	Diff Actual vs Assign	Bus Capacity Used
Elementary School	**540**	**59**	**27.4**	**21.2**	**-6.2**	**36%**
After School	11	82	NA	18.0	Na	22%
Exceptional Education	64	40	3.8	4.0	0.2	10%
Except Educ. Combo	213	58	24.2	21.3	-2.9	37%
Explorers	12	47	1.8	1.8	0.0	4%
Pre-Kindergarten	61	34	4.2	4.3	0.1	13%
Pre-Kindergarten Combo	18	73	34.7	27.9	-6.8	38%
Regular	99	78	49.2	35.0	-14.1	45%
Regular Combo	2	48	4.0	4.0	0.0	8%
Transfer	20	67	54.3	36.9	-17.4	55%
Transfer Combo	40	72	62.8	36.4	-26.4	51%
K-8 School	**82**	**55**	**17.4**	**13.8**	**-3.6**	**25%**
Exceptional Education	26	44	4.7	4.7	0.0	11%
Except Educ. Combo	22	52	22.3	19.3	-3.0	37%
Explorers	9	23	3.3	4.3	1.0	19%
Explorers Combo	3	82	8.7	6.7	-2.0	8%
Regular	22	79	34.5	24.0	-10.5	30%
Middle School	**378**	**68**	**41.5**	**30.7**	**-10.8**	**45%**
After School	22	75	NA	11.0	Na	15%
Exceptional Education	76	35	5.4	5.6	0.2	16%
Except Educ. Combo	45	69	38.5	29.6	-8.9	43%
Pre-Kindergarten	5	14	4.6	4.6	0.0	33%
Regular	122	81	55.3	44.2	-11.1	55%
Transfer	34	78	61.4	43.5	-17.9	56%
Transfer Combo	74	79	63.2	36.8	-26.4	47%
High School	**237**	**56**	**34.6**	**21.6**	**-13.0**	**39%**
After School	15	73	NA	13.0	Na	18%
Exceptional Education	97	29	6.3	6.3	0.0	22%
Except Educ. Combo	25	52	30.7	29.8	-0.9	57%
Regular	63	81	62.6	35.1	-27.5	43%
Transfer	5	81	58.8	31.2	-27.6	39%

School Level / Route Type	# Bus Runs	Avg Bus Capacity	Avg Assigned Students	Avg Actual Riders (Nov '13)	Diff Actual vs Assign	Bus Capacity Used
Transfer Combo	32	81	80.9	37.8	-43.1	47%
TUSD All Routes	**1,237**	**61**	**32.4**	**23.7**	**-8.7**	**39%**

Source: Transportation Department, home to school transportation on January 7, 2014

Table 6.7 documents cost based on mileage for routes. The cost per mile $3.28 is the variable cost per mile based on 2012-13 actual expenses. The variable costs exclude the expenses for bus monitors, Sun Tran passes, and white fleet maintenance and fuel. Monitors are excluded to maintain comparable costs between routes since not all buses have a monitor.

Table 6.7. Cost of TUSD Transportation per Each Rider Boarding a Bus by Type of Route (2013-14 Routes, 2012-13 Variable Cost per Mile Excluding Monitors)

	Route Miles	Total Daily Miles	Percent Route Miles*	Daily Cost	Cost per Each Rider Boarding (Nov '13)
Central Facility	**6,610**	**10,513**	**63%**	**$34,535**	**$11.26**
After school	531	32**	NA	$106	$8.25
Exceptional Education	1,472	1,940	76%	$6,371	$16.95
Except Educ Combo	1,712	3,637	47%	$11,948	$14.94
Explorers	140	286	49%	$941	$25.50
Explorers Combo	24	52	46%	$172	$12.47
Pre-kindergarten	232	395	59%	$1,297	$15.50
Pre-kindergarten combo	61	126	48%	$414	$2.08
Regular	1,063	2,167	49%	$7,120	$6.44
Regular combo	20	32	64%	$104	$12.03
Transfer	233	672	35%	$2,208	$2.71
Transfer combo	1,123	1,173	96%	$3,853	$4.51
East Facility	**4,739**	**7,504**	**63%**	**$24,652**	**$13.61**
After school	246	25**	NA	$82	$8.94
Exceptional Education	864	1,072	81%	$3,520	$18.00
Except Educ Combo	1,691	2,760	61%	$9,065	$16.61
Explorers	82	174	47%	$571	$40.10
Explorers Combo	46	NA	NA	NA	NA
Pre-kindergarten	221	461	48%	$1,515	$13.49
Pre-kindergarten combo	45	101	45%	$332	$5.93
Regular	864	2,017	43%	$6,624	$7.38

	Route Miles	Total Daily Miles	Percent Route Miles*	Daily Cost	Cost per Each Rider Boarding (Nov '13)
Transfer	108	324	33%	$1,065	$4.94
Transfer combo	572	571	100%	$1,876	$11.47
West Facility	**5,161**	**8,677**	**59%**	**$28,502**	**$11.79**
After school	349	NA**	NA	NA	NA
Exceptional Education	969	1,274	76%	$4,186	$22.49
Except Educ Combo	1,481	3,310	45%	$10,872	$17.47
Explorers	40	41	98%	$134	$29.31
Pre-kindergarten	266	481	55%	$1,580	$18.12
Pre-kindergarten combo	97	159	61%	$523	$5.12
Regular	1,356	2,469	55%	$8,111	$3.70
Transfer	38	172	22%	$567	$16.82
Transfer combo	564	770	73%	$2,529	$3.48
TUSD Total	**16,510**	**26,694**	**62%**	**$87,689**	**$12.09**

Source: Transportation Department, home to school transportation on January 7, 2014

*Percent Route Miles is percent of total daily miles used for actual bus route operation, meaning the margin between the percent and 100 represents deadhead miles and miles driven to connect tiered bus routes

**Total Daily Miles for After School may not be available and/or reflect actual service as routes are dynamic depending on which students choose to use the after school program that day

Table 6.7 illustrates the reasons TUSD student transportation is a costly operation. Routes are designed to serve a very complex system of eligibility for numerous types of academic programs. This complexity makes it difficult to design the most efficient routes (the most efficient route is home to neighborhood school). Routes are designed to provide transportation to all students who are eligible to ride and do not opt out. This policy is to ensure a bus will be available "if" a student who elects to ride requires more resources in miles, drivers/buses, and route time. A significant percent of bus miles are required to deadhead and/or to drive between routes in order to position the bus for the next run. About 38 percent of all bus miles are non-route miles. Distance is time, and so this analysis indicates how much of a driver's or monitor's schedule is also required for non-route travel.

The Transportation Department works with TUSD administration to adjust school bell times to accommodate for tiering of routes. The goal is to have as many routes as possible with three runs. Tiering three routes together is not always possible due to bell times and the travel distance of some routes. Table 6.8 summarizes how routes are tiered by operations facility.

Table 6.8. Route Tiering by Facility (2013-14)

Facility	Bus Runs from Facility	Tiered Routes from Facility	Average Tiers per Route	Peak Buses Required (AM)
Central	514	246	2.089	113
East	359	172	2.087	80
West	364	168	2.167	78
TUSD Total	**1,237**	**586**	**2.111**	**271**

Source: Transportation Department, home to school transportation on January 7, 2014

The typical driver operates a route consisting of two tiered runs during both morning and afternoon times. Additional tiering is a challenge because of the complexity of the district's eligibility requirements and the length of the runs (distance and time required) for open enrollment, magnet schools, and some exceptional education runs. The Director of Transportation said the challenges to adjust bell times further or to change district policy for eligibility may be more difficult than the benefits in cost efficiency.

Analysis of actual bus routes and driver assignments revealed the Transportation Department is paying for about 8 percent more hours of labor due to the guaranteed six hour minimum workday for drivers. The November 2013 TransPar Group RouteYield report documents that about 270 vehicles are required (271 at the time of the site visit) in maximum service due to a large middle tier of routes, but if all routes were tiered to three runs then only 182 vehicles would be required for service[23]. The district currently uses older, less robust automated software. Changing to a state of art software could result in tiered runs and routes that are more efficient. The difference between the current 271 peak vehicles and 182 hypothetical is about 30 percent fewer vehicles. The district has adjusted bell times each year of the previous two years to facilitate tiered routes. The Transportation Department staff feel that some additional gains may be possible, but the additional efficiency gains may be modest. New software capable of scenario testing could demonstrate how changes in bell times could allow more efficient routing and fewer required buses in peak service.

Recommendation 6-3: Continue with planned efforts to implement state of the art routing and scheduling software to optimize routing efficiency, and schedule transportation for students who "intend" to ride the school bus.

The Transportation Department uses Trapeze Mapnet software, with other related custom software components, to route students. A RFI to provide routing and scheduling software is currently in circulation. The department issued the RFI because the present software solutions do not have all of the capabilities desired by the routing/scheduling staff. State of the art software will have optimization capabilities that allow the district to test "what if" scenarios and then examine the costs. Efficient route planning reduces the miles operated and the driver/monitor time for a route.

[23] Transportation 132 FY 14 Bound Report

Additional efficiencies can reduce the number of runs/routes and save not only driver time, but also reduce the maximum number of buses required to operate service. TUSD currently designs bus routes capable of carrying all eligible students. TUSD should evaluate changing the district policy to schedule transportation only if the student or parent registers an intent to ride the school bus or should identify students actually riding the bus during the start of each school year and revise routes accordingly. The new software will make it possible to test scenarios for the impact of the change in policy. The ability to quickly develop multiple scenarios and compare operating costs will be more feasible with state-of-the-art software tools.

The combination of new routing software and GPS implementation means the Transportation Department will have opportunities to evaluate services to identify efficiencies, service improvements, and cost savings.

Fiscal Impact

A conservative improvement using new routing and scheduling software is 5 percent of variable operating costs. Variable operating costs (excluding monitors, white fleet, and public transit) in 2012-13 were $18.3 million. Therefore, annual fiscal savings of 5 percent beginning in 2015-16 will result in an estimated $915,000 annual savings due to routing software implementation. The district should assume savings in the first year at 50 percent of the first full year of implementation. New software will require an investment (currently listed at $300,000 in the 2013-14 budget) and a continuing annual maintenance expense ($150,000 per year estimate).

Additional savings could be achieved if TUSD does not require the Transportation Department to schedule service for every student who is eligible. Either the Transportation Department could reduce service in October, after patterns for ridership are established, or, preferably, TUSD Administration could change the policy to provide transportation only if the student or parent registers an intent to ride the school bus (rather than opting out which is now the policy). The new software will make it possible to test scenarios for the impact of the change in policy. For this analysis, a conservative estimate of the impact of a change in policy to schedule routes for students who choose to ride the bus could save at least 5 percent of daily miles, or about $788,000 per year (26,694 daily miles x 5 percent fewer miles = 1,334.7 daily miles x 180 days x $3.28 variable operating costs per mile in 2012-13).

Recommendation 6-3	One-Time Costs / Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Implement state of the art routing and scheduling software.	($300,000)	$450,000	$915,000	$915,000	$915,000	$915,000
Annual software maintenance.	$0	$0	($150,000)	($150,000)	($150,000)	($150,000)
Net (Cost) Savings	**($300,000)**	**$450,000**	**$765,000**	**$765,000**	**$765,000**	**$765,000**

Recommendation 6-3	One-Time Costs / Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Schedule transportation for students who intend to ride the school bus.	$0	$0	$788,000	$788,000	$788,000	$788,000
Net Fiscal Impact	**($300,000)**	**$450,000**	**$1,553,000**	**$1,553,000**	**$1,553,000**	**$1,553,000**

Note: Costs are negative. Savings are positive.

Recommendation 6-4: Renegotiate labor agreement to pay drivers and monitors for actual time worked.

The single largest cost driver for student transportation services is driver and monitor labor. The current Memorandum of Understanding for Blue Collar Employees (effective July 1, 2013 through June 30, 2015) guarantees drivers a minimum six hours pay per day. Bus monitors are guaranteed a minimum six hours per day. TUSD should negotiate a change in the Memorandum of Understanding for Blue Collar Employees to pay drivers actual time worked (effective July 1, 2015).

Table 6.9 summarizes analysis of driver shifts in 2012-13 and 2013-14. Based on the current labor agreement, the department's goal is to have as many drivers as possible working assignments that have them on duty and productive for six to eight hours. As compared to 2012-13, a lower percentage of drivers are working six to eight hours in 2013-14, and a higher percentage of drivers work less than six hours or more than eight hours.

Table 6.9. Driver Assignments, 2012-13 vs 2013-14

Driver Assignment	2012-13		2013-14	
Average Assignment	**6.26**	**Hours**	**6.17**	**Hours**
Shortest Assignment	1.88	Hours	1.77	Hours
Standard Deviation	1.37	Hours	1.73	Hours
Total Drivers	**262**	**Percentage**	**243**	**Percentage**
# Drivers under 6 hours	98	37%	123	51%
# Drivers 6 to 8 hours	148	56%	100	41%
# Drivers over 8 hours	16	6%	20	8%

Source: TUSD Transportation Department route schedules Spring 2012-13 and Fall 2013-14

Note: Analysis based on best available route data for a sample of route schedules with driver field populated, may not include all drivers.

At the time of this review, the Transportation Department assigned 127 drivers less than the minimum six hours per day, or a total of 122 hours per day paid time not worked. Analysis of 2013-14 data determined the department is paying for approximately 22,000 annual hours for time drivers work less than the guaranteed six hours per day. Approximately 270,000 hours are required annually to operate

student transportation services. Therefore, the district is paying for about 8 percent more hours of labor than hours worked.[24]

Monitors are required on buses if at least one child has an IEP that prescribes a monitor. TUSD employs 130 bus monitors. Route data do not specify which runs include monitors. With the information available, there is not enough detail to determine the minimum number of monitors required for IEP assignments or the savings that might occur if monitors are paid only for actual time worked rather than a minimum of six hours per day.

Drivers and monitors report time on an exception basis. Each driver's work schedule and pay time ("assignment") is established by the Routing and Scheduling group (see discussion below). Drivers pick assignments based on seniority four times per year (August before start of school, October to adjust routes after start of school, December for next semester beginning in January, and May for summer school). Each driver is paid based on the assignment that the driver picked most recently. If the driver is on duty any day longer than the assignment calls for, the driver files an exception report with the dispatcher. The dispatcher verifies the exception and forwards the documentation to payroll to adjust pay, if warranted per the Memorandum of Understanding for Blue Collar Employees. Route schedules may be updated week to week, based on requirements for student changes (especially exceptional education and homeless students); however, the driver is paid according to the assignment that the driver picked.

Fiscal Impact

As previously noted, there are 127 driver assignments less than the minimum six hours per day, for a total of 122 hours per day paid time not worked. Assuming an average driver pay of $17.13 per hour plus 30 percent payroll benefits, savings are $489,600 annually ($17.15 per hour x 122 hours x 180 days + 30 percent payroll benefits).

A previous recommendation assumes a reduction in the number of monitors who are not required for exceptional education, with corresponding savings. Additional savings may be realized if monitors are paid for actual time worked. However, data are not available to determine the actual monitor assignments that are less than seven hours per day.

[24] These values are approximate calculations based on the best data available for January 7, 2014 routes and driver assignments annualized assuming 180 school days.

The existing Memorandum of Understanding for Blue Collar Employees will expire June 30, 2015.

Recommendation 6-4	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Renegotiate labor agreement to pay drivers and monitors actual time worked.	$0	$0	$489,600	$489,600	$489,600	$489,600

Note: Costs are negative. Savings are positive.

Fleet Maintenance

A quality fleet maintenance program helps to ensure that services can be delivered reliably and that vehicles in the fleet will operate efficiently throughout their expected economic life (service life). A good fleet maintenance program thus protects service availability and the value of the capital asset. The Transportation Department is responsible for vehicle maintenance for the school bus fleet and the general services fleet.

The Transportation Department has a fleet of 322 school buses ("yellow fleet"). The fleet is comprised of 218 large buses over 69-passenger capacity (68 percent), 60 buses with wheelchair accessibility (19 percent), 19 buses 45- to 48-passenger capacity (6 percent), and 25 vehicles with 12- to 16-passenger capacity (7 percent). The district recently purchased 10 medium-sized buses with 30-passenger capacity, to replace an equal number of the oldest, large buses. The smaller buses will be assigned to routes that do not require the capacity of large school buses. Historically, the school district purchases replacement vehicles on an irregular schedule, depending on when funds are available for capital purchases. The Transportation Department also provides vehicle maintenance for 315 cars, trucks, and vans used to support general administrative functions ("white fleet").

The school bus fleet uses three types of fuel. Seventy-eight percent of all school buses operate on diesel, 14 percent operate on compressed natural gas, and 8 percent operate using unleaded gasoline. New, smaller buses are gasoline-powered and will replace diesel buses. The fuel for most of the general service white fleet is gasoline.

In January 2014, TUSD added 10 medium-size (30-passenger), gasoline-powered buses to the fleet. The new buses are not included in this analysis. The 30-passenger buses will eventually replace 10 of the largest buses with over 20 years of service. The purchase of smaller buses is part of an initiative to "right-size" the fleet. The reference to right-size is a reflection of the excess capacity when larger buses are assigned to routes with lower ridership (see Table 6.6).

Table 6.10 shows the school bus fleet by years of service (age) and fuel type. The average age of the fleet is 10.2 years. Seventy-eight percent of the fleet is diesel powered, 14 percent runs on compressed natural gas (CNG), and 8 percent of the fleet uses gasoline. The buses that use gasoline are all smaller, 12-to 16-passenger vehicles.

Table 6.10. School Bus Fleet by Years of Service and Type of Fuel

Years of Service	Number of Buses by Age and Type of Fuel				
	Diesel	CNG	Gas	Total	% of Fleet
Over 20 Years	18	0	0	**18**	6%
16-20 Years	34	0	0	**34**	11%
11-15 Years	80	12	0	**92**	29%
6-10 Years	77	33	0	**110**	34%
5 Years or Less	43	0	25	**68**	21%
Total All Buses	**252**	**45**	**25**	**322**	**100%**
% of Fleet	78%	14%	8%	**100%**	
Average Age in Years	11.6	7.9	1.0	10.2	

Source: TUSD Transportation fleet inventory

Table 6.11 shows the school bus fleet by years of service and the seating capacity of the bus. Buses with wheelchair capacity are identified separately. Sixty-eight percent of the fleet are larger school buses with capacity of over 69-passengers; most of the buses have 81-passenger capacity (92 buses) or 84-passenger capacity (94 buses). Nineteen percent of buses are equipped with wheelchair lifts, and 6 percent of the fleet is 45- to 48-passenger buses. Seven percent of the school buses are 12- to 16-passenger vehicles. The addition of 10 new 30-passenger buses that replace larger buses will alter the fleet mix to 64 percent larger buses and 11 percent 30-passenger buses or smaller. Buses with wheelchair lifts will still be 19 percent of the fleet mix and 45- to 48-passenger buses will still be 6 percent of the fleet.

Table 6.11. School Bus Fleet by Years of Service and Seating Capacity

Years of Service	Number of Buses by Age Seating Capacity						
	>69	W/C*	45 to 48	16	12	Total	% of Fleet
Over 20 Years	18	0	0	0	0	**18**	6%
16-20 Years	27	7	0	0	0	**34**	11%
11-15 Years	73	12	7	0	0	**92**	29%
6-10 Years	73	29	8	0	0	**110**	34%
5 Years or Less	27	12	4	11	14	**68**	21%
Total	**218**	**60**	**19**	**11**	**14**	**322**	**100%**
% of Fleet	68%	19%	6%	3%	4%	**100%**	
Average Age in Years	11.7	9.2	7.9	1	1	10.2	

Source: TUSD Transportation fleet inventory

*Vehicles with wheelchair access

The school bus fleet is 322 buses and the peak bus requirement in January 2014 was 271 buses, leaving a spares ratio of 51 buses, or 19 percent of the peak fleet. However, not every bus is interchangeable for

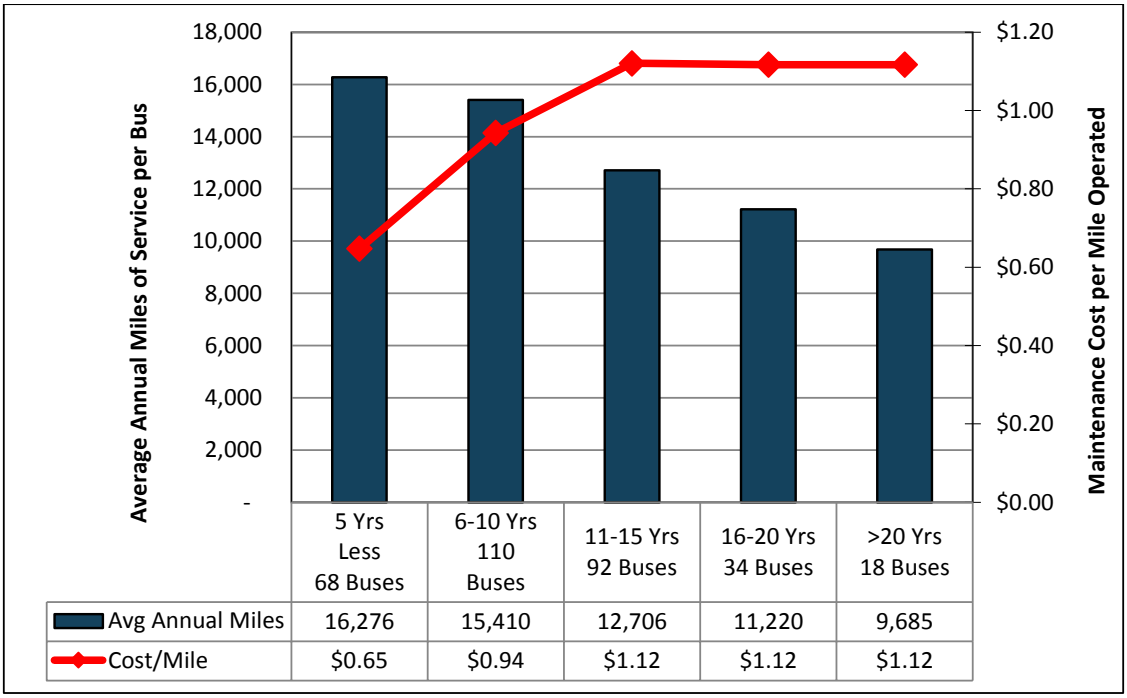
every other bus. For example, only wheelchair-lift equipped buses can be assigned to a route where a student who uses a wheelchair will ride the bus. The spares ratio is also reduced by buses that are "hard down," meaning the buses are out of service for several days due to mechanical repair or accident repair and not available for service. For example, during the week of the site visit, a total of 30 buses were "hard down" (in major repair, not available for service), leaving less than 10 percent of the fleet available as spares. The fleet manager stated the limited number of spare buses makes it difficult to schedule buses for preventive maintenance inspections.

The Transportation Department also provides vehicle maintenance for 315 general services vehicle to support general administrative functions. The white fleet includes 234 trucks, 60 vans, and 21 cars.

The Transportation Department uses a vehicle maintenance information system (VMIS) to record all data on the cost of maintaining the school bus fleet and the white fleet. The VMIS system captures data for all labor hours reported on work orders, parts and supplies, outside vendor services, fuel and lubricants, and miles of service. This comprehensive data makes it possible for the fleet manager to monitor the cost of vehicle maintenance by vehicle and by vehicle characteristic (age, fuel, size).

Figure 6.2 illustrates the average vehicle maintenance cost per mile and average annual miles of service for the school bus fleet by age of the buses. The data show that buses over 10 years in service operate fewer annual miles at a higher cost per mile.

Figure 6.2. Vehicle Maintenance Cost per Mile and Average Annual Miles by Age of Fleet



	5 Yrs Less 68 Buses	6-10 Yrs 110 Buses	11-15 Yrs 92 Buses	16-20 Yrs 34 Buses	>20 Yrs 18 Buses
Avg Annual Miles	16,276	15,410	12,706	11,220	9,685
Cost/Mile	$0.65	$0.94	$1.12	$1.12	$1.12

Source: TUSD Transportation vehicle maintenance information system, July 1 – December 31, 2013

Table 6.12 documents the average vehicle maintenance cost per mile and average annual miles of service by fuel type. The data show that buses using gasoline operate at a low cost per mile. A major factor that must be taken into account is that gasoline-powered vehicles are new, still under warranty, and small 12- to 16-passenger vehicles. The data also show vehicle maintenance cost per mile (includes maintenance and fuel) is lower for buses using CNG than buses using diesel.

Table 6.12. Cost per Mile and Average Annual Miles for School Bus Fleet by Fuel Type

Fleet by Fuel Type	Buses	Percent of Fleet	Average Annual Miles	VM Cost per Mile
Diesel	252	78%	13,959	$1.01
Compressed natural gas	45	14%	13,721	$0.90
Gasoline	25	8%	16,213	$0.38
Fleet Total	**322**	**100%**	**14,058**	**$0.94**

Source: TUSD Transportation vehicle maintenance information system, July 1 – December 31, 2013

Table 6.13 documents the average vehicle maintenance cost per mile and annual miles of service for the school bus fleet by bus capacity and for vehicles with wheelchair lifts. The data show that smaller buses operate at a low cost per mile. A major factor that must be taken into account is that smaller buses are new and still under warranty. The data also show vehicle maintenance cost per mile is lower for buses with wheelchair lifts than other full-size buses (wheelchair accessible buses also report lower annual miles).

Table 6.13. Cost per Mile and Average Annual Miles for School Bus Fleet by Bus Capacity

Capacity	Buses	Percent of Fleet	Average Annual Miles	VM Cost per Mile
>69 passenger	218	68%	14,246	$1.01
Buses w/wheelchair lift	60	19%	12,390	$0.89
45-48 passenger capacity	19	6%	14,329	$1.05
16-passenger	11	3%	17,445	$0.40
12-passenger	14	4%	15,245	$0.37
Fleet Total	**322**	**100%**	**14,058**	**$0.94**

Source: TUSD Transportation vehicle maintenance information system, July 1 – December 31, 2013

Table 6.14 documents the average annual miles of service and the vehicle maintenance cost per mile for the white fleet. Not all vehicles are in service. During the period July through December 2013, about 11 percent of the white fleet (25 trucks and 9 vans) recorded less than 100 miles in service. The Transportation Department is responsible for providing maintenance and fuel; however, the department is not responsible for the assignment of the white fleet or decisions about white fleet management. Those responsibilities are left up to the department to which the vehicle is assigned.

Table 6.14. School Bus Fleet by Years of Service and Annual Miles, Cost per Mile

Vehicle Type	Number	Percent of Fleet	Average Annual Miles	VM Cost per Mile
Cars	21	7%	8,808	$0.39
Trucks	234	74%	4,340	$0.53
Vans	60	19%	4,396	$0.43
Fleet Total	**315**	**100%**	**4,648**	**$0.50**

Source: TUSD Transportation vehicle maintenance information system, July 1 – December 31, 2013

Two factors that influence appropriate maintenance staffing ratios are the age of the fleet and the preventive maintenance program adopted by the district. The TUSD practice is to schedule a preventive maintenance inspection for each bus every 8,000 miles of service. The average annual miles per school bus is 14,000 (July 1 through December 31 actual miles, annualized), and so each school bus is scheduled for a preventive maintenance inspection less than two times per year. VMIS documents on average 26 work orders per bus per year (including inspections) and 66.6 maintenance labor hours per year. Preventive maintenance and annual inspections require 6.6 annual hours, or 10 percent of the total maintenance hours. This means that 90 percent of maintenance hours are committed to unscheduled repairs. Table 6.15 documents the calculations to determine vehicle maintenance labor hours per bus for inspection and repairs.

Table 6.15. Vehicle Maintenance Labor Hours per Bus for Inspections and Repairs

Maintenance Activity	Hours to Complete	Number Per Year	Total Annual Hours	Percent of Hours
8,000 mile inspection	2	1.8	3.5	
16,000 mile inspection	2	0.9	1.8	
Annual inspection	1.3	1.0	1.3	
Total scheduled inspection hours	5.3	3.6	6.6	10%
Unscheduled repairs	60		60.0	90%
Total labor hours per bus			**66.6**	

Source: TUSD Transportation vehicle maintenance information system, July 1 – December 31, 2013

The actual hours of labor recorded in VMIS for the white fleet from July 1 through December 31, 2013 (six months) was 1,741 hours for 281 vehicles with more than 100 miles reported. These data indicate the mechanics work on average 12.4 hours per vehicle in the general services fleet. This does not include time for preventive maintenance inspections. The district contracts inspections for the white fleet to local vendors.

Each Transportation Department vehicle mechanic is scheduled to work full-time, 12 months per year, or approximately 260 days and 2,080 hours. However, not all paid time is available to actually work on vehicles. Each employee is provided benefits in paid time off. Since many of the mechanics have several years of experience working for TUSD, the benefits for paid leave are significant. The fleet manager

estimated the average TUSD vehicle mechanic is on holiday or paid leave 42.9 days per year, or 343.2 paid hours (16.5 percent of paid time) based on the following:

- Holidays 14.0 days for every full-time employee
- Vacation Days 19.3 days average actual per mechanic
- Sick Leave 4.3 days average actual per mechanic
- Personal Leave 5.3 days average actual per mechanic
- Total 42.9 days paid time off

In addition, mechanics are paid 1.5 hours per day for breaks and other duties. Assuming 260 days per year less 43 days paid leave, each mechanic spends about 326 paid hours per year (260-43 = 217 days x 1.5 hours per day) on breaks or duties other than work on vehicles. The estimated actual time spent on vehicle maintenance per mechanic is about 1,410 hours (68 percent of paid time).

Table 6.16 documents how many mechanics are required given the current fleet of 322 school buses, 315 general administration vehicles, and assuming each mechanic will spend about 1,410 hours per year performing maintenance activities.

Table 6.16. Staff Requirements for Mechanics

	No. Vehicles	Annual Hours Maintenance per Vehicle	Totals
School buses	322	x 66.6 =	21,436
White fleet	315	x 12.4 =	3,906
Total annual hours required based on hours per vehicle			25,342
Add 5% contingency for maintenance campaigns (special projects)			1,267
Total annual hours maintenance required			**26,609**
Divide by average productive hours per mechanic			1,410
Mechanics required			**19**
Positions budgeted			21
Positions filled			16

Source: TUSD Transportation vehicle maintenance information system, July 1 – December 31, 2013

Recommendation 6-5: Reduce budgeted staff for mechanics from 21 to 19.

Nineteen mechanics represent an allocation of time equivalent to three mechanics for the white fleet and 16 mechanics for school buses. Sixteen mechanics for the school bus fleet is one mechanic for every 20 school buses. This level of staffing is within the range of national school district experience based on peer research. Peer examples range from 15 to 30 buses per mechanic for school districts serving a large geographic area with a similar size bus fleet.

The current staffing level for 16 mechanics is below the 19 mechanics required to provide a minimum number of maintenance hours for the school bus fleet and the white fleet (as outlined in Table 6.16). The budget for 21 mechanics is more than the minimum required. The budgeted positions can be reduced by two mechanics.

The fleet manager will still need to fill three vacant mechanic positions to be fully staffed.

Fiscal Impact

The fiscal impact for this recommendation includes a savings in labor costs. The savings each year for each mechanic is $55,270 ($20.44 per hour x 8 hours x 260 days + 30 percent payroll benefit). Savings each year for two mechanics is $110,540 ($55,270 x 2).

Recommendation 6-5	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Reduce budgeted mechanics by 2 positions.	$0	$110,540	$110,540	$110,540	$110,540	$110,540

Note: Costs are negative. Savings are positive.

Recommendation 6-6: Adopt a policy to perform a preventive maintenance inspection for every school bus every 4,000 miles or not less than once every 90 days.

The policy to inspect a school bus every 8,000 miles, or about twice per year, is less frequent than the industry standard. For example, in the state of Florida, the standard is a preventive maintenance inspection every month.

A change in policy to conduct inspections every 4,000 miles or no less than every 90 days will double the hours invested in preventive maintenance and reduce the hours for unscheduled repairs an equal number of hours. Over time, the school district can expect a reduction in total maintenance hours required per bus. The immediate return on investment will be improved reliability of the fleet. By increasing the frequency of inspections, the hours for inspections will increase to 20 percent of the total maintenance hours, and the hours for unscheduled repairs will be not more than 80 percent of maintenance hours.

Fiscal Impact

No fiscal impact is projected. The goal should be to move maintenance hours from repair and unscheduled maintenance to scheduled, preventive maintenance.

Recommendation 6-7: Conduct preventive maintenance inspections on a second shift at the Central facility.

The fleet manager stated that it is difficult to schedule buses for preventive maintenance inspections because the spares ratio is not sufficient to hold buses out of service for inspection. A second shift at the

Central facility will resolve this problem. The Transportation Department recently hired a fourth supervisor who can be assigned to manage the second shift. Mechanic assignments can be distributed to two shifts without adding additional personnel. Buses due for preventive maintenance can be scheduled for inspection as the driver returns at the end of a route.

Fiscal Impact

No fiscal impact is projected. The goal should be to move maintenance assignments to a second shift to conduct scheduled, preventive maintenance inspections and other appropriate maintenance work to ensure buses are ready and available for service the next day.

Fleet Replacement

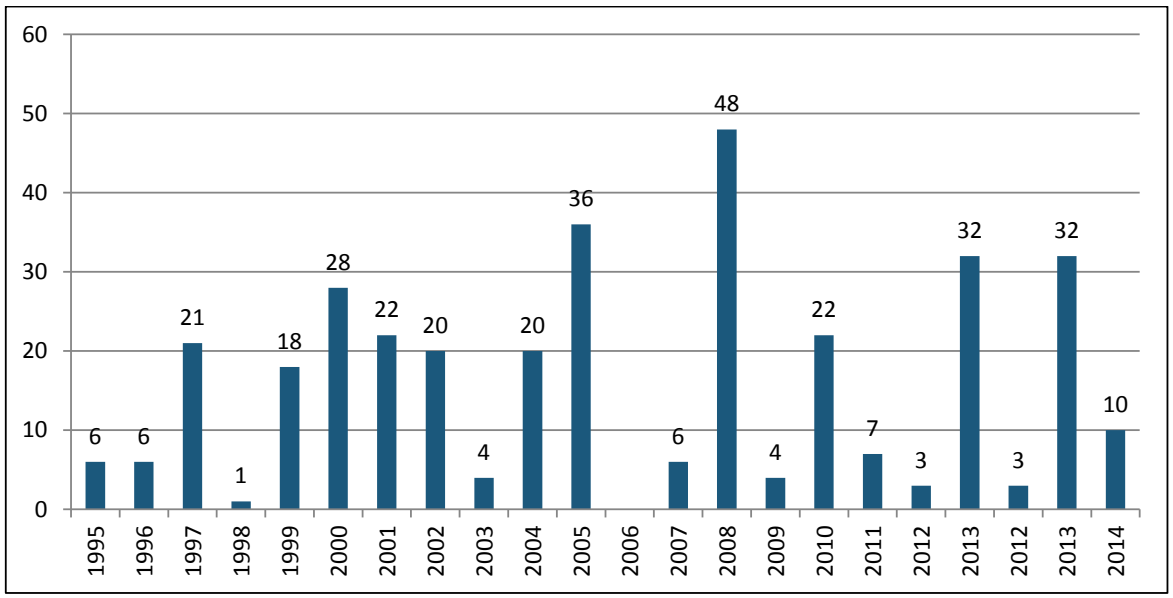
School buses represent a large capital investment for school districts. Many districts adopt replacement plans to regularly introduce new buses in fleets. TUSD does not have a formal fleet replacement program primarily because there has not been a dedicated or predictable capital funding source. In general terms, fleet replacement is based on: large diesel buses 20-year life, compressed natural gas buses 15-year life (due to the life of the CNG tanks), and medium to small buses 10-year life. Over the last two years, equipment replacement has been based on funds available and the need to "right size" the fleet to recognize the large number of routes with low ridership.

The average age of the white fleet is 14.7 years. There is no formal fleet replacement program. With the exception of school safety vehicles, vehicles are not replaced until they are no longer serviceable. Decisions about replacement are the responsibility of the department that is assigned the white vehicle.

As shown in Table 6.10, eighteen diesel buses exceed the recommended 20-year service life and 10 CNG buses will reach the 15-year service life in 2016. Ten of the large diesel buses will be replaced this year with the addition of 10 new medium-size buses. When the CNG buses reach 15 years, the buses must either be retired or the CNG tanks must be replaced. The fleet manager said he has not yet completed a cost-benefit analysis on replacing the CNG tanks to extend the useful life of the buses.

Figure 6.3 illustrates the number of buses purchased by TUSD each year since 1995. Over the past 20 years (1995 through 2014) the school district purchased an average of 16 buses per year. In the last 10 years (2005 through 2014) the school district purchased an average of 17 buses per year. In the last five years since 2010 TUSD purchased an average of 15 buses per year. However, the number of buses per year varies from zero to a high of 48 buses in 2008. If the district plans to purchase 15 buses per year, the average bus in the current fleet will be in service 22 years. Older vehicles mean higher costs per mile for maintenance (including fuel) and lower average annual miles per bus. The purchase of smaller buses means some buses will have to be replaced after 10 years' service. Smaller buses will have to be replaced twice as frequently as full-size school buses.

Figure 6.3. TUSD Purchase of School Buses per Year 1995 - 2014



Source: TUSD Transportation 125 Fleet Summary by Year

Decisions about the right fleet mix by size of vehicle should consider bus capacity, service life, and life cycle operating cost. Because the smaller vehicles are all the newest buses in the fleet, the Transportation Department records are not sufficient to estimate life-cycle costs.

Table 6.6 documents the number of students riding buses on average by route type and considering all runs. Based upon these data, approximately 647 of 1,237 runs (52 percent) require a large bus to accommodate actual average student riders. About 355 of 1,237 runs (29 percent) could be accommodated on a 30-passenger bus. The remaining 235 runs could be accommodated using small 12- to 16-passenger vehicles. The school district should maintain sufficient large vehicles for other types of transportation service such as field trips and extracurricular activities. A conservative mix might be 60 percent large buses (190 buses given the current fleet), 25 percent medium-size buses (90 buses), and 15 percent small buses (40 buses). The mix of wheelchair-accessible buses must also be considered in fleet planning. About 20 percent of all buses (of any size) should be equipped with a wheelchair lift and sufficient spaces for students who use wheelchairs.

Recommendation 6-8: Budget funds to replace school buses each year and continue to buy medium-duty buses to replace larger buses.

Regular purchase of buses prevents the purchase of large numbers of buses in any one year. A replacement plan enables these districts to maintain the necessary fleet size and avoid large one-time expenses. Further, it tends to "smooth" annual operating costs related to vehicle maintenance by maintaining a consistent average fleet age. TUSD should budget funds each year to replace school buses. TUSD should also continue the policy to buy medium-size buses to replace larger buses (up to a planned maximum). Table 6.17 provides an example replacement schedule.

Table 6.17. Example Fleet Replacement Schedule

Buses Replaced			Year to Replace/ Purchase New						
Year of Purchase	Fuel	Capacity	2014	2015	2016	2017	2018	2019	Total
Schedule to Replace Buses End of Service Life									
>20 Years	Diesel	84	-10	-8					-18
1995	Diesel	84		-6					-6
1996	Diesel	84		-3					-3
1996	Diesel	W/C		-3					-3
1997	Diesel	84				-17			-17
1997	Diesel	W/C			-4				-4
1998	Diesel	84			-1				-1
1999	Diesel	84					-12		-12
1999	Diesel	48					-1		-1
1999	Diesel	W/C					-5		-5
2000	Diesel	84				-6	-3	-18	-21
2000	Diesel	W/C						-1	-1
2001	CNG	81			-10				-10
TOTAL buses replaced			**-10**	**-20**	**-15**	**-23**	**-21**	**-19**	**-108**
Schedule to Purchase New Buses									
Large (Fuel TBD)*					10				10
Medium-size			10	17	5	23	16	18	89
Wheelchair				3			5	1	9
TOTAL buses purchased			**10**	**20**	**15**	**23**	**21**	**19**	**108**
Cost to Purchase New Buses (Estimate)									
Price Est.	**Annual Cost**		**Complet**	**$1,890,00**	**$1,950,00**	**$2,070,00**	**$2,040,00**	**$1,740,00**	**$9,690,00**
$150,000	Large				$1,500,000				
$90,000	Medium-size		$900,000	$1,530,000	$450,000	$2,070,000	$1,440,00	$1,620,00	
$120,000	Wheelchair			$360,000			$600,000	$120,000	

Source: Gibson Consulting Group, Inc.

The example replacement plan builds a fleet of almost 90 medium-size buses. The mix of wheelchair-accessible buses is 10 percent of the fleet purchased. The Transportation Department should evaluate the fleet mix to see if this will meet requirements for students who use wheelchairs.

This analysis cannot address all fleet decisions, such as the decision to replace CNG buses or install new tanks and extend the life of the existing fleet. However, adopting a fleet replacement plan will put into motion the other decisions that will be required to execute the plan.

Future fleet purchases require careful consideration of the economics of fuel. The district is currently purchasing gasoline powered small- and medium-size buses. The current large school bus fleet operates on diesel. These two fuel types are subject to volatile increases in price for reasons TUSD cannot control. Data shows CNG vehicles operate at a lower cost per mile than diesel. CNG fuel price is more predictable. Before 2016, the district will need to decide on whether to replace CNG tanks in 10 buses or

replace the buses entirely (and what fuel to specify). The district will need to conduct a cost analysis to see if the investment in new tanks can be recovered in the lower operating cost for the remaining life of the vehicles.

Fiscal Impact

The recommended fleet replacement plan above calls for replacing 15 to 23 vehicles per year. The fleet mix differs from year to year, but annual purchases in the next five years emphasize medium-size buses to replace larger capacity buses.

Assumptions for purchase of buses are included in Table 6.17. The price for a large (conventional fuel) bus is $150,000; the price for a medium-size bus is $90,000; and the price for a wheelchair accessible bus is assumed to be $120,000. Revenues for sale of retired buses as surplus are estimated at $5,000 per bus.

Recommendation 6-8	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Budget funds to replace school buses each year and continue to buy medium-duty buses to replace larger buses.	$0	($1,890,000)	($1,950,000)	($2,070,000)	($2,040,000)	($1,740,000)
Sale of retired buses for surplus.	$0	$100,000	$75,000	$115,000	$105,000	$95,000
Net Fiscal Impact	**$0**	**($1,790,000)**	**($1,875,000)**	**($1,955,000)**	**($1,935,000)**	**($1,645,000)**

Note: Costs are negative. Savings are positive.

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Chapter 7 – Food Services

This chapter provides commendations and recommendations regarding the Tucson Unified School District (TUSD) food services program. The primary mission of a school district's food service program is to provide an appealing and nutritionally-sound breakfast and lunch to students while operating on a cost-recovery basis. In addition, these meals should be provided to the students in a safe, clean, and accessible environment. Several success factors can be used to measure the efficiency and evaluate the effectiveness of a school district's food service operation. These factors include a high ratio of meals per labor hour, minimizing food costs and waste, maximizing student participation in breakfast and lunch programs, providing a variety of meal choices that meet or exceed nutritional standards, reducing the length of time students must wait in line for service, and operating a financially self-sufficient program.

Efficient food service program management and cost controls can allow a district to operate its food services program on a break-even basis, thereby preventing the need to take dollars away from classroom instruction. Successfully managed school food service programs provide customer satisfaction and contain costs while complying with applicable federal, state, and local board regulations and policies.

The TUSD food services program operates 90 full-service cafeterias. The food services program serves over 8,500 breakfasts and 30,000 lunches daily. All services must comply with national meal standards set forth by the United States Department of Agriculture (USDA), as well as policies and procedures established locally at TUSD.

The food services program derives its revenues from reimbursements (on a per-meal basis) from the federal government, for meals provided to students who qualify for economic assistance, and cash sales from all other students. For the most recent fiscal year, food services earned $19.3 million in total revenues and incurred $18.6 million in expenditures for a net surplus of approximately $735,000. Profitability has not been stable however. Table 7.1 shows the financial performance of the food services program over the past three years.

Table 7.1. TUSD Food Services Program Financial Performance, Fiscal Years (FY) 2007-2010

	FY 2011	FY 2012	FY 2013
Food sales	$2,438,926	$2,122,437	$2,200,959
Federal/state reimbursements	$16,031,047	$16,391,997	$17,107,992
Other revenues	$13,213	$6,659	$2,667
Total Revenues	**$18,483,186**	**$18,521,093**	**$19,311,618**
Personnel expenditures	$8,751,763	$8,882,832	$8,853,797
Food costs	$7,579,900	$7,793,408	$7,501,362
Materials and supplies	$527,893	$735,529	$684,091
Capital outlays	$56,389	$79,818	$83,380
Other expenditures	$1,346,968	$1,495,987	$1,453,444
Total expenditures	**$18,262,913**	**$18,987,574**	**$18,576,074**
Net surplus or (deficit)	**$220,273**	**($466,481)**	**$735,544**

Source: TUSD Food Service Profit and Loss Statements

In FY 2012, the most recent year where comparable data are available, TUSD's cost per meal equivalent (includes breakfast, lunch and a la carte sales) was $2.79, 13.4 percent above its Arizona peer district average of $2.46.[25] One factor likely contributing to a higher cost per meal is the larger number of schools in TUSD relative to the student population.

A common measure of the productivity and efficiency of school cafeteria operations is meals per labor hour (MPLH). This measure is an average of the number of meal equivalents served by the cafeteria over a given period of time, typically one month, divided by the total number of hours worked by cafeteria staff. The fewer the hours required to prepare and serve a given number of meals, the more efficient the cafeteria. Industry standards usually assume that more hours are required to prepare a meal in a full, conventional kitchen – where meals are prepared from scratch – than in a satellite convenience kitchen, where meals are prepared and packaged off-site and reheated and served at the school's cafeteria.

Additionally, as the number of meal equivalents served increases, the standard MPLH increases as larger cafeterias are expected to benefit from economies of scale. Table 7.2 shows the industry standard recommended MPLH for each range of meal equivalents served for both conventional and convenience systems. Virtually all TUSD schools have conventional kitchens.

[25] Source: Arizona School District Spending, Fiscal Year 2012, Office of the Auditor General

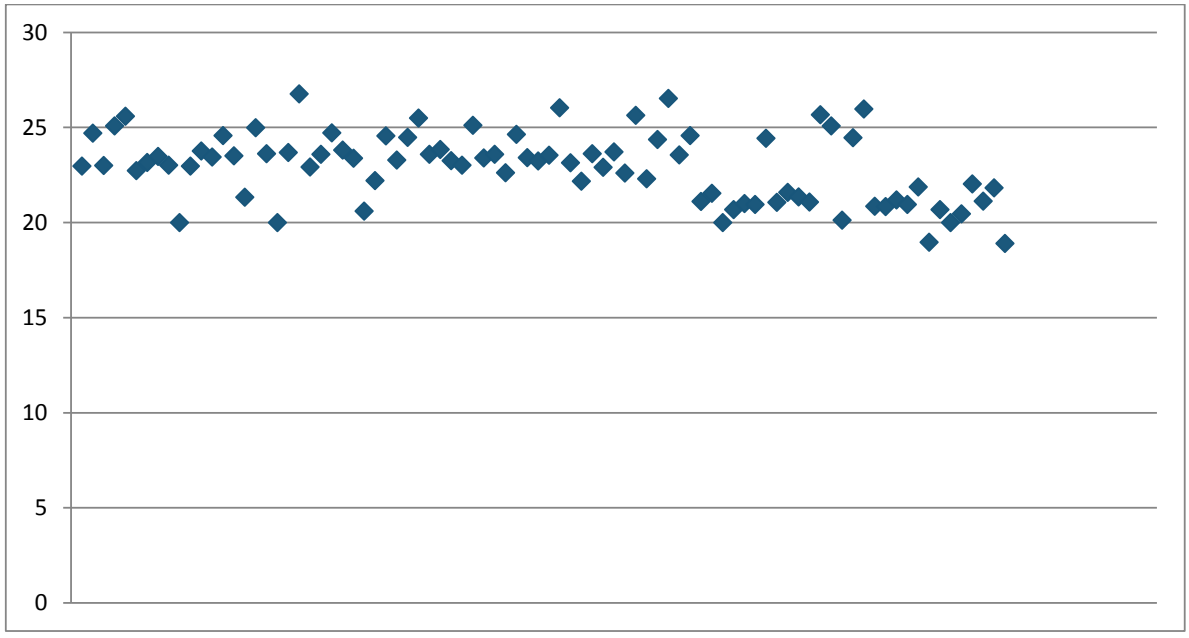
Table 7.2. Industry Standard Recommended Meals per Labor Hour

Number of Meal Equivalents	Meals Per Labor Hour (MPLH)			
	Conventional System		Convenience System	
	Low Productivity	High Productivity	Low Productivity	High Productivity
Up to 100	8	10	10	12
101 – 150	9	11	11	13
151 – 200	10-11	12	12	14
202 – 250	12	14	14	15
251 – 300	13	15	15	16
301 – 400	14	16	16	18
401 – 500	14	17	18	19
501 – 600	15	17	18	19
601 – 700	16	18	19	20
701 – 800	17	19	20	22
801 – 900	18	20	21	23
901 up	19	21	22	23

Source: School Foodservice Management for the 21st Century, 5th edition

TUSD applies a general guideline of 20 MPLH for staffing purposes; however, its actual MPLH is higher, reflecting a higher degree of productivity. District wide, the average MPLH is 24.6, and only two schools showed a MPLH less than 20. Figure 7.1 presents a scatter diagram of TUSD's MPLH for each school.

Figure 7.1. TUSD Meals per Labor Hour by School, October 2013



Source: TUSD MPLH Analysis, October 2013

This remainder of this chapter contains recommendations to lower costs and increase revenues in the food service operation, and to allocate additional allocable costs from the Maintenance and Operations (M&O) Fund to the Food Service Fund.

Recommendation 7-1: Allocate additional indirect costs of the food services operations to the food services fund.

Federal guidelines permit the allocation of certain costs to the Food Service Fund, such as those expenditures that are necessary and reasonable for proper and efficient administration of the food program – including utilities, trash removal, and janitorial services. Currently, TUSD allocates almost $500,000 per year in indirect costs to the food service operation.

The review team estimates that approximately $1 million of additional M&O Fund expenditures relate to the operation of kitchens and cafeterias at TUSD schools. The following is a discussion of each major category of expenditures that should be considered for allocation.

- **Janitorial/custodial services** – TUSD does not allocate any costs to the Food Service Fund for custodial services. The time spent by custodians policing the cafeteria area during breakfast and lunch periods and the time spent cleaning the cafeterias after lunch can be charged from the M&O Fund to the Food Services Fund. In a typical school system, at least two to three hours each day for one day shift custodian is spent at each elementary school and two to three hours for two custodians is spent at each secondary school. This includes time incurred during and after the lunch period. For TUSD, a conservative estimate of the custodial hours spent cleaning the cafeterias would be three hours each day per school, or $988,800 annually (based on average hourly pay rate of $20 per hour – plus 30 percent benefits – for 183 school days).

- **Waste Disposal** – Approximately one-third of the trash collected daily in a school relates to the kitchen and cafeteria operations. Additional analysis is necessary to confirm the actual proportion of trash collected by TUSD food services. Budgeted expenditures for refuse services districtwide are $358,600 in FY 2014. Assuming 33 percent of this relates to food services, the allocable amount is $119,533.

- **Utilities** – TUSD allocated $468,130 in utility costs to the food services operation in FY 2013. Utility costs for electricity, natural gas and water/sewage can be estimated based on the cafeteria's proportionate share of the overall square footage of each school, and the mix of uses for the cafeteria facility for food services or other functions during the school year. In detailed studies of other school systems, the review team has found that cafeteria/kitchen space typically accounts for 5 percent of the floor space of secondary schools and 5 to 7 percent for elementary schools. Use of the cafeteria for breakfast and lunch, including preparation, serving, and clean-up time generally accounts for 50 percent of the total use of the cafeteria. TUSD's budget for electricity, natural gas, and water/sewage for FY 2014 is $20,942,216. A full allocation of utilities costs to the food service operation would be approximately $523,555 (one-half of 5 percent of total expenditures) or $55,425 more than the current allocation.

The total amount of additional allocable costs to the Food Service Fund is $833,758 per year. Current profitability levels in the Food Service Fund are not sufficient to cover this allocation. The remaining recommendations in this chapter will help increase the profitability to cover the allocation and have a reserve for capital equipment replacement. Whether or not the recommended savings are achieved, however, all allocable costs should be transferred to the Food Service Fund so that the true cost and profitability of the operation can be presented.

Fiscal Impact

Allocation of direct costs would yield M&O Fund savings of approximately $833,758 annually (beginning in 2014-15). The $658,800 related to custodial services could be used to support the recommended investments in this area. These investments are presented in *Chapter 5 – Facilities Use and Management* of this report.

The fiscal impact shown below represents savings to the general fund and costs to the Food Service Fund Based on the net surpluses generated in the past two years, food services cannot fully absorb these direct costs without improving financial performance. The remainder of this section suggests methods for boosting surpluses by increasing revenues through increased student meal participation.

Recommendation 7-1	One-Time Costs / Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Allocate additional indirect costs to the Food Service Fund.	$0	$1,163,758	$1,163,758	$1,163,758	$1,163,758	$1,163,758

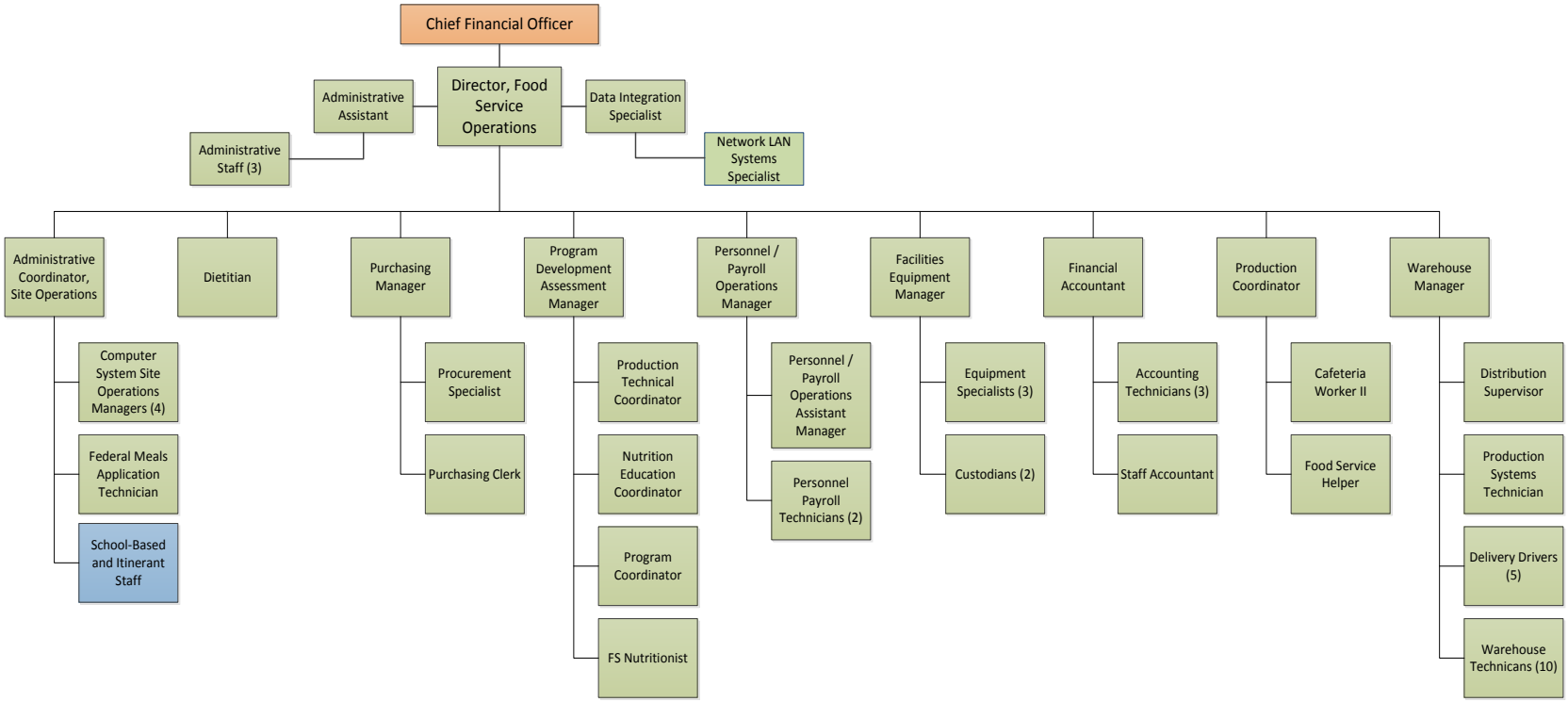
*Table indicates savings to the Maintenance and Operations Fund.

Note: Costs are negative. Savings are positive.

Recommendation 7-2: Eliminate vacant positions in the food service central office.

Figure 7.2 shows the TUSD food services organization structure. The Director of Food Service reports to the Chief Financial Officer. Fifty-seven other full-time or part-time positions comprise the department, excluding school-based staff and itinerant staff shared by the schools. The current Director has been in the position since July 2013.

Figure 7.2. Current Food Services Organizational Chart



Source: TUSD Food Services Department Organization Chart, FY 2013-14

Of the 57 central office positions shown in Figure 7.2, 20 were vacant at the time of this review, 15 of which have been vacant for more than one year. One position, the financial accountant, has been vacant since 2003. Table 7.3 presents a listing of the vacant positions in the Food Services Department as of January 2014. All of these positions are included in the 2013-14 budget.

Table 7.3. TUSD Food Services Vacant Positions as of February 2014

Position	Vacant Since
Financial Accountant	2003
Production Technical Coordinator	2005
Dietician	2007
Federal Meals Tech	2010
Financial Accountant Temp	2010
Supervisor Intern	2010
Float / Cafeteria Worker II	2010
Personnel/Payroll Asst. Manager	2011
Float / Cafeteria Worker II	2011
Federal Meals Tech	2012
Clerk Typist	2012
Program Development & Assessment Coordinator	2012
Project Specialist	2012
Personnel/Payroll Technician	2012
Distribution Supervisor	2013
Delivery Driver	2013
Warehouse Technician	2013
Project Technical Specialist	2014
Inventory Technician	2014

Source: TUSD Food Services

The positions listed in Table 7.3 represent close to $1 million of the Food Services budget, and reflect an unnecessary and misleading padding of the budget. The Food Services Department has been operating without most of these positions for more than a year, indicating that they are not needed. During the 2014-15 budget cycle, all food service positions that have been vacant for more than one year should be eliminated. If it is determined that any of these positions are needed, they should be resubmitted as new requests for approval.

Fiscal Impact

There is no fiscal impact of this recommendation since actual expenditures are not affected. However, the Food Service Department's operating budget will more closely represent expected expenditures in future years.

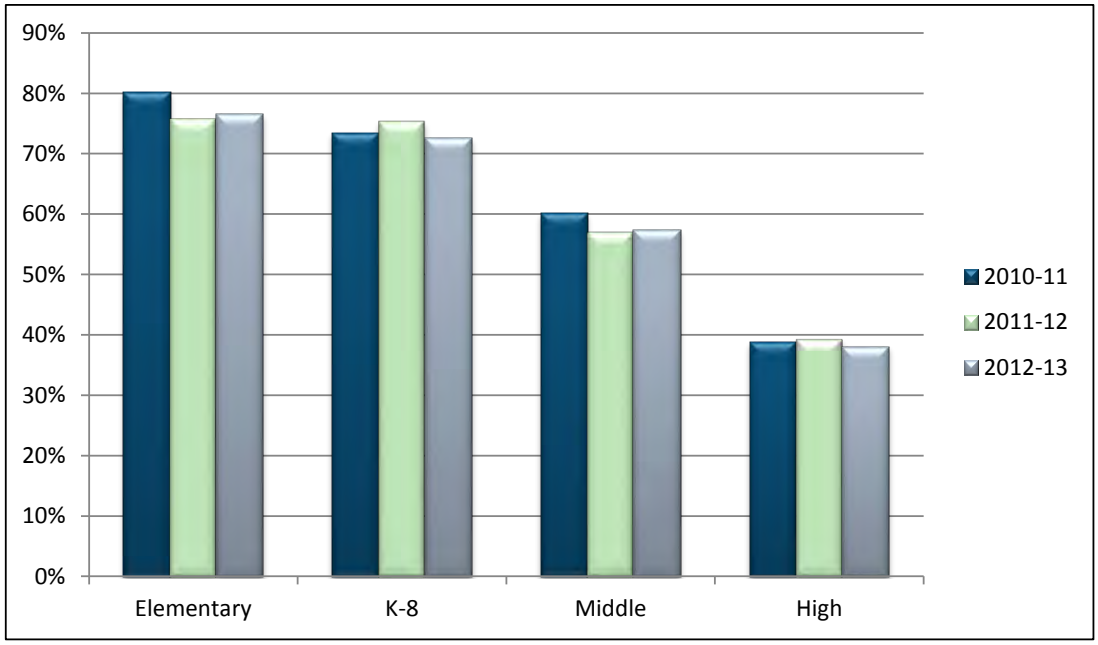
Recommendation 7-3: Implement steps to increase meal participation at schools.

Meal participation rates reflect the percentage of the students at a school that eat a meal prepared by the school. There are separate participation rates for breakfast and lunch, and there are also rates by type of payment – free meal, reduced price meal, paid meal, and a la carte sales. Free and reduced price meals are provided through the National School Lunch Program for which TUSD submits reimbursement claims for eligible students that participate. Participation rates are calculated by dividing the number of meal equivalents served by the total enrollment at the school.

Higher participation rates are good for students in that more students eat a healthy meal and are also good economically, as federal reimbursements revenues from paid meals increase. Higher participation allows schools to realize economies of scale and lower the overall cost per student.

Figure 7.3 presents total lunch participation rates (inclusive of free, reduced, paid, and a la carte) by school type for the past three years. Each school type has shown a net decline in student meal participation during that period, with elementary schools and middle schools showing slightly larger percentage point declines (-3%).

Figure 7.3. TUSD Total Lunch Participation Rates by School Type, 2010-11 to 2012-13

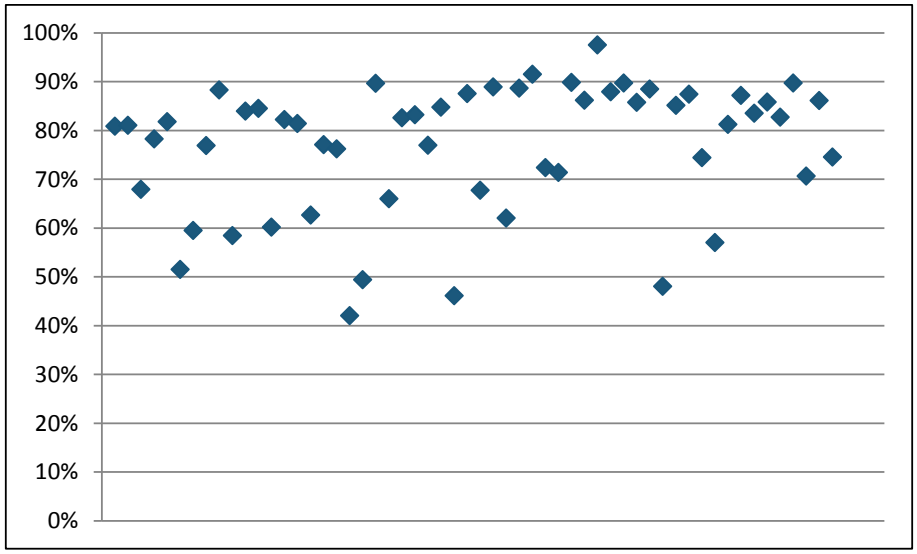


Source: TUSD Average Daily Participation with Meal Equivalents

Nationally, the overall lunch participation rate for K-12 schools is approximately 61.5 percent.[26] TUSD's 2012-13 districtwide lunch participation rate is 58.2 percent, 3.3 percentage points lower than the national average.

At the school level, there is wide variation in lunch participation rates. Figure 7.4 presents lunch participation rates (as a percentage of school enrollment) for TUSD elementary schools as of October 2013. Each point on the scatter diagram represents the lunch participation rate for an elementary school. Lunch participation at elementary schools ranges from 42.1 percent 97.6 percent.

Figure 7.4. TUSD Lunch Participation Rates, Elementary schools, October 2013

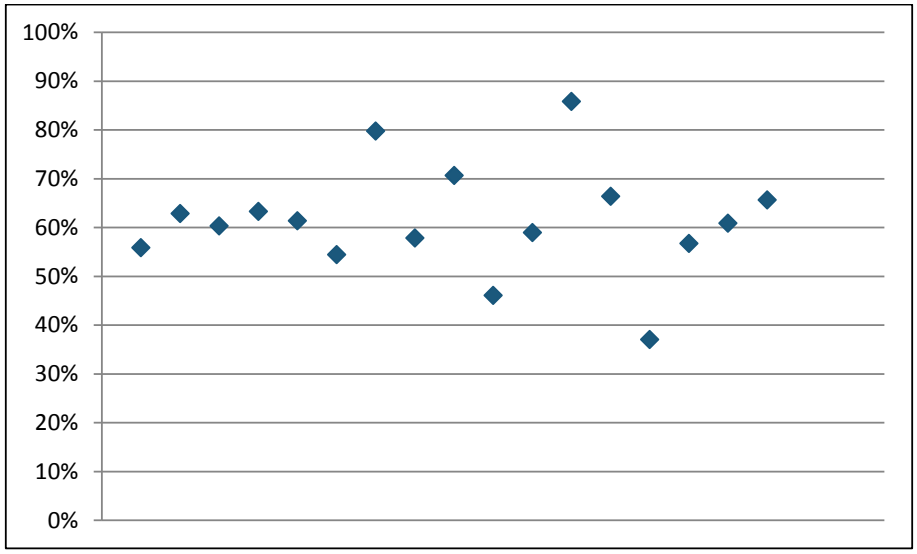


Source: TUSD participation rate calculations, October 2013

Figures 7.5 and 7.6 present the same participation data for middle schools, K-8, and high schools. The range of participation rates are not as wide as elementary schools, but still significant. K-8 and middle school participation rates range from 37 percent to 85.8 percent; high school participation ranges from 15.1 percent to 65 percent.

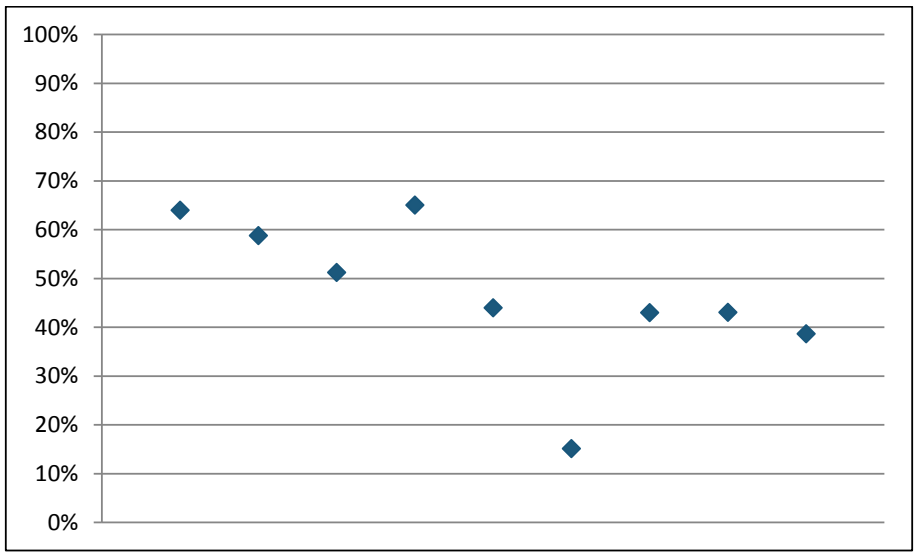
[26] School Nutrition Association: National School Lunch Program Participation Tracker, 2012-13, http://www.schoolnutrition.org/uploadedFiles/School_Nutrition/102_ResourceCenter/Researching_SN_Industry/ParticipationTrackerforNSLPandSBP.pdf; Digest of Education Statistics, Table 36, http://nces.ed.gov/programs/digest/d12/tables/dt12_036.asp

Figure 7.5. TUSD Lunch Participation Rates, K-8 and Middle Schools, October 2013



Source: TUSD participation rate calculations, October 2013

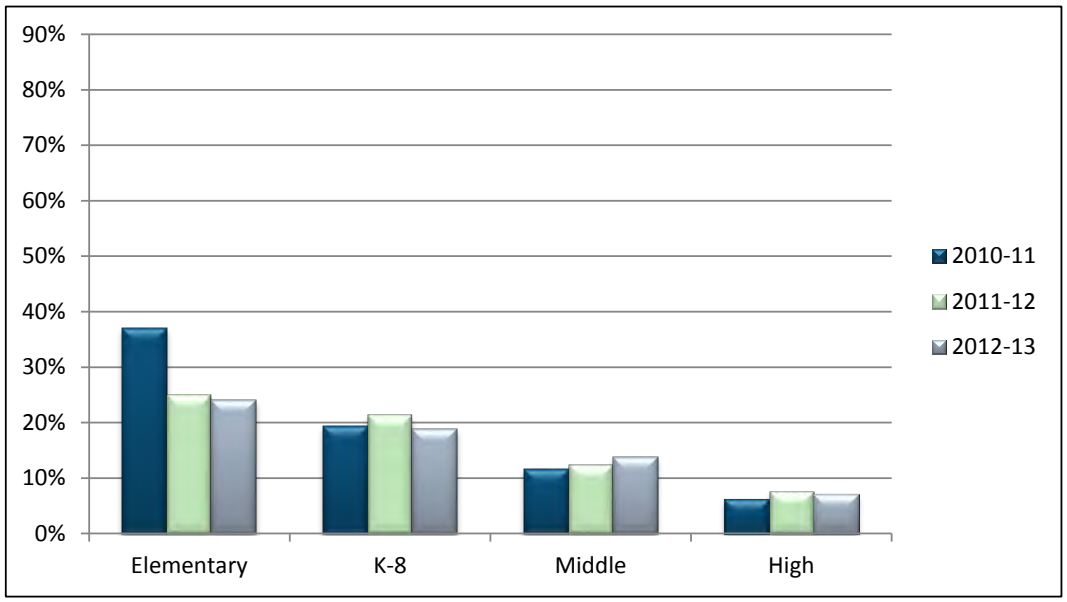
Figure 7.6 TUSD Lunch Participation Rates, High Schools, October 2013



Source: TUSD participation rate calculations, October 2013

TUSD, like most school systems, has lower breakfast participation rates, as many students will eat before they arrive at school. Figure 7.7 presents breakfast participation rates by school type for 2010-11 to 2012-13. While middle and high schools saw an increase in participation over this time period (18 percentage points and 16 percentage points respectively) elementary schools showed a significant decline – 35 percentage points. Middle schools saw a slight decline in participation during this time period (3 percentage points).

Figure 7.7. TUSD Total Breakfast Participation Rates by School Type, 2010-11 to 2012-13



Source: TUSD average daily participation with meal equivalents

Each percentage point of participation generates approximately $327,000 of revenue for TUSD, based on average daily revenue of $3.50 ($19.3 million revenue / (30,000 students participating per day x 183 days) per student for 183 days, applied to 1 percent of the TUSD student population, or approximately 510 students.

The TUSD Food Service Department has a program development and assessment manager position, but it is currently vacant. This position is responsible for food program design, program marketing, service design, and assessment of product usage. Each of these functions are important elements in maximizing student participation.

Other factors outside the control of the Food Service Department affect participation rates, including the enforcement of closed campuses and accessibility to nearby competing restaurants. All schools at TUSD are closed campuses, meaning that students are not allowed to leave during the school day for lunch. However, according to Food Service Department staff, this is not consistently enforced. Some students leave school to eat elsewhere and parents also bring food to students at school. Both instances undermine the ability of TUSD to maximize meal participation.

TUSD should reinstate the program development and assessment manager position, make additional investments in food program design and marketing, and establish a goal of increasing meal participation by 6 percentage points over the next three years, or 2 percentage points per year. The district should also evaluate the enforcement of closed campuses. Schools with lower participation rates should be targeted first, as they will have greater opportunities for improvement.

Fiscal Impact

The fiscal impact is based on the expected additional revenue of $1,962,000 from increased participation (6 percentage points of participation x $327,000 per percentage point) less the additional cost (50 percent) associated with those revenues, or $981,000 annually. Food costs represent 40 percent of total costs and some additional labor hours may be incurred to provide these additional meals at the schools. However, the average TUSD school cafeteria would be adding only 34 meals per day spread over multiple lunch periods. It is also assumed that increased participation will occur at 2 percentage points per year, although earlier achievement could be possible. After full implementation, $981,000 per year of net revenue will be realized.

There is no cost of filling the program development and assessment manager position, as it is currently in the Food Service Department budget. An additional up-front investment of $50,000 is recommended for outside expertise in marketing and program design.

Recommendation 7-3	One-Time Costs / Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Implement steps to increase meal participation at schools.	($50,000)	$327,000	$654,000	$981,000	$981,000	$981,000

*Amounts relate to the Food Services Fund.

Note: Costs are negative. Savings are positive.

Recommendation 7-4: Develop performance report for Food Services.

The TUSD Food Service Department does not report basic efficiency and profitability measures needed to effectively manage the program. Profitability by school, MPLH by school, and other measures should be tracked, analyzed and reported to ensure that each school is operating efficiently and is self-sustaining. The data are available to support the calculation of measures, but a standard performance report is not generated.

Table 7.4 presents a sample of performance measures that should be tracked and reported by TUSD food services management on an annual basis, and some measures (e.g., participation rates, profitability) should be tracked on a monthly basis. Graphical representations (e.g., charts and graphs) of these data should be used to report district and school level measures over a 5-year period for annual reports.

Table 7.4. Recommended Performance Measures for TUSD Food Service Department

Performance Measure	Level
Meals per labor hour (MPLH), by school	School
Participation Rates (breakfast/lunch), by school:	School
Free (percentage participating)	School
Reduced price (percentage participating)	School
Paid (number of paid meals per year)	School
Net profit (loss) of food services operation	District
Net profit (loss), by school	School
Indirect costs allocated to food service (amount and type) - (from M&O Fund only)	District
Cash in lieu of commodities	District
Food cost as a percent of total cost	Both

Source: Gibson Consulting Group, Inc.

Fiscal Impact

This recommendation can be accomplished with existing resources.

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Chapter 8 – Other Recommendations

Recommendations made in this chapter comment on two areas of the study not included in other chapters of this report: school clerical staff, and safety and security.

School Clerical Staff

Recommendation 8-1: Re-engineer school processes to reduce clerical staff work demands.

School clerical staff are the originators of many of the district's transactions involving purchasing, payroll, student information, substitutes, student activity funds, and other functions. They also are the first people you see when you go into a school and the first person you talk to when you call. School clerical staff are stationed at the front desk of the school's office, and are responsible for greeting and taking care of parents, students and school visitors.

Tucson Unified School District (TUSD) assigns staff to schools based on staffing formulas approved by the board. Each school is assigned an office manager position that is primarily responsible for processing most school transactions. The high schools have additional positions because of their larger size and more complex work demands. These positions include a finance manager, a registrar, and attendance clerks. Additional clerical positions are allocated for schools with larger enrollment. In 2013-14, the following formulas applied to clerical staffing at the schools.

Table 8.1. TUSD Clerical Staffing Formulas

Efficiency Measure	Elementary	K-8	Middle	High
Office Manager	1	1	1	1
Finance Manager				1
Registrar				1
Attendance (> 1,000 students)				1
Attendance for each additional 500 students				1
Additional clerical staff	.5 (351-499 students) 1 (500 or more students)	1 (451-599 students) 1.5 (600-749 students) 2 (750 – 1,049 students 3 (1,050 or greater)	.75 (if less than 450 students) 1 (451 or greater students)	

Source: TUSD FY 2014 School Funding Formulas.pdf

Four school site visits were conducted to validate the clerical staff and better understand their responsibilities and work demands. Each of the four schools were found to have clerical staff levels that matched the prescribed formula except Booth Fickett K-8, which had 0.25 of a full-time equivalent (FTE) lower than the formula amount.

In comparison to most school systems and industry standards, these staff levels are very lean. Most school systems are above industry standards; with the exception of elementary schools, TUSD schools clerical staffing levels are below what standards would prescribe. TUSD's elementary staffing formula provides 1.5 FTEs up to 499 students. Industry standards provide 1 FTE up to 499 students and 1.5 FTEs up to 749 students.

The review team has not observed any other school system over the past 20 years that has clerical staff levels below industry standards. Table 8.2 presents the four schools formula and actual enrollment, and the suggested industry standard for each school.

Table 8.2. TUSD Formula, Actual and Industry Standard Enrollment, Selected Schools

School	Enrollment	Formula Staffing	Actual Staffing	Industry Standard
Vesey Elementary	611	2	2	1.5
Booth-Fickett K-8	1,282	3.75	4	5.5
Doolen MS	791	2	2	4.5
Tucson Magnet HS	3,209	8	8	12

Sources: Calculated from TUSD FY 2014 School Funding Formulas.pdf; TUSD Student enrollment; prior staffing guidelines of the Southern Association of Colleges and Schools (SACS).

Note: SACS no longer maintains these standards, and no other organization currently maintains clerical staffing standards for schools.

The industry standards are based on optimum efficiency in school operations. This is not the case at TUSD schools. Many school business and student information processes are highly manual and paper-intensive. In some schools software tools exist but are not used as intended, causing increased demands on school clerical staff. Following are examples of inefficient processes at one or more of the schools visited:

- Personnel Action Forms (PAF) are completed using hard copy forms.
- Schools have access to an automated substitute management system, but it is not used by teachers. Teachers call school clerical staff that enter the request into the substitute system. In most school districts, teachers have direct access to these systems.
- Timesheets for hourly employees are prepared manually and processed manually by school clerical staff. Absence forms for teachers are prepared manually.
- School clerical staff enter student attendance from forms submitted by substitute teachers since substitutes do not have access to the district's student information systems.

- Separate spreadsheets are maintained to monitor the school's budget status because of the perceived unreliability of the district's financial information systems. Every purchase transaction is entered into the spreadsheet and again into the district's financial systems.
- Phone calls from parents are manually entered onto a log and also into a computer system.
- Different schools use different auto-dialer systems to contact parents in case of a student absence or other school matter. For some systems it takes several hours to get the calls out.
- All student files are maintained in hard copy form.
- Schools experience difficulties in attaching scanned documents to the district's financial information systems.

There are also examples of efficient processes and systems. TUSD schools enter maintenance requests into an online system and can monitor the status of work orders. A similar online system exists for technology work orders. TUSD teachers enter grades and attendance directly into the district's student information system, eliminating the need for clerical staff to perform this function.

In 2013, TUSD completed an exercise that re-engineered and streamlined many school and central office processes. However, as of the date of the review team's site work in early January 2014, these new processes were not implemented. Some processes cannot be changed until the district decides whether to change its information systems for student, finance and human resources management. Other processes, such as those related to the substitute management system and auto-dialer systems, can be re-engineered immediately.

Fiscal Impact

The district should seek outside assistance in implementing streamlined procedures at the schools. Based on similar initiatives at other large school systems, approximately $150,000 should be invested to ensure that school staff are trained and supported for up to 18 months after the procedures are updated. Additional streamlining is expected to occur after the district makes its decision on its student, finance and human resource information systems. The cost of any outside assistance needed should be added to those cost estimates.

No expected savings are anticipated because the staff levels are already lean. After implementation of the streamlined procedures, TUSD should re-evaluate its clerical staffing standards, particularly for the middle schools and high schools with larger enrollments.

Recommendation 8-1	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2017-18
Re-engineer school clerical processes to reduce work demands.	($150,000)	$0	$0	$0	$0	$0

Note: Costs are negative. Savings are positive.

Safety and Security

School districts are expected to provide a safe and secure environment for their students, staff, and visitors. While districts are largely insulated from violent crime, it is incidents of violence at schools that draw national attention. School districts must take proactive measures in safety and security, even in incident-free schools. Students, teachers, and other district employees deserve a safe school environment in which to learn and work.

The School Safety Department includes the positions shown in Figure 8.1. The investigator position is new as of November 2012 and focuses on various types of investigations, including allegations of use of force by staff members, thefts, and embezzlements. The investigator handled 80 cases in 2012-13, some of which led to employee terminations. The School Safety and Security Manager oversees a 24/7 operation to provide school safety and security. The Safety and Training Manager oversees the Field Safety Supervisor who are primarily focused on bus driver training and transportation-related incidents and accidents. The crossing guard positions are all part-time.

The district no longer has School Resource Officers (SROs). These positions were previously grant-funded and were eliminated approximately five years ago when grant funding ended. The Tucson Police Department used to have school liaison officers to work in schools, but those positions were eliminated due to budget cuts.

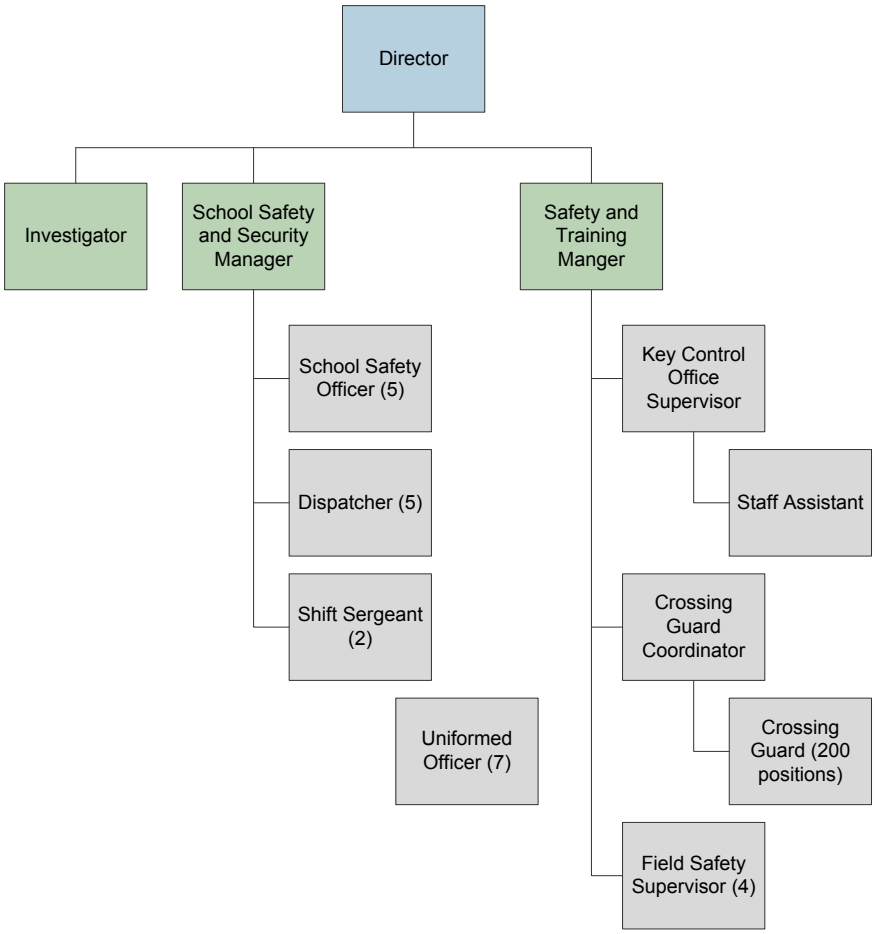
There are three other district groups/positions responsible for some aspect of school safety:

- School Monitors – There are 54 positions (some part-time, some full-time), plus one lead. These positions report to principals. Elementary principals determine how many school monitors they employ, based on an allocation of budget dollars determined through their school enrollment. Middle school principals are allocated up to two positions. High school principals are allocated 4.0 FTE positions. All school monitors report to their respective principals.

- Site Security Agents – There are 11 positions (all full-time). These positions are primarily at the high schools and are generally responsible for physical security matters.

- Parents on Patrol – This is volunteer group that works to support a specific TUSD school. The School Safety Director oversees the group of about 30 parents, which is active in six elementary/K-8 schools.

Figure 8.1. Current School Safety Department Organizational Structure



Source: TUSD, November 2013

Recommendation 8-2: Move badging to the School Safety Department.

Employee badging is currently done in the HR Department, using an old system (Allison Systems "Badge Pro 2000" version V9.2.16) that is not tied to other systems, such as the PeopleSoft system that is used to manage employee data. The Badge Pro system prints the employee identification number on the badge. This employee identification number is used for several applications in TUSD. Although the badge includes an employee's photo, that photo is not transferred to the employee database, which reduces the value of the employee database and which could be exploited by someone using a stolen badge. The district currently uses for its employee identification badges.

The district is implementing an access control system, whereby the employee badge will control building access. Thus far 25 schools have been completed on the outside doors, so that the employee badge is coded to grant access (or not). Individual interior and classroom doors have not yet been converted and still require keys.

Currently, once a badge has been created in the Human Resources Department it is routed to a staff member in the fire safety area who encodes the building access onto it. From there, the badge is routed to the School Safety Department for issuance to the employee along with any needed keys. This process could be improved by using the badging capabilities available in PeopleSoft and assigning responsibility for all steps to the School Safety Department.

Fiscal Impact

The district will likely need to replace its existing badge camera in the near future, according to HR staff. The camera system should be selected to easily interface with PeopleSoft. This one-time cost is estimated to be up to $7,000.

Recommendation 8-2	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Move badging to the School Safety Department.	($7,000)	$0	$0	$0	$0	$0

Note: Costs are negative. Savings are positive.

Recommendation 8-3: Transition to electronic fingerprinting and relocate all fingerprinting to the School Safety Department.

The district currently has fingerprinting capabilities in both the Human Resources and School Safety Departments. The School Safety Department fingerprints all bus drivers while the Human Resources Department fingerprints all other employees and non-parent volunteers. Both departments have only the outdated ink roll systems, which are more time-consuming and prone to error than newer all-electronic systems.

The efficiency of obtaining fingerprints for criminal history background checks is greatly reduced by the rolled ink impressions onto fingerprint cards. The time the fingerprint clerk in human resources and support staff in the School Safety Department spend in collecting the print, processing and mailing the card and the requisite forms, the cost of supplies, and the inability to move the fingerprint station to different locations as needed are all reasons that this operation should move to live scan, electronic devices which submits fingerprint images electronically. More than one of these portable devices can be purchased to increase the number of employees who can be fingerprinted at the same time and location.

The School Safety Department is aleady responsible for fingerprinting of some employees. Such a function is more closely aligned with the other functions of this department than it is aligned with human resource functions. The School Safety Department already coordinates with the Human Resources Department for the issuance of keys and badges for employees and is directly responsible for issuing keys to employees.

Fiscal Impact

A top of the line, digitizing fingerprint scan will cost approximately $4,000 per unit. The district should purchase two and both should be portable.

Recommendation 8-3	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Transition to electronic fingerprinting.	($4,000)	$0	$0	$0	$0	$0

Note: Costs are negative. Savings are positive.

Recommendation 8-4: Require all school monitors and site security guards to complete annual training with the School Safety Department.

Although the School Safety Department's "mission and goal is to assist our district administrators in maintaining a safe, secure environment conducive to teaching and learning by enforcing board policies, regulations and state statues when applicable" it is not currently responsible for providing any training to the school monitors of site security agents. Staff in both of these position types report directly to their principals. The lack of required safety/security training for school staff members charged with providing a safe and secure learning environment raises some potential liability issues for the district in addition to concerns over whether staff in these positions are optimally effective in their duties.

At the elementary level, schools are given a dollar figure in their budgets for school monitors that ranges from $10,000 to $21,000, depending on enrollment. There are few controls over how this money is spent and no oversight over how effectively it is used for school safety functions.

The School Safety Department should provide annual training of at least eight hours for the school monitors and site security agents. This could be provided through in-person and online means.

Fiscal Impact

The review team estimates this will require approximately $25,000 per year in staff wages and materials, and this investment should improve the knowledge and capabilities of the school-level safety staff outside the School Safety Department. Some common areas of school safety/security training could be provided online, such as requiring all school monitors and site safety agents to complete.

In addition to TUSD-specific training, there are several free internet training resources available from FEMA and the U. S. Department of Education concerning emergency management. Courses offered by FEMA and recommended for all public entity leaders are:

- ICS-100: An Introduction to Incident Command System (ICS)
- ICS-700.a NIMS: An Introduction to the National Incident Management System

Both courses are available and can be completed online for free. Advanced online training resources for district emergency response staff can be found at the Readiness and Emergency Management for Schools Technical Assistance Center.[27]

Recommendation 8-4	One-Time Costs/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19
Require all school monitors and site security guards to complete annual training.	$0	($25,000)	($25,000)	($25,000)	($25,000)	($25,000)

Note: Costs are negative. Savings are positive.

[27] (2013) *Readiness and Emergency Management for Schools.* Retrieved from http://rems.ed.gov/display.aspx?page=trainings_emergency_management

Appendices

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Appendix A – Summary of Recommendations and Fiscal Impacts

Table A.1 lists all recommendations made as a result of the review, by operational area, priority level for implementing each recommendation, as well as estimated savings, investments, and net fiscal impacts.

Table A.1. Summary of Fiscal Impacts (five-year)

Recommendation	One-Time Cost/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19	Total Fiscal Impact
Chapter 1 – District Organization and Management							
1-1. Develop a long-range strategic plan and related performance measures.	$0	$0	$0	$0	$0	$0	**$0**
1-2. Implement an internal audit function at TUSD that reports directly to the governing board.	($75,000)	($250,000)	($250,000)	($250,000)	($250,000)	($250,000)	**($1,325,000)**
1-3. Maximize the use of available technologies to streamline board meeting management.	$0	$65,390	$148,044	$148,044	$148,044	$148,044	**$657,566**
1-4. Reorganize instructional and student support services by function.	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined
1-5. Develop a decision-making framework for instructional and school administrators.	($50,000)	$0	$0	$0	$0	$0	**($50,000)**
Net Fiscal Impact – Chapter 1	**($125,000)**	**($184,610)**	**($101,956)**	**($101,956)**	**($101,956)**	**($101,956)**	**($717,434)**
Chapter 2 – Financial Management							
2-1. Reduce Finance Office staffing after new information systems and re-engineered processes are implemented.	$0	$0	$260,000	$520,000	$832,000	$832,000	**$2,444,000**
2-2. Improve financial reporting to the board and ensure accessibility of financial reporting to department and school leaders.	$0	$0	$0	$0	$0	$0	**$0**
2-3. Implement the feature in Lawson that checks for available funds for requisitions and budget transfers.	$0	$0	$0	$0	$0	$0	**$0**

Recommendation	One-Time Cost/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19	Total Fiscal Impact
2-4. Reduce the volume of Personnel Action Forms by eliminating multiple codes for substitutes.	$0	$0	$0	$0	$0	$0	**$0**
2-5. Consolidate district payroll functions under the Chief Financial Officer/Payroll Manager.	$0	$0	$0	$0	$0	$0	**$0**
2-6. Implement bar codes and scanners to more efficiently track fixed assets.	($50,000)	$0	$0	$0	$0	$0	**($50,000)**
2-7. Develop procedures and controls for the district's procurement card program.	$0	$0	$0	$0	$0	$0	**$0**
2-8. Expand "Punch-Out" purchasing programs with high volume merchants.	$0	$0	$0	$0	$0	$0	**$0**
2-9. Implement performance measures for the Purchasing Department.	$0	$0	$0	$0	$0	$0	**$0**
Net Fiscal Impact – Chapter 2	**($50,000)**	**$0**	**$260,000**	**$520,000**	**$832,000**	**$832,000**	**$2,394,000**
Chapter 3 – Human Resources							
3-1. Reorganize the HR Department, creating a development team that will have no daily routine responsibilities but will instead be focused on the myriad of systems and procedural improvements that are needed in the department.	$0	$84,243	$84,243	$0	$0	$0	**$168,486**
3-2. Improve the hiring process in several areas.	($70,000)	($50,000)	($50,000)	($50,000)	($50,000)	($50,000)	**($320,000)**
3-3. Conduct dependent eligibility audit.	($72,000)	$171,000	$171,000	$171,000	$171,000	$171,000	**$783,000**
3-4. Implement needed changes in leave policies and procedures.	$0	$0	$0	$0	$0	$0	**$0**
3-5. Require all schools to use SubFinder in order to better control use of leave.	$0	$0	$0	$0	$0	$0	**$0**
3-6. Develop strategies to reduce employee absences on Mondays and Fridays.	$0	$0	$0	$0	$0	$0	**$0**

Recommendation	One-Time Cost/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19	Total Fiscal Impact
3-7. Publish an online employee handbook, as well as detailed HR screens on the district's website to handle the top 10 most frequent calls to the HR Department.	$0	$0	$0	$0	$0	$0	**$0**
3-8. Discontinue printing hard copies of the TUSD benefits handbook.	$0	$6,566	$6,566	$6,566	$6,566	$6,566	**$32,830**
3-9. Improve records processing and maintenance.	($15,000)	$10,000	$10,000	$10,000	$10,000	$10,000	**$35,000**
Net Fiscal Impact – Chapter 3	**($157,000)**	**$221,809**	**$221,809**	**$137,566**	**$137,566**	**$137,566**	**$699,316**
Chapter 4 – Technology Management							
4-1. The district should use a requirements-based application selection process for identifying and selecting an ERP system and student information system.	$0	$0	$0	$0	$0	$0	**$0**
4-2. Bring all technology-related staff and resources that are located in other departments into the Technology Services Department.	$0	$0	$0	$0	$0	$0	**$0**
4-3. Use staffing formulas and service level metrics to determine the number of staff necessary to maintain TUSD's computers and devices.	$0	$0	$0	$0	$0	$0	**$0**
4-4. Develop a project management methodology using industry standards and implement it throughout the department.	$0	$0	$0	$0	$0	$0	**$0**
4-5. Update the Technology Services Department job descriptions according to current departmental needs.	$0	$0	$0	$0	$0	$0	**$0**
4-6. Conduct a feasibility analysis to identify ways to have a data center that is on par with industry standards.	$0	$0	$0	$0	$0	$0	**$0**
4-7. Implement the recommendations from the Dell, Inc. IT Simplification Assessment.	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Net Fiscal Impact – Chapter 4	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Recommendation	One-Time Cost/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19	Total Fiscal Impact
Chapter 5 – Facilities Management							
5-1. Reduce number of portable classrooms.	$0	$500,000	$500,000	$500,000	$500,000	$500,000	**$2,500,000**
5-2. Continue to evaluate school capacities and consider further school consolidation.	$0	$0	$7,500,000	$7,500,000	$7,500,000	$7,500,000	**$30,000,000**
5-3. Continue to implement warehouse process improvements and overhaul the facilities purchasing process.	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined
5-4. Enhance existing facility condition assessment process though the incorporation of best practice procedures.	$0	$0	$0	$0	$0	$0	**$0**
5-5. Utilize A/E project managers for contract management, quality assurance/quality control, FCI, support of technology projects, fire and life safety inspections.	$0	$0	$0	$0	$0	$0	**$0**
5-6. Develop TUSD Operations Division strategic facilities plan.	$0	$0	$0	$0	$0	$0	**$0**
5-7. Document facilities management policies, procedures and workflow processes.	$0	$0	$0	$0	$0	$0	**$0**
5-8. Implement and integrate new CMMS to improve efficiencies and provide facilities data for better decision making.	($45,000)	($4,000)	($4,000)	($4,000)	($4,000)	($4,000)	**($65,000)**
5-9. Improve preventive maintenance program.	($45,000)	$0	$0	$0	$0	$0	**($45,000)**
5-10. Enhance operations and maintenance training program.	$0	($100,000)	($100,000)	($100,000)	($100,000)	($100,000)	**($500,000)**
5-11. Formalize and improve operations and maintenance performance measurement.	$0	$0	$0	$0	$0	$0	**$0**
5-12. Repair/replace outdated equipment.	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined
5-13. Implement more centralized management approach to custodial services.	$0	($380,840)	($380,840)	($380,840)	($380,840)	($380,840)	**($1,904,200)**

Recommendation	One-Time Cost/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19	Total Fiscal Impact
5-14. Invest in updated cleaning equipment to improve efficiency through reduced work demands	($325,000)	($65,000)	($65,000)	($65,000)	($65,000)	($65,000)	**($650,000)**
5-15. Increase custodial staffing after management change and equipment investments.	$0	($1,105,260)	($1,105,260)	($1,105,260)	($1,105,260)	($1,105,260)	**($5,526,300)**
5-16. Implement energy management plan.	($540,000)	$0	$0	$0	$750,000	$750,000	**$960,000**
Net Fiscal Impact – Chapter 5	**($955,000)**	**($1,155,100)**	**$6,344,900**	**$6,344,900**	**$7,094,900**	**$7,094,900**	**$24,769,500**
Chapter 6 – Transportation Management							
6-1. Reduce the number of monitors for non-IEP routes.	$0	$97,200	$97,200	$97,200	$97,200	$97,200	**$486,000**
6-2. Eliminate position classification for router and increase the number of router/analysts.	$0	$145,563	$145,563	$145,563	$145,563	$145,563	**$727,815**
6-3. Implement state of the art routing and scheduling software to optimize routing efficiency. Schedule transportation for students who intend to ride the school bus.	($300,000)	$450,000	$1,553,000	$1,553,000	$1,553,000	$1,553,000	**$6,362,000**
6-4. Renegotiate labor agreement to pay drivers and monitors for actual time worked.	$0	$0	$489,600	$489,600	$489,600	$489,600	**$1,958,400**
6-5. Reduce budgeted staff for mechanics from 21 to 19.	$0	$110,540	$110,540	$110,540	$110,540	$110,540	**$552,700**
6-6. Adopt a policy to perform a preventive maintenance inspection for every school bus every 4,000 miles or not less than once every 90 days.	$0	$0	$0	$0	$0	$0	**$0**
6-7. Conduct preventive maintenance inspections on a second shift at the Central facility.	$0	$0	$0	$0	$0	$0	**$0**
6-8. Budget funds replace school buses each year and continue to buy medium-duty buses to replace larger buses.	$0	($1,790,000)	($1,875,000)	($1,955,000)	($1,935,000)	($1,645,000)	**($9,200,000)**
Net Fiscal Impact – Chapter 6	**($300,000)**	**($986,697)**	**$520,903**	**$440,903**	**$460,903**	**$750,903**	**$886,915**

Recommendation	One-Time Cost/ Savings	2014-15	2015-16	2016-17	2017-18	2018-19	Total Fiscal Impact
Chapter 7 – Food Services							
7-1. Allocate additional indirect costs of the food services operations to the food services fund.	$0	$1,163,758	$1,163,758	$1,163,758	$1,163,758	$1,163,758	**$5,818,790**
7-2. Eliminate vacant positions in the Food Service central office.	$0	$0	$0	$0	$0	$0	**$0**
7-3. Implement steps to increase meal participation at schools.	($50,000)	$327,000	$654,000	$981,000	$981,000	$981,000	**$3,874,000**
7-4. Develop performance report for Food Services.	$0	$0	$0	$0	$0	$0	**$0**
Net Fiscal Impact – Chapter 7	**($50,000)**	**$1,490,758**	**$1,817,758**	**$2,144,758**	**$2,144,758**	**$2,144,758**	**$9,692,790**
Chapter 8 – Other							
8-1. Re-engineer school processes to reduce clerical staff work demands.	($150,000)	$0	$0	$0	$0	$0	**($150,000)**
8-2. Move badging to the School Safety Department.	($7,000)	$0	$0	$0	$0	$0	**($7,000)**
8-3. Transition to electronic fingerprinting and relocate all fingerprinting to the School Safety Department.	($4,000)	$0	$0	$0	$0	$0	**($4,000)**
8-4. Require all campus monitors and site security guards to complete annual training with the School Safety Department.	$0	($25,000)	($25,000)	($25,000)	($25,000)	($25,000)	**($125,000)**
Net Fiscal Impact – Chapter 8	**($161,000)**	**($25,000)**	**($25,000)**	**($25,000)**	**($25,000)**	**($25,000)**	**($286,000)**
Total Net Fiscal Impact	**($1,798,000)**	**($638,840)**	**$9,038,414**	**$9,461,171**	**$10,543,171**	**$10,833,171**	**$37,439,087**

Appendix B – Sample Operational Performance Measures

Performance Measure	Level
General District Management	
Ratio of students (enrollment) to full-time-equivalent (FTE) employees	District
Ratio of students (enrollment) to non-teaching FTE employees	District
Central administration and instructional leadership expenditures (general fund) per pupil	District
Central administration and instructional leadership expenditures (general fund), as a percentage of total expenditures	District
General fund balance as a percent of target fund balance	District
Percentage of students economically disadvantaged, mapped against the percentage of total revenue supported by federal funds	District
School Management	
Pupil-teacher ratio, by school	Campus
Pupil-aide ratio, by school	Campus
Special education student population as a percent of total enrollment	District
Percentage of schools meeting staffing standards for principals, assistant principals, counselors, library/media specialists	Campus
Average teacher class load per term by secondary schools	Campus
Number of secondary class periods with < 5 students enrolled by school	Secondary Campus
Number of secondary class periods with < 10 students enrolled by school	Secondary Campus
Finance	
Number of total employees per finance department employee	District
Number of invoices and direct payments made per accounts payable personnel (FTE)	District
Number of AP checks processed per AP department FTE	District
Average age of accounts payable	District

Performance Measure	Level
Number of accounts payable check voids and reissues	District
Number of purchase orders processed per purchasing FTE	District
Average dollar value of purchase orders processed	District
Number of payroll checks processed per number of payroll FTE	District
Number of payroll check/advice voids and reissues	District
Human Resources and Benefits	
Number of district employees per FTE human resources employee	District
Number of employment applications processed	District
Average days from position vacancy to recommendation by hiring manager	District
Average days from recommendation by hiring manager to start date	District
Non-certified teachers as a percentage of total teachers	District
Total overtime cost	District
Turnover rate for teachers	District
New teacher turnover rate (one year or less)	District
Turnover rate for non-teachers	District
Low income/high minority campuses compared to teachers experience	Campus
Percentage of teachers by ethnicity, compared to percentage of students by ethnicity	Campus
Teacher absentee days per year, by campus	Campus
Substitute costs per year, by campus	Campus
Benefits cost as a percentage of total salaries and wages	District
Technology	
Students (enrollment) per instructional computer (in classrooms and labs, plus laptops)	District
Average age of PCs	District
Average age of Apple computers	District
Number of computers per maintenance, repair, installation FTEs	District

Performance Measure	Level
Ratio of total students to total technology staff	District
Ratio of total students to total instructional technology staff (including campus liaisons)	District
Ratio of total employees to total technology staff	District
Ratio of total employees to technical support staff	District
Ratio of total computers to technical support staff	District
Ratio of instructional computers to instructional technology staff	District
Average turnaround time for computer work orders (days)	District
Facilities	
Average annual salary of skilled trades/maintenance FTE	District
Maintenance expenditures per gross square foot (Including portables)	District
Maintenance expenditures as a percent of total expenditures	District
Total maintenance expenditures per student	District
Gross square feet per maintenance FTE	District
Average turnaround time (days) for maintenance work orders to be closed	District
Percentage of work orders that were preventative	District
Average salary of all building and grounds FTE	District
Average annual salary of custodial FTE	District
Custodial salaries per gross square foot (Including portables)	District
Gross square feet per FTE custodian	District
Acres per grounds FTE	District
Facility capacity (permanent only) versus occupancy by school (TEA standards for capacity, room size)	Campus
Facility capacity (including portables) versus occupancy by school (TEA standards for capacity, room size)	Campus
Percentage of square footage that is portable classrooms	Campus
Percentage of district portable classrooms by school	Campus

Performance Measure	Level
Electricity cost (kwh) per square foot	Campus
Water cost (kgal) per square foot	Campus
Natural gas cost (ccf) per square foot	Campus
Nutrition	
Meals per labor hour (MPLH), by school	Campus
Participation Rates (breakfast/lunch), by school:	Campus
Free (percentage participating)	Campus
Reduced price (percentage participating)	Campus
Paid (number of paid meals per year)	Campus
Net profit (loss) of food services operation	District
Net profit (loss), by school	Campus
Indirect costs allocated to food service (amount and type) - (from gen. fund only)	District
Cash in lieu of commodities	District
Food cost as a percent of total cost	Both
Transportation	
Total cost per mile driven	District
Total cost per average daily rider	District
Average fuel cost per gallon (gasoline and diesel)	District
Annual transportation cost per student rider	District
Annual maintenance cost per bus	District
Accidents every 100,000 miles of service	District
Student incidents every 1,000 students transported	District
Maximum length of student time on school bus (minute)	District
Annual turnover rate for bus drivers	District
Annual turnover rate for bus monitors	District

Appendix C – Sample Governing Board Policy

POLICY TITLE: Leaves of Absence

POLICY CODE: xxx

The Tucson United School District (TUSD) recognizes that employees may experience extenuating medical or personal family circumstances which require them to be absent from work.

Definition: A leave of absence is consecutive absences of days greater than 10 working days.

Employees are required to request a leave of absence through their supervisors at their work sites and the Human Resources Department, and to provide all required documentation deemed appropriate.

Employees must use all sick and personal accrued balances during leaves of absence, but may reserve up to five days of accruals. Employees may use accrued vacation if they wish.

Employees shall not accrue leave time while on leave of absences.

Employees are not permitted to use one leave type after another consecutively unless permitted by law. (For example, military call orders received after an FML for non-military use).

Types of Leave: Eligibility and Benefits

Family Medical Leave (FML)

Description: Serious illness of the employee or spouse or child or parent; leave has to be approved by HR

Eligibility:

- Employee has at least 12 months of cumulative service and has worked at least 1,250 hours for TUSD during the 12 month period preceding the date their FML is to begin; and
- Have a qualifying reason for taking FML; and/or
- Have a remaining balance of FML.

Qualifying Reasons:

- The birth of the employee's child and the care of such newborn child; the placement of a child with the employee for adoption or foster care;
- The care of the employee's spouse, child, or parent who has a serious health condition;
- The employee's own serious health condition that prevents him/her from performing the essential functions of his/her position; or
- Military leave.

Benefits:

- Employees on approve FML of absence retain existing insurance benefits coverage. Employees will be billed for missed employee premiums and the district will continue to pay its portion of the premium as it applies for medical. If employees do not pay premiums during FML, they will be deducted from the employees' paycheck(s) upon the employees return to work.

Personal Leave

Description: Discretionary leave that must be approved by the responsible administrator

Eligibility:

- Employee has at least six months of continuous employment (excluding substitute or temporary hourly status
- Has not taken a personal leave in the preceding 12 months
- Has exhausted all accrued personal, sick, and vacation prior to the commencement of the planned personal leave of absence
- Assurance made that requested leave time will not be used in employment or work outside the district
- Approval of request by the responsible administrator

Benefits:

- Employees on approved personal leave who wish to retain existing insurance benefits coverage shall make arrangements with HR Benefits Office prior to commencement of the leave to pay both the employee's and district's premiums for such coverage. Failure to pay both the required premiums on a monthly basis will result in termination of coverage, and the employee will be offered COBRA. Vacation, personal, and sick leave shall not accrue during the period of personal leave of absence.

Governing Board Leave

Description: Discretionary leave that must be approved by the TUSD Governing Board one month prior to commencement of the leave. Approval of this leave will depend largely on the circumstances, specialization, or critical nature of the employee's position, as well as the practicality of replacing the employee for a temporary period. This leave shall not exceed one year, subject to the combination of all prior leave in that 12-month period. Employees on this leave shall resign from TUSD position upon approval of long term disability with the Arizona State Retirement System when it is foreseeable that the disability will extend beyond one year.

Eligibility:

- Employee has to have at least two years of continuous employment, excluding substitute or temporary hourly status.
- Has exhausted all accrued personal, sick, and vacation prior to the commencement of the planned leave of absence
- Assurance that the requested leave time will not be used for employment or work outside the district
- Approval through channels by the Governing Board

Reasons:

- Health of employee (submit physician's certification on TUSD form)
- Health of immediate family (submit physician's certification to verify illness or disability and to give project date of return to work)
- New infant or childcare (birth certificate or doctor's statement required)
- Course of study, education, or training, as approved by TUSD (enrollment or registration

documentation required)

- Military service (military orders required)
- Political campaign or to serve in public office
- Bargaining unit business

Benefits:

- Active benefits will terminate at the end of the month in which the approved leave begins. Employees on this leave shall have the opportunity to elect COBRA in order to continue applicable health benefits. Vacation, personal, and sick time shall not accrue during the period of this leave.

Military Leave:

- Employees shall receive pay for all days during which they are employed in training duty under orders with any branch of the armed forces for a period not to exceed 30 days in any two consecutive years. For purposes of this article only the term *year* means the fiscal year of the U.S. Government.

Expiration of or Return from Governing Board Leave:

- Employees must notify TUSD in writing of their return date by February 1 or 30 days prior to the leave's expiration date, whichever is earlier. Upon expiration of the leave, the employee is guaranteed return to a comparable (same grade, same step) position if one is available, and if the employee is recommended for the position by the hiring supervisor as a result of a selection process. If no comparable position is available, or if the employee is not selected, the employee will be assigned to the next vacancy that is in a classification below that of the position held at the time of the leave, and for which the employee meets the minimum requirements. Such employee will be placed on the step closest to their previous annual salary which does not result in an increase. Employees on this leave of absence are subject to the provisions of reduction in force in the applicable employee union agreement. Employees may request in writing that their leave be rescinded prior to the scheduled expiration of the leave.

Disciplinary Action

Employees who do not request a leave of absence in a timely manner, including extensions, shall constitute a breach of contract and therefore, may result in the initiation of dismissal procedures, loss of salary or such disciplinary action as may be deemed appropriate.

Source: TUSD benefits manager, January 2014.

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Appendix D – Sample Table of Contents for Online Employee Handbook

- Family and Medical Leave (FMLA)
- Personal Leave of Absence
- Bereavement Leave
- Jury Duty
- Voting Leave
- Military Leave of Absence
- Lactation/Breastfeeding

BENEFITS

- Medical and Dental Insurance
- Domestic Partners
- Flexible Spending Account
- Group Life Insurance
- Short-Term Disability Benefits
- Long-Term Disability Benefits
- 401(k) Plan
- Workers' Compensation Benefits
- Tuition Assistance
- Employee Assistance Program (EAP)

Source: Society for Human Resource Management (SHRM), February, 2014. *www.SHRM.org*

Appendix E – Asset Management Plans: Implementation of BMAR Approach

The TUSD Operations Division has developed a facility condition assessment (FCA) approach to cost-effectively evaluate school conditions and generate facility condition indexes (FCIs) for each school. The approach is well thought-out and reliable. It is based on rational and procedures common to an industry best practice FCA approach called the Backlog of Maintenance and Repair (BMAR) methodology. We do not recommend changing the approach, but we do recommend enhancing it with BMAR standards to provide more valuable and credible asset management plans.

The BMAR method was selected as a basis to overcome the challenges of cost-effectively, consistently, and accurately assessing the conditions of school systems, government agencies, and institutions across the U.S. Simply applying the method as implemented in the past without modification was viable. However, Facility Engineering Associates (FEA) has made a number of key improvements making it more accurate and credible for the specific application of public school evaluations. These improvements are presented in the following performance plan and methodology discussion.

Performance Plan and Methodology

Several process development meetings were conducted with representatives of School Facilities Commissions and FEA to develop a performance plan detailing how to effectively, efficiently, accurately, and consistently accomplish FCAs using the BMAR approach. The meetings identified previous assessment shortcomings and the requirements for new facility condition assessment methodologies. Goals and objectives and desired outcomes were clearly defined. In the end, a consensus-based plan utilizing the BMAR approach to conduct FCAs and develop asset management plans as a basis was developed.

The plan included the following key components:

1) Enhancement of the BMAR Approach
2) Development of Project Standards
3) Development of Generalized System Condition Levels
4) Creation of Automated Assessment Tools and Technology
5) BMAR Assessment Methodology and Assessor Training
6) Facility Assessment Pilot Study and Calibration
7) Facility Interviews and Data Review
8) Field Quality Control and Assurance Program
9) Documentation and Completing the Program

Enhancement of the BMAR Approach

The BMAR condition assessment approach implemented by NASA, Smithsonian Institution, and other DoD facilities typically begins with a rapid visual inspection of the different building systems at each facility. The assessors conducting the visual inspections rate each of the building systems, based on ASTM Uniformat II Classification for Building Elements, from ***five*** (Excellent condition – Only routine maintenance required) to ***one*** (Failure/Crisis – Systems not operational, or unsafe) for specific building types. The building types are defined in the PACES categorization of similar facility types for DoD facilities.

This categorization allows consistent extrapolation of system condition for each building system as a percentage of the current replacement value (CRV) of the facility. When the assessments are complete, the ratings are entered into a database where the parametric model converts the assessed condition ratings to a set of key metrics. The key metrics include: Deferred Maintenance (DM) costs, System Condition Index (SCI), and the Facility Condition Index (FCI).

The following figure demonstrates the simple assessment algorithm. The cost of replacing each major system in a building is a percentage of the current replacement value (CRV) of the building. The major system replacement percentage (MS%) is based on R.S. Means Square Foot Assembly Cost Data categorized by Uniformat classification. Repair cost percentages (RC%) were estimated based on experience and historical data for repairing and replacing systems based on condition. The BMAR deferred maintenance cost estimate is equal to the product of the MS%, the RC%, and the CRV for each building.

Figure E-1: Calculation of BMAR Deferred Maintenance Costs

MS%

Based on Uniformat and R.S. Means Data. Modified based on actual conditions.

System	MS%	System	MS%
A Substructure	11%	E Equipment	5%
B Structure and Shell	18%	F Specialty Construction	5%
C Interiors	26%	G Site Work	N/A
D Services	35%	H Accessibility Issues	N/A

RC%

Based on Generalized Condition Level

Rating	Condition	Repair Cost
5	Excellent	2% of CRV
4	Good	10% of CRV
3	Fair	33% of CRV
2	Poor	75% of CRV
1	Failure/Crisis	100% of CRV

BMAR = [Sum (MS%)*(RC%)] CRV

- MS% = major system percentage of CRV
- RC% = repair cost percentage of CRV
- CRV = current replacement value of the building

As an example, assuming a building is 100,000 s.f. in area with an estimated replacement cost of $200 per s.f.; the CRV would be equal to $20,000,000. Based on an example condition rating of 3 – Fair for Interiors, thus a RC% of 33% (or 0.33), the BMAR deferred maintenance cost for the interiors is equal to $1,716,000 (0.26 x 0.33 x $20,000,000).

The primary assumptions dictating the accuracy of the DM cost estimates include the actual costs of the building systems (or MS% times CRV), the estimate of repair cost percentages (RC%), and the consistency in which the generalized condition ratings are determined for each building. Previous BMAR methods for the DoD and NASA have based RC% on practical experience with objective life-cycle analyses and system degradation curves for use in engineered management systems. The values for MS% have typically been based on the PACES system for 42 types of facilities. This is a reasonable approach when evaluating hundreds of buildings of various types. However, it does assume that all buildings in each type category are identical.

The final assumption, and probably the most important, is that each assessor consistently rates the condition of systems in all buildings. This becomes more of a variable with multiple assessors and requires careful training and calibration.

The enhanced BMAR approach developed for this project takes the primary assumptions into consideration and allows for flexibility to increase the accuracy and consistency of the results. Instead of relying on PACES classifications to generate a single MS% value for all school buildings, the project team created a variable approach to model a multitude of system variations in elementary, junior high school, and high school buildings. Automated data collection and condition rating forms were created to simply and quickly identify system types and allow modifications of the MS% to accurately reflect conditions

encountered at each school. Details are presented later in this section (Creation of Automated Assessment Tools and Technology).

Increased consistency of the enhanced BMAR approach was achieved through the development of detailed Building Systems Condition Rating Field Guide for use by the field assessors. The Field Guide was generated based on decades of experience in performing facility condition assessments for multiple building facilities. It was calibrated to the RC% and DM costs based on comparison with comprehensive facility condition assessment and life cycle analysis data. To further increase the accuracy and consistency, interview forms were developed to gain further relevant condition data that visual observations might not identify.

Development of Project Standards for Schools

The project team discussed and selected a number of standards during the development meetings for use on the project. The selected project standards included:

- CSI Uniformat II - Building System Classification System
- RS Means - Assembly Cost Data
- DoD - Bldg. System Life-Cycle Curves
- APPA's Facility Condition Index (FCI)
- GAO FASAB Standard No 6 - Deferred Maintenance

The group brainstormed about the different methods and procedures for categorizing and completing the assessment. During the discussions, three different formats were discussed which included the Construction Specification Institute (CSI) Masterformat, CSI Masterformat 2004, and the ASTM/ANSI/CSI Uniformat II. Comments included:

- The 16 Division CSI Masterformat works well for design and construction but is difficult to use when attempting to describe in place building systems (i.e., steel frame with composite concrete deck, elements include roofing, building sealants, building insulation, etc.). CSI Masterformat 2004 includes several more divisions specifically related to facilities management, but still fall a little short in matching how systems are maintained.

- The Uniformat II classification system divides the information into eight categories which generally match the methodology used to collect assessment data. Additionally, Contractors in the future can be forced to submit their bids to accommodate the standard format.

The group decided that the Uniformat II format was the appropriate method for categorizing the condition assessment data. The subcategories could also be utilized in future years when additional information is captured during the assessments.

Uniformat was developed in the 1970s for use by U.S. Federal agencies, R.S. Means, and others in response to the growing need to classify building systems in a consistent, expandable, organized manner. It provided a means of comparing and evaluating alternative construction concepts in terms of a facility's functional parts, especially during the design phase of the project. In 1993, ASTM published

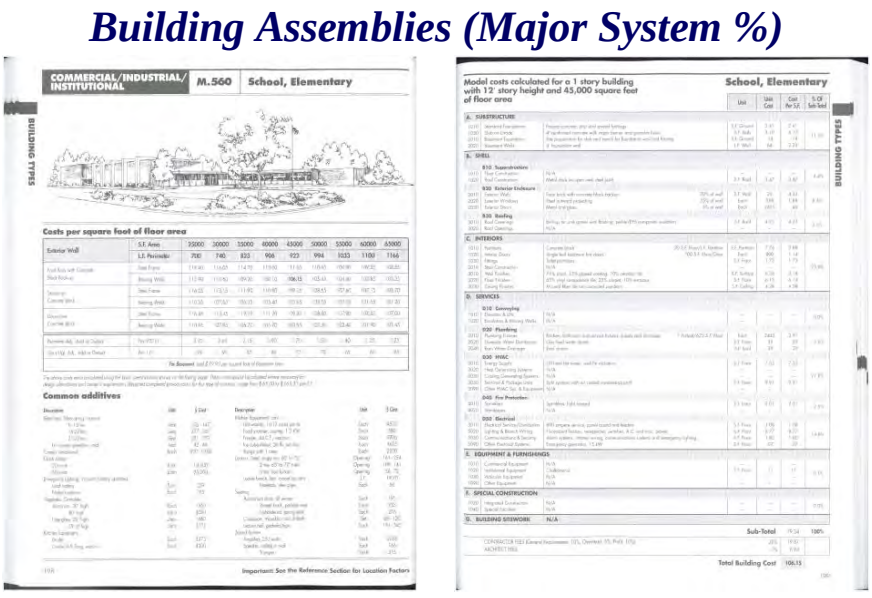
Uniformat II in conjunction with a team of experts from ANSI and CSI. Uniformat II expanded the classification system to include all types of construction, not just buildings.

The general Uniformat II categories utilized for this project include:

- A – Substructure
- B – Shell
- C – Interiors
- D – Services
- E – Equipment/Furnishings
- F – Special Construction
- G – Building Sitework
- H – ADA Compliance[28]

As previously stated, the selection of widely used published cost standards (i.e., R.S. Means) was made as an alternative to PACES data for the calculation of system unit costs and MS% values. A sample of the assembly cost data for a typical elementary school is shown in Figure E-2 (RS Means, 2006).

Figure E-2: RS Means Elementary School Assembly Example Costs



RS Means 2006 Square Foot Cost Manual (Basis - Uniformat II)

One of the most widely used and accepted benchmarks that can be produced from the collected data is the Facility Condition Index (FCI). The FCI was developed by the National Association of College and University Business Officers (NACUBO) and is a parametric tool used to relatively compare building

[28] The ADA category was created to include accessibility evaluations for the schools and is not part of the Uniformat II classification system.

conditions. FCI is calculated by dividing the Current Replacement Value of the building and its associated systems by the total cost of remedying maintenance deficiencies of those same systems. The FCI is a ratio and thus the higher the FCI the worse the buildings condition. A new building with no deficiencies and 100% replacement value would have an FCI of 0.

$$\mathbf{FCI} = \frac{\text{Cost of Deficiencies (DM)}}{\text{Current Replacement Value (CRV)}}$$

Excellent	**FCI < 0.05**
Good	**0.05 < FCI < 0.15**
Average	**0.15 < FCI < 0.30**
Poor	**0.30 < FCI < 0.50**
Crisis	**FCI > 0.50**

The FCI rating classifications of Excellent through Crisis are based on level of service performance measures recommended by APPA (APPA, 2002).

Development of Generalized System Condition Ratings

The following general system condition ratings were developed for this project. Details of condition ratings by system type are presented in the following section.

5. Excellent; only normal preventive maintenance required.
4. Good; Some repairs needed; overall system generally functional.
1. Fair; Many repairs needed; limited functionality and availability.
2. Poor; May be functional but obsolete or does not meet codes.

1. Crisis/Failure; Not operational; unsafe.

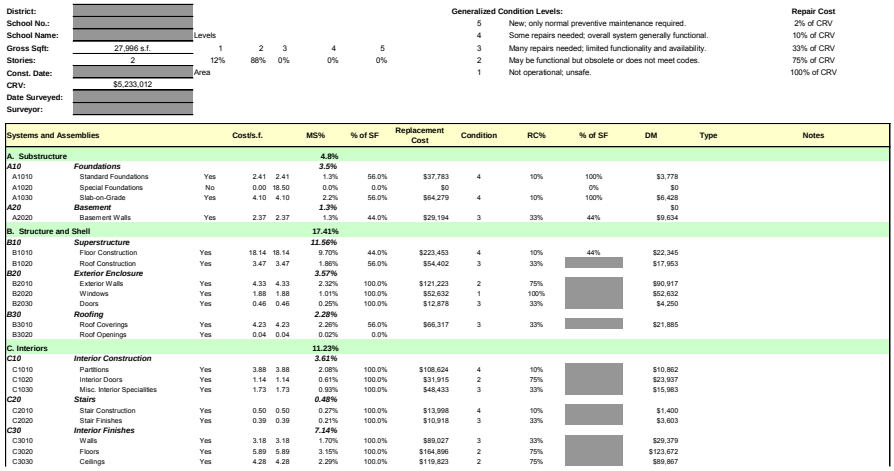
Creation of Automated Assessment Tools and Technology

The project team created an automated data collection process to enhance the efficiency, accuracy, and consistency of the condition assessments. The automated collection process allowed for the accounting of variations in building configuration and systems. Where previous methods relied solely on the building area, the enhanced approach captures variations in building cost due to number of floors, types of systems, and inclusion of other features and amenities. As an example, a single-story high school supported by shallow spread footings with a multipurpose room and boiler for heating only should not be expected to cost the same as a two-story school built on a special deep foundation system with elevators, stairs, gymnasium, pool, and central heating and air-condition with automated controls of the same size.

The automated process allows the field assessors to select the specific systems actually observed or reported, as well as determine the additional estimated costs for basement walls, stair construction,

elevated floor construction, etc. The automated forms calculate revised MS% and CRV based on the systems and subsystems selected. This maintains consistency in the relative evaluations while increasing the accuracy of the DM cost calculations and overall FCI.

Figure E-3: Example Automated FCA Data Collection Form



District:
School No.:
School Name:
Gross Sqft: 27,996 s.f.
Stories: 2
Const. Date:
CRV: $5,233,012
Date Surveyed:
Surveyor:

Levels: 1 2 3 4 5
12% 88% 0% 0% 0%
Area

Generalized Condition Levels:

		Repair Cost
5	New; only normal preventive maintenance required.	2% of CRV
4	Some repairs needed; overall system generally functional.	10% of CRV
3	Many repairs needed; limited functionality and availability.	33% of CRV
2	May be functional but obsolete or does not meet codes.	75% of CRV
1	Not operational; unsafe.	100% of CRV

Systems and Assemblies			Cost/s.f.		MS%	% of SF	Replacement Cost	Condition	RC%	% of SF	DM	Type	Notes
A. Substructure					**4.8%**								
A10	***Foundations***				***3.5%***								
A1010	Standard Foundations	Yes	2.41	2.41	1.3%	56.0%	$37,783	4	10%	100%	$3,778		
A1020	Special Foundations	No	0.00	18.50	0.0%	0.0%	$0			0%	$0		
A1030	Slab-on-Grade	Yes	4.10	4.10	2.2%	56.0%	$64,279	4	10%	100%	$6,428		
A20	***Basement***				***1.3%***						$0		
A2020	Basement Walls	Yes	2.37	2.37	1.3%	44.0%	$29,194	3	33%	44%	$9,634		
B. Structure and Shell					**17.41%**								
B10	***Superstructure***				***11.56%***								
B1010	Floor Construction	Yes	18.14	18.14	9.70%	44.0%	$223,453	4	10%	44%	$22,345		
B1020	Roof Construction	Yes	3.47	3.47	1.86%	56.0%	$54,402	3	33%		$17,953		
B20	***Exterior Enclosure***				***3.57%***								
B2010	Exterior Walls	Yes	4.33	4.33	2.32%	100.0%	$121,223	2	75%		$90,917		
B2020	Windows	Yes	1.88	1.88	1.01%	100.0%	$52,632	1	100%		$52,632		
B2030	Doors	Yes	0.46	0.46	0.25%	100.0%	$12,878	3	33%		$4,250		
B30	***Roofing***				***2.28%***								
B3010	Roof Coverings	Yes	4.23	4.23	2.26%	56.0%	$66,317	3	33%		$21,885		
B3020	Roof Openings	Yes	0.04	0.04	0.02%	0.0%							
C. Interiors					**11.23%**								
C10	***Interior Construction***				***3.61%***								
C1010	Partitions	Yes	3.88	3.88	2.08%	100.0%	$108,624	4	10%		$10,862		
C1020	Interior Doors	Yes	1.14	1.14	0.61%	100.0%	$31,915	2	75%		$23,937		
C1030	Misc. Interior Specialities	Yes	1.73	1.73	0.93%	100.0%	$48,433	3	33%		$15,983		
C20	***Stairs***				***0.48%***								
C2010	Stair Construction	Yes	0.50	0.50	0.27%	100.0%	$13,998	4	10%		$1,400		
C2020	Stair Finishes	Yes	0.39	0.39	0.21%	100.0%	$10,918	3	33%		$3,603		
C30	***Interior Finishes***				***7.14%***								
C3010	Walls	Yes	3.18	3.18	1.70%	100.0%	$89,027	3	33%		$29,379		
C3020	Floors	Yes	5.89	5.89	3.15%	100.0%	$164,896	2	75%		$123,672		
C3030	Ceilings	Yes	4.28	4.28	2.29%	100.0%	$119,823	2	75%		$89,867		

The field assessors simply record the number of floors in the building and whether a specific system is present and the condition rating. The data is then entered directly into the database for calculation of the cost of deferred maintenance and the FCI for each building. The database may be used for long term storage of the data, as well as follow-up evaluations.

BUILDING SYSTEM CONDITION RATINGS FIELD GUIDE

Past condition assessments performed for WFSC resulted in inconsistent ratings. The condition assessment generated a "number" but the number was not tied to industry standards. Concerns about the ability to use and reliability recreate the assessment, led to the necessity to develop a detailed Building Systems Condition Rating Field Guide for use by the field assessors. The intent was to lend consistency to field assessors and to allow field assessors to rate conditions and age accurately.

The Field Guide was generated based on decades of experience in performing facility condition assessments for multiple building facilities following industry standards and best practices. It correlates this experience with actual repair and maintenance costs along with expected useful lives of individual building elements.

The assessors conducting the visual inspections rate each of the building systems, based on ASTM Uniformat II Classification for Building Elements, from ***five*** (Excellent condition – Only routine maintenance required) to ***one*** (Failure/Crisis – Systems not operational, or unsafe) for specific building types. The building systems are first categorized according to Uniformat II, as shown as follows.

- A – Substructure

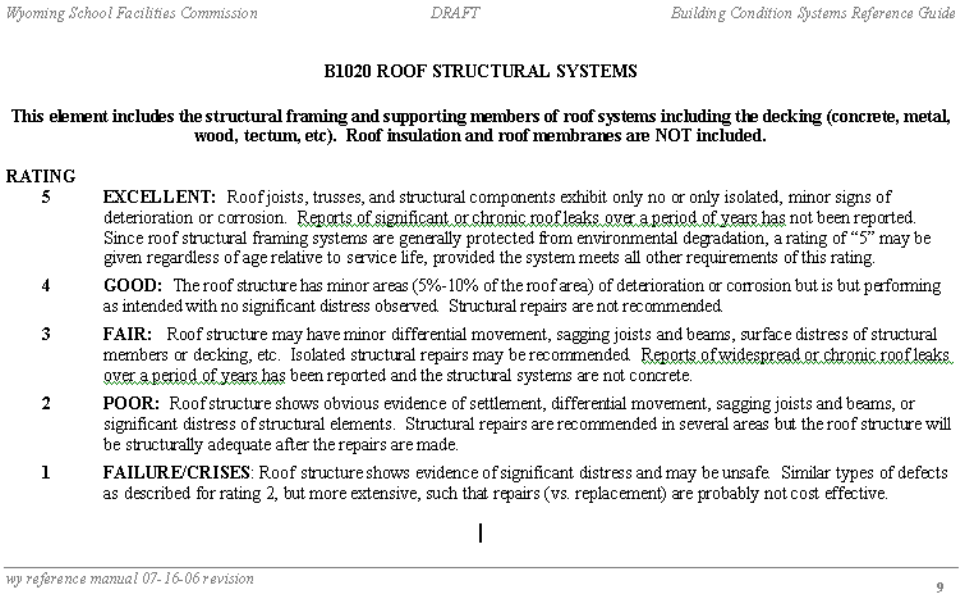
- B – Shell
- C – Interiors
- D – Services
- E – Equipment/Furnishings
- F – Special Construction
- G – Building Sitework
- H – ADA Compliance
- Modular Buildings

They are then broken down into specific building elements, as shown below.

- D30 HVAC
  - D3010 Energy Supply
  - D3020 Heating
  - D3030 Cooling
  - D3050 Self-Contained / Package Units
  - D3060 Controls

This categorization allows consistent extrapolation of system condition for each building system as a percentage of the current replacement value (CRV) of the facility. Each system evaluated and rated was included in the Field Guide (FEA, 2006). Examples of Building System Condition Ratings are shown in Figures E-4, E-5, and E-6.

Figure E-4: Roofing System Rating Guide



Wyoming School Facilities Commission *DRAFT* *Building Condition Systems Reference Guide*

B1020 ROOF STRUCTURAL SYSTEMS

This element includes the structural framing and supporting members of roof systems including the decking (concrete, metal, wood, tectum, etc). Roof insulation and roof membranes are NOT included.

RATING

5 **EXCELLENT:** Roof joists, trusses, and structural components exhibit only no or only isolated, minor signs of deterioration or corrosion. Reports of significant or chronic roof leaks over a period of years has not been reported. Since roof structural framing systems are generally protected from environmental degradation, a rating of "5" may be given regardless of age relative to service life, provided the system meets all other requirements of this rating.

4 **GOOD:** The roof structure has minor areas (5%-10% of the roof area) of deterioration or corrosion but is but performing as intended with no significant distress observed. Structural repairs are not recommended.

3 **FAIR:** Roof structure may have minor differential movement, sagging joists and beams, surface distress of structural members or decking, etc. Isolated structural repairs may be recommended. Reports of widespread or chronic roof leaks over a period of years has been reported and the structural systems are not concrete.

2 **POOR:** Roof structure shows obvious evidence of settlement, differential movement, sagging joists and beams, or significant distress of structural elements. Structural repairs are recommended in several areas but the roof structure will be structurally adequate after the repairs are made.

1 **FAILURE/CRISES**: Roof structure shows evidence of significant distress and may be unsafe. Similar types of defects as described for rating 2, but more extensive, such that repairs (vs. replacement) are probably not cost effective.

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Figure E-5: Heating System Rating Guide

D3020 HEATING
Includes Boilers/ Water Heaters used for Heating Systems. Domestic boilers/water heaters are NOT included.

RATING

5 **EXCELLENT:** Less than 5% defects, none of which represent major deficiencies affecting proper operation of the equipment. No reported or observed rusting or corrosion; relief valves reportedly function properly. Water treatment provided for boilers (space heating only) over life of equipment. Equipment is in first 1/3 of service life. Only routine maintenance is required.

4 **GOOD:** Less than 10% defects, none of which represent major deficiencies affecting proper operation of the equipment. No corrosion or leaks observed or reported. Equipment in first or second 1/3 useful service life.

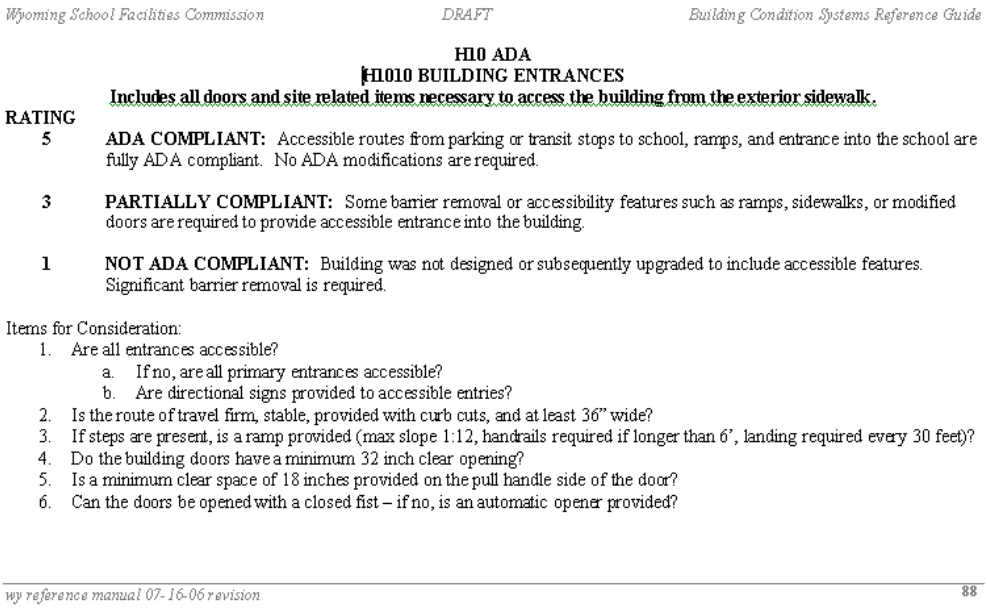
3 **FAIR:** Minor corrosion or vibration and some repairs needed. Equipment typically in second or last 1/3 average useful service life. Rusting or corrosion on boiler surface and fittings observed, possibly with minor leaks. Minimal or no preventative maintenance reportedly performed on unit including an automatic water treatment program. Equipment such as unit relief valve(s) not tested regularly as required by code. Boiler tubes reportedly never inspected or boiler seldom tuned up.

2 **POOR:** Significant corrosion or vibration with evidence of water leaks. Units shut down periodically requiring repairs. Final 1/3 of service life. Tubes or refractory in poor condition.

1 **FAILURE/CRISIS:** Does not work reliably and is generally not considered repairable. Severe rusting and corrosion on boiler surface and fittings observed. No preventative maintenance reportedly performed on unit. Water treatment program not in place for a majority of service life. Major corrosion and leaks are present.

CONDITION RATING	5	4	3	2	1
TYPE OF SYSTEM	AVERAGE EFFECTIVE REMAINING LIFE, YEARS				
BOILERS	40		14		0
WATER HEATERS	15		5		0

Figure E-6: Building Entrances ADA Rating Guide



Wyoming School Facilities Commission *DRAFT* *Building Condition Systems Reference Guide*

H10 ADA
H1010 BUILDING ENTRANCES
Includes all doors and site related items necessary to access the building from the exterior sidewalk.

RATING

5 **ADA COMPLIANT:** Accessible routes from parking or transit stops to school, ramps, and entrance into the school are fully ADA compliant. No ADA modifications are required.

3 **PARTIALLY COMPLIANT:** Some barrier removal or accessibility features such as ramps, sidewalks, or modified doors are required to provide accessible entrance into the building.

1 **NOT ADA COMPLIANT:** Building was not designed or subsequently upgraded to include accessible features. Significant barrier removal is required.

Items for Consideration:

1. Are all entrances accessible?
   a. If no, are all primary entrances accessible?
   b. Are directional signs provided to accessible entries?
2. Is the route of travel firm, stable, provided with curb cuts, and at least 36" wide?
3. If steps are present, is a ramp provided (max slope 1:12, handrails required if longer than 6', landing required every 30 feet)?
4. Do the building doors have a minimum 32 inch clear opening?
5. Is a minimum clear space of 18 inches provided on the pull handle side of the door?
6. Can the doors be opened with a closed fist – if no, is an automatic opener provided?

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BMAR APPROACH APPLIED TO SCHOOL FACILITIES

Upon completion of the project development meetings and development of the project performance plan, the WSFC/FEA team held training sessions and performed calibration testing to verify suitability for application to the Wyoming school facilities. This section includes a discussion of the following key components:

- BMAR Assessment Methodology Assessor Training
- Facility Assessment Pilot Study and Calibration
- Facility Assessments, Interviews, and Data Review
- Field Quality Control and Assurance Program
- Documentation and Completing the Program

Assessor Training

FEA provided technical training and approach calibration for assessor teams. The training was led by Jim Whittaker, P.E., Les ZumBrunnen, P.E., and Paul Swanson, P.E. of FEA. Project Managers from the various school districts included on the project were present for the training. Documentation of the training program is provided in the WSFC project Condition Assessment Training Manual, dated July10-14, 2006 (FEA, 2006).

The training generally included the following topics:

- ***Introduction*** – Review and understanding of the facility condition assessment project goals and objectives, project scope, and desired outcomes.
- ***Asset Management Theory*** – Presentation of historical asset management practices, establishment of common terminology, regulatory issues, and other best practices.
- ***Assessment Methodologies*** – Review of important aspects of conducting effective and accurate condition assessments, life-cycle analyses, and extrapolating techniques for parametric evaluations.
- ***Application of the BMAR Approach*** – Training on the application of project standards, building systems, condition ratings, data collection and interview techniques, and data entry.
- ***Building System Condition Ratings*** – Focus on use of the Building Systems Condition Rating Field Guide and accurately and consistently rating the conditions of the building systems.

A majority of the training effort was directed at the evaluation and rating of building systems expected to be encountered in the school facilities. Photographic examples, case studies, and experience in conducting facility condition assessments were used in conjunction with the generalized condition ratings to obtain consensus for rating building systems. An interactive and iterative process was also utilized to refine the generalized condition ratings and Field Guide prior to deployment.

FEA modified the training program from the scope proposed to provide better calibration of the assessors. To accomplish this, the scope was modified to increase the number of schools evaluated in a pilot study to a total of 10 schools during the two week training period.

Pilot Study and Calibration

The project pilot study was developed to objectively evaluate the accuracy and consistency of the assessors in performing the assessments following the BMAR methodology. Ten schools in the Cheyenne area of varying in size, age, and complexity, as well as grade range, were selected for the pilot study. The basis of the pilot study was to have each assessor independently evaluate each of the ten schools selected. FEA trainers also independently evaluated the schools for the calibration process.

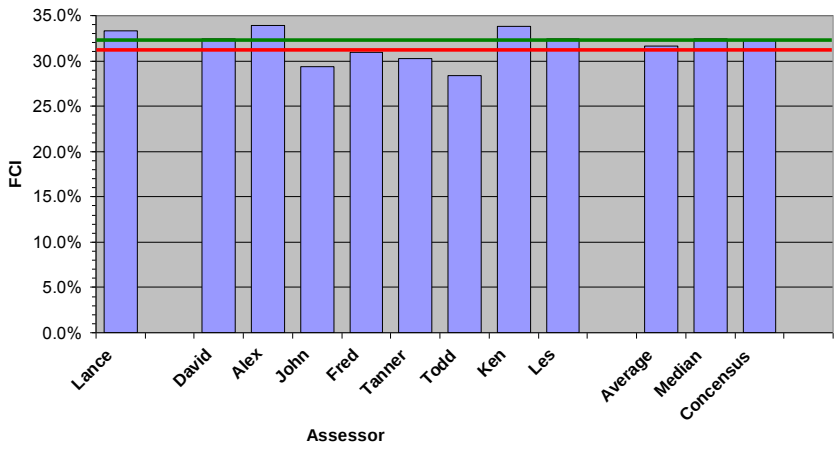
The data from each assessor was collected on a daily basis and analyzed by FEA. The next day the trainers and assessors reviewed the results from the previous day and obtained consensus on system condition ratings. Variances (identified by high standard deviations) were discussed to modify assessment approaches and increase the consistency of the ratings. Detailed spreadsheets summarizing all assessor condition ratings on a system by system basis were generated (Refer to Figure E-7). Average and median scores, as well as standard deviations, were calculated to evaluate consistency of the condition ratings and trending improvement of the overall training program.

Figure E-7: Sample Pilot Study Calibration Spreadsheet

Systems and Assemblies		JE	Lance	TN	AS	FH	TW	KB	DL	LZ	Group				Ave.	Median	S.D.
A. Substructure																	
A10	***Foundations***																
A1010	Standard Foundations	4	4	4	4	4	4	4	4	4	4				***4.00***	***4***	***0.00***
A1020	Special Foundations	0	0	0	0	0	0	0	0	0	0				***0.00***		
A1030	Slab-on-Grade	4	4	4	4	4	4	4	4	4	4				***4.00***	***4***	***0.00***
A20	***Basement***																
A2020	Basement Walls	3	4	4	4	4	4	4	4	4	4				***3.90***	***4***	***0.32***
B. Structure and Shell																	
B10	***Superstructure***																
B1010	Floor Construction	4	4	5	4	4	4	4	4	4	4				***4.10***	***4***	***0.32***
B1020	Roof Construction	4	3	3	3	3	3	3	3	3	3				***3.10***	***3***	***0.32***
B20	***Exterior Enclosure***																
B2010	Exterior Walls	2	2	2	1	2	2	2	2	2	2				***1.90***	***2***	***0.32***
B2020	Windows	1	2	2	2	2	2	2	2	2	2				***1.90***	***2***	***0.32***
B2030	Doors	3	3	3	3	2	3	3	3	2	3				***2.80***	***3***	***0.42***
B30	***Roofing***																
B3010	Roof Coverings	3	3	3	3	3	3	3	3	3	3				***3.00***	***3***	***0.00***

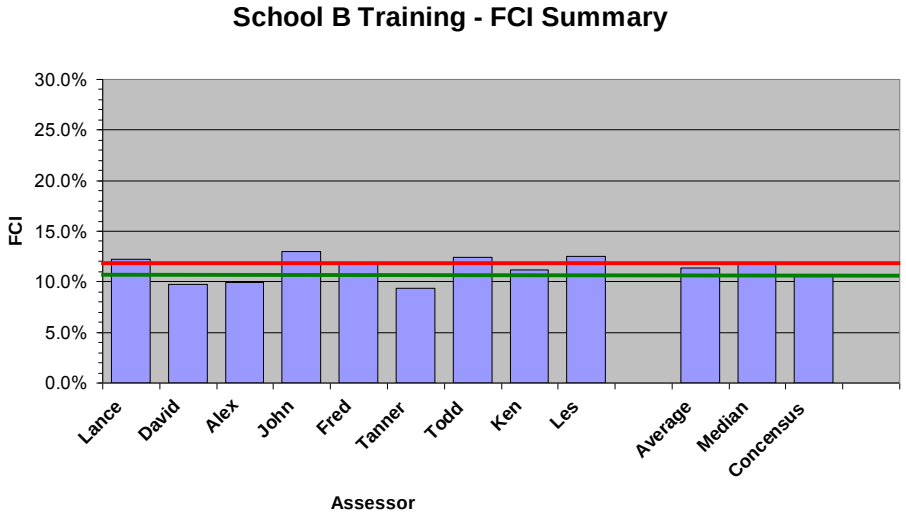
The deferred maintenance costs and overall facility condition index for each school were calculated in addition to the system condition ratings. The results were tabulated and graphed to evaluate the suitability of the approach. The results also provided validation that consensus-level impressions of school condition matched the objective FCI ratings. As an example, the results of FCI values generated by assessors for a school deemed to be in fair to poor condition (School A) are shown in Figure E-8.

Figure E-8: Summary of FCI Values for School in Poor Condition



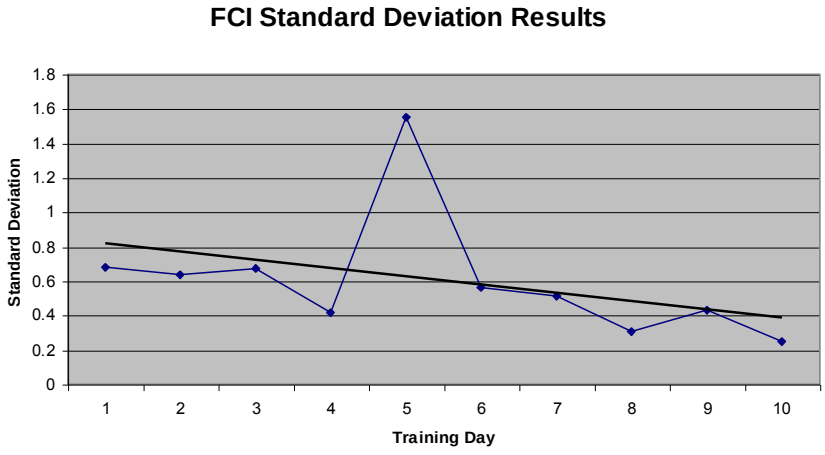
The results of FCI values generated by assessors for a school generally deemed to be in good condition (School B) are shown in Figure E-9. Average and median values are represented by the green and red lines, respectively. The graphs present data verifying both the accuracy of the approach and the consistency of its application. Consensus values were also plotted to identify trends in assessments that could be corrected to further enhance consistency.

Figure E-9: Summary of FCI Values for School in Good Condition



At the completion of the two week training and calibration program, the results were summarized and reviewed to evaluate the success of the program. Using the system condition rating data, the overall average standard deviations for each system rating were calculated for each school. The results of the first of the ten schools evaluated to the last trended from about 0.7 to a value of about 0.2 (Refer to Figure E-10). Again indicating increased consistency of the data over the two-week training and calibration pilot study.

Figure E-10: Trend in Standard Deviation Over Time



Facility Assessments, Interviews, and Data Review

Interview forms have been developed to support the data collection and validate field observations. A copy of the interview forms are attached at the end of this section.

Interviews of school facility representatives were conducted to gain a better understanding of the maintenance history and current issues at each school. A copy of the interview forms used is attached at the end of this section.

Field Quality Control and Assurance Program

FEA performed quality assurance (QA) reviews of the WSFC assessor's evaluation methods for selected schools in each of the regions. During the project the assessors have 619 buildings to evaluate. Based on 6 to 7 assessors evaluating generally an equivalent number, each assessor will evaluate 90 to 100 buildings from August through October. The QA reviews were conducted at roughly 25% completion and again at about 50% completion points of the overall evaluations. A brief final review of the methods will be conducted near the completion of the evaluations.

Appendix F – CMMS Implementation and Data Standards

Many CMMS software packages offer bells and whistles that are not needed for accomplishing the primary mission of implementation. In fact, they often complicate the systems configuration and interface, rendering it laborious to use and maintain. The *Planning Guide for Maintaining School Facilities* published in 2003 by the U.S. Department of Education offers helpful guidelines for evaluating the ever-growing number of CMMS software packages on the market.

Guidelines include the following:

- The CMMS should be web-based, be compatible with standard operating systems, have add-on modules, and be able to track assets and key systems. Source codes must be accessible so that authorized district staff members are able to customize the system to fit their needs as necessary. In terms of utility, a good CMMS program will include the following:
  - acknowledge the receipt of a work order;
  - allow the Maintenance Department to establish work priorities;
  - allow the requesting party to track work order progress through completion;
  - allow the requesting party to provide feedback on the quality and timeliness of work;
  - allow preventive maintenance work orders to be included; and
  - allow labor and parts costs to be captures on a per-building basis.
- At a minimum, work order systems should account for the following:
  - the date the request was received;
  - the date the request was approved;
  - a job tracking number;
  - job status (received, assigned, ongoing, or completed);
  - job priority (emergency, routine, or preventive);
  - job location (where, specifically, is the work to be performed);
  - entry user (the person requesting the work);
  - supervisor and craftsperson assigned to the job;
  - supply and labor costs for the job; and
  - job completion date/time.

Implementation of an automated work order system requires careful forethought and development of data standards to ensure long-term usability of the system. Many CMMS and computer-aided facility management (CAFM) systems fail because the data is not standardized and maintainable. Proper implementation and the use of data standards will lead to valuable and effective information and work management systems. Because there are currently no CMMS/CAFM systems in use at TUSD, there is an opportunity to do it right the first time.

Any automated system should be implemented as a tool to support business processes. Thus, it is imperative to document work processes prior to implementing technology. Then, a specific set of data standards can be established to provide the framework for data management. Most often, the Construction Specification Institute (CSI) Uniformat/Masterformat or Omniclass standards, or Omniclass table standards are used for creating building information models. These standards provide guidance on defining naming conventions and parameters such as buildings, building systems, equipment, components, work processes, and attributes. CSI Masterformat classification standards are the industry standard in the United States for classifying building elements during design, specification and construction of facilities. OmniClass standards utilize CSI Uniformat and Masterformat building construction elements and work products as a basis for their table structure. Use and enforcement of these standards increases the quality of the data, optimizes the system performance, and enables better reporting.

Developing a facility management information technology plan will provide the long-term focus needed to successfully select and implement a system and ensure that it supports facility business processes. The most successful CMMS implementations are those where the facility manager had a sound strategic facility management information technology plan, automated broadly, emphasized training, did not try to over-populate the system, had good internal electronic communication in place, had a dedicated automation manager, had buy-in from top to bottom of the organization, understood all costs, and maintained good administrative procedures.

The critical success factors in creating a strategic facility management information technology plan include answers to the following questions:

- Who needs to participate on the planning team?
- Who needs to commit to the objectives of the plan?
- What are the roles of vendors and consultants in preparing a plan?
- What are the predictable dos and don'ts?
- What should be included in the plan?
- Have we set up implementation expectations in the plan?

Typical facility management (FM) technology projects incur problems, such as too much reliance on vendor claims or a sense of urgency that shortcuts methodical implementation. The following lists common steps to be sure to take and to be sure to avoid so that a district gets the desired benefits from FM technology while maintaining cost control:

- Go through the discipline of identifying detailed functionality from FM technology that would benefit both the Maintenance Department's clients and staff;
- Emphasize training;
- Understand all costs;
- Ask simple questions about how things are done;
- Test applications yourself; don't just watch demos;
- Try prototypes and get feedback from users;
- Start by fixing small problems to win support;

- Structure big projects so there are payoffs along the way;
- Select your best employees for implementation;
- Settle for 80 percent solutions; and
- Agree on realistic goals.

Common pitfalls include the following:

- Over-populating the database;
- Trying to use a large project to cover costs;
- Setting vague objectives such as “improve productivity”;
- Structuring the implementation to avoid conflict;
- Selecting a technical implementation leader unskilled in negotiation;
- Assuming that interviewing users reveals exactly what they need; and
- Emphasizing incremental improvement if what you really need is fundamental change.

Metrics and processes have been developed as part of the first two phases of our scope of work and presented in this report. There are several more critical steps in the overall process. We have presented recommendations for some of these in this report as they are directly related to the process maps and SOPs that we developed. Our recommendations are to proceed with the following steps, incorporating our recommendations where appropriate.

Next steps:

1. Develop data standards
2. Complete asset/equipment inventory
3. Develop PM/PdM procedures
4. Implement and configure the CMMS
5. Prepare and implement socialization/training program
6. Pilot the CMMS and processes
7. Measure performance
8. Conduct GAP analysis
9. Optimize program
10. Go live with full deployment

The initiation and implementation of the steps may overlap, but in general should flow in this order.

Facility Management Data Standards

One of the top five reasons IT projects fail is the lack of appropriate data standards. In a computerized maintenance management system (CMMS), computer-aided facility management (CAFM) system, or an integrated workplace management system (IWMS), there are many things to consider that will require standardization so that the data is consistent and usable. These include, but are not limited to, naming conventions, asset nomenclature, and maintenance standards. There is a need for—and current lack of—consistent data standards and equipment naming conventions across the TUSD.

The TUSD needs consistent naming conventions and supporting policies and practices to realize the data quality and holistic view of building systems and equipment inventories achievable with a well-implemented CMMS. The TUSD facilities leaders understand the benefits a standardized nomenclature brings when mining facility data at the school and building levels. Effective work, cost, project, asset, and data management require appropriate and consistently applied standards. To accomplish this will require the development or selection of appropriate nomenclature standards for building systems, and consistent implementation of the standards to define assets, components, and equipment attributes.

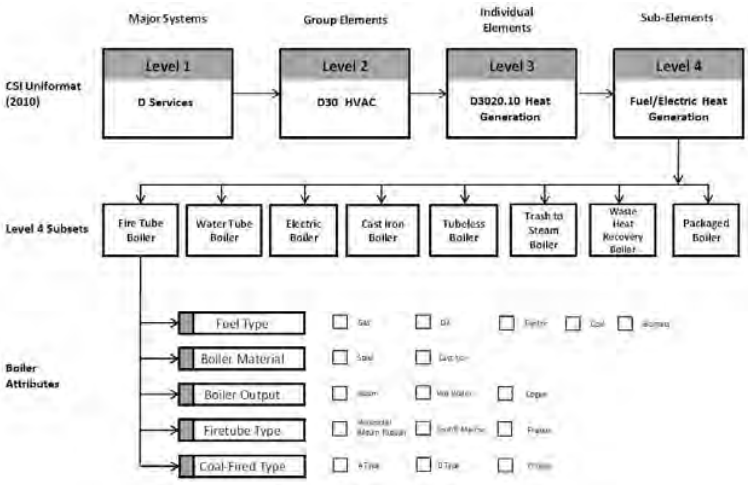
There are several building classification schema available. It is important to select a standard that best answers the call to "collect data once …for use by many". It is best to be able to leverage data so multiple stakeholders/users within the TSDU can benefit from the shared data and select a nomenclature standard that will most effectively structure IWMS data to support operations and maintenance processes. A summary of the classification systems and high-level summaries are listed below:

- **CSI Uniformat (2010)** – Similar to UNIFORMAT II, the Construction Specifications Institute (CSI) publishes versions for use in cost estimating and management of building systems data. The latest published version at the time of this report is the 2010 version. Our recommendation is to use CSI Uniformat (2010) as the foundational building classification system within the CMMS.
- **ASTM UNIFORMAT II (ASTM E1557)** – Provides three levels of elements with a proposed level four. Effective for use in CMMS and IWMS for O&M work management and asset management.
- **OmniClass Table 21** –Uses Uniformat (System Based) as a foundation, but only gets to four levels. Example; level 1 – Services, level 2 – HVAC, level 3 – Heating Systems, and level 4 – Heat Generation. Due to the Uniformat foundation the opportunity to map to an augmented Uniformat exists. The threat to this is the continuing evolution of OmniClass tables.
- **OmniClass Table 23** – Uses MasterFormat (Product Based) as a foundation for the tables. Table 23 has four levels of products and gets to a reasonable level of detail, but again not ideal in the system layout from a maintenance perspective (Boiler example; level 1 – HVAC specific products and equipment, level 2 – Commercial boilers, level 3 – boiler controls, condensing boilers, fire tube boilers, cast-iron boilers, watertube boilers, flexible tube boilers, electric boilers, and boiler components. Level 4 – defines pressure, temperature, burners, filters, draft fans, heat recovery devices, blowers, and nozzles). Due to the MasterFormat foundation the opportunity to map to an augmented Uniformat that has a one-to-one relationship to MasterFormat exists.
- **CSI MasterFormat** – Based on products and not defined by systems and elements. Very difficult to use in an O&M environment. Maintenance and repair is not done by material type (product).

Based on the evaluation of industry building classification standards, we recommend the use of the CSI Uniformat (2010) standard for the CMMS implementation at the TUSD. This system best supports the total cost of ownership models, APPA benchmarking, and specific TUSD needs. The CSI Uniformat (2010) standard creates CMMS nomenclature that utilizes industry standards, is compatible with typical PM job

plans and schedules, and can be utilized by various "other" management systems within the TUSD. A depiction of the CSI Uniformat (2010) levels and attribute examples is shown in Figure F-1.

Figure F-1: Sample of CSI Uniformat (2010) Levels for a Boiler



To determine the level of granularity needed for your data, you'll need to first establish what equipment or assets will be maintained, and what level of information is needed to determine a replacement-in-kind or preventative maintenance needs. Table F-1 below shows the level of granularity for four major industry nomenclature standards.

Table F-1: Level of Granularity of the 4 Major Industry Standard Nomenclatures

Nomenclature Standard	UniFormat (merged)*	MasterFormat	OmniClass 21	OmniClass 23
Level	**Minimum PM Level**			
8 Attributes/Energy/Gas	Energy/Gas			
7 Attributes/Type/Steel	Type/Steel			
6 Attributes/Temp/Medium	Temp/Medium			
5 Type/Hot Water	Hot Water			
4 Components /Boiler	Boiler		Components/ Boiler	Pressure,
3 System/ Heating	Heating	Energy/Gas	System/Heating	Boiler Controls
2 D30 HVAC	HVAC	Type/Steel	HVAC	Commercial Boilers
1 Services	Services	Boiler	Services	HVAC Specific Product

*This merged version takes CSI UniFormat (2010), ASTM UniFormat II, and the GSA augmented UniFormat.

CSI Uniformat (2010) was developed through an industry/government consensus process and has been widely accepted as a building classification standard. Once the building system and nomenclature standards have been developed, the equipment should be inventoried in accordance with the standards.

Asset/Equipment Inventory

In this section we discuss what is needed to build an equipment data set and how it is to be treated in maintenance scheduling; such that these guidelines can be applied to an equipment database to be uploaded into the CMMS. To determine the appropriate inventory level or groups of equipment, the following elements should be considered:

1. Maintenance requirements
2. Portable vs. fixed building systems
3. Financial cost of the asset
4. Criticality (impact to mission if it fails)
5. Preventative maintenance labor required
6. Life safety/regulatory requirements with record-keeping and inspection
7. Commonality of preventative maintenance tasks
8. Similar schedules of preventative maintenance

In order to answer if a piece of equipment should be captured in the CMMS as an individual piece of equipment, as part of a group, or aggregated to a parent piece of equipment, we have reviewed buildings maintenance industry standards. The purpose was to capture how the PM guidelines addressed frequency of maintenance, maintenance expertise required, whether or not PM tasks were common to all asset components, and were these tasks occurring on the same schedule. It is important to first define what is meant by grouping or aggregation of assets.

- **Grouping** relates to taking the same type of assets that would require the same type and frequency of PM and listing them as one record. The amount of assets within that record would be listed in a quantity field or on the comment field. A typical asset that would fit this description would be fire extinguishers.

- **Aggregation** relates to assets that are “children” or “components” of a larger piece of equipment (the “parent”). Based on typical PM frequencies of these assets and the need to access the parent equipment, it would be more effective to bundle this equipment with the parent equipment and perform PMs at the same time. A typical asset that would fit this description would be the hoist in an elevator, or the valves associated with a fire alarm system.

When considering if equipment should be captured as an individual record or grouped for entry into the CMMS, you must consider the following questions:

1. Who performs maintenance? A technician or a mechanic?
2. Is the equipment portable?
3. What is the financial cost of an asset? Is it generally an operational cost or a capital cost?

4. How critical is this piece of equipment to the operation of this building?
5. What is the frequency of maintenance?
6. Are there any life safety or regulatory requirements?
7. Are there PM tasks common to all asset components in a group?
8. Are the PM tasks on the same schedule for all components?

Not all of the questions above can be answered from the PM standards, especially items such as financial cost and criticality. Criticality is very dependent on each building's function and organizational mission. That is, the back-up emergency generator of a data center facility will have a higher criticality than one in a warehouse facility. However, whenever possible, we answered some of these questions based on our experience with buildings in general and our experience with the TUSD school buildings.

One major observation from our experience with the different asset inventories is that not all assets are included in the CMMS. For example, not all components of a plumbing system (i.e. toilets, pipes, lavatories, etc.) are listed as an asset. This means that the value of that asset is missing from the overall building value, which impacts capital planning. A possible solution is to capture the plumbing system as an asset, but since there is no recurring maintenance associated with it (as a whole), is the CMMS the best place to keep that information? Or does it ultimately belong in a Building Information Modeling (BIM) system that is integrated with the CMMS?

Another question to ask is; how does grouping or aggregating affect accounting for asset value? Grouping or aggregating could lend itself to double-counting of asset value if the system is not set-up correctly.

Our recommendations to either keep the equipment as an individual record, group the asset with other assets of the same type, or to aggregate assets with their parent asset are presented in the Building System and Aggregation & Grouping Rules table. Below we summarize some of our recommendations.

1. **Valves**: Different types of valves need to be grouped as an equipment record. For example, fire suppression system valves would be grouped together, while plumbing type valves would be a separate group/record because their PM frequencies are different.
2. **Steam Traps**: Much like valves, they would be grouped by type.
3. **Fire suppression system**: Different components of the system would be grouped into one record. Therefore, all sprinkler heads would be one record, hose connections would be grouped into another record. The same would apply to the valves and the standpipes, where the record would include the quantity of that type of equipment.
4. **Fire alarm system**: Different components of the system would be grouped into one record. Annunciators would be all grouped into one record, so would pull stations. Similarly, you would group controllers, heat detectors, and receivers as one record. In each case, you would establish a quantity within each record.
5. **Fire extinguishers**: Because of the inspections required by code, maintenance of fire extinguishers must occur at the same time. It is therefore more efficient to generate a task

order to service/inspect all the fire extinguishers in the same cycle. This particular asset is also one that is not static. More often than not, they get swapped for new ones during their annual inspections, making inventory and tagging of this particular asset difficult to maintain.

6. **Children**: Typically these are recommended to be aggregated with their parent equipment, which is reinforced by many of the PM guidelines that recommend PM of the children when maintenance of the parent equipment is scheduled. Assets that are typically recommended for aggregation include: motors, filters, valves, disconnects, burners, traps, and controls.
7. **Records**: Anything that is individual/grouped is a record within the CMMS. Assets that are aggregated are part of a parent record.

Ultimately the question of aggregation comes down to how much data your system can handle, how much you can maintain. Based on our current understanding of the data in TUSD's inventory, the challenges to maintain the inventory and to keep it consistent across the district's schools, it is recommended that you ***start at a high level***. The key is to select a system that will allow you to collect assets at the parent level. You would then attach the PM for the children to the parent. This way work orders are generated for the asset, along with any associated children that are scheduled for maintenance at the same time.

In some cases, the PM to the main asset already includes "checkpoints" for some of its children. For example, the PM for the Fire Alarm System, which references NFPA 72, includes checking the fire alarm system printer as part of the overall PM. There are CMMS that also allow you to expand your data collection capabilities by adding the child as a "sub-record" to the parent. This capability may allow you to keep track of separate components, their replacement schedules, and specific PMs.

In our experience, the most useful information that maintenance technicians and facility managers often need are simplified diagrams showing locations of critical components. This can most effectively be achieved through consolidated line diagrams, such as valve charts, critical shut-off diagrams, and as-built drawings linked to a grouped equipment record. A single aggregated valve record for a building, with a valve chart linked to it, can save substantial time in locating necessary information. Similarly, single-line sprinkler system diagrams identifying sprinkler head locations are much more valuable than hundreds of independent sprinkler head records in the CMMS.

<u>Industry Maintenance Standards</u>

Multiple maintenance standards in various forms and levels of detail exist within the industry. Some of the most common standards include:

- GSA Public Building Service Preventive Maintenance Guides
- RS Means – Facilities Maintenance and Cost Repair Data
- ANSI/ASHRAE Standard 180-2012: Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems

The GSA guide has been used since 1970s and was revised in 2012. Although developed initially for the U.S. General Services Administration (GSA), FEA has found that other organizations have adopted this standard.

RS Means Facilities Maintenance and Cost Repair Data book contains lists of preventive maintenance tasks for a many types of building components and systems, including HVAC, electrical and plumbing. This information includes frequencies as well as cost data. It should be noted that although this book can be used to create maintenance checklists, the primary purpose of the book is to determine the cost of maintenance.

ASHRAE Standard 180 is the newest of the standards listed here, but is the most concise. It provides preventive maintenance practices for common HVAC equipment structured as tables that list the task and frequency which the task should be performed. First published in 2008, the standard was updated in 2012 based on requests made which would allow the Standard to be adopted into the building code.

In addition to following an industry standard, it is also recommended that parent child relationships be used for larger maintenance tasks, especially for equipment that requires work to be completed by more than one trade.

Communication with Customers

As the new work order system is rolled out to customers, it is recommended that any changes that may be experienced by the customer be clearly communicated. During this time, it is also recommended to communicate any new practices or information that may help to provide consistent service to all customers and to help manage customer expectations. Common information to communicate with customers includes:

- When to submit a service request and proper protocols for what work can be submitted as a service request
- What information to provide when entering a service request
- What is defined as an emergency, using examples when relevant
- Response times

Customer Satisfaction Surveys

The current best practice for customer satisfaction surveys is to conduct periodic surveys, instead of a survey attached to an email stating the work order is complete. To develop a periodic customer satisfaction survey, a few things to keep in mind include:

- The survey should be between six to ten questions. When surveys are too long, the response rate generally decreases.
- Many on-line survey tools, such as SurveyMonkey and Zoomerang, will allow short surveys to be created and distributed free of charge. As the terms and conditions of free services can change, be sure to review the details carefully.

- It is also important to determine how the results of the surveys will be used, such as to improve customer satisfaction, verify if service level agreement (SLAs) targets are being met, provide data to help evaluate staffing levels and quality of service and to support staff evaluations.
- When writing the survey questions, try to capture topics that reflect how the survey results will be used. For example, if verifying if SLA targets have been met is important, a possible question may include a short list of the SLAs and targets to help the respondent provide an accurate response.
- Using feedback from customers within staff evaluations can help to validate supervisor's expectations and feedback. If customers are requesting changes to the facility, having the requests quantified and documented within a survey can help to increase buy in from financial decision makers, as consistent complaints can often motivate change.

Appendix G – PM/RCM Program

Reliability-Centered Maintenance (RCM)

With few exceptions, preventive maintenance has been considered the most effective way of maintaining building systems and extending the service life of equipment. Most PM programs are based on the assumption that there is a cause and effect relationship between scheduled maintenance and system reliability. The primary assumption is that mechanical parts wear out, thus the reliability of the equipment must be in direct proportion to its operating age. Research has indicated that operating age sometimes may have little or no effect on failure rates. There are many different equipment failure modes, only a small number of which are actually age or use-related. Reliability-Centered Maintenance (RCM) was developed to include the optimal mix of reactive-, time- or interval-based, and condition-based maintenance.

RCM is a maintenance process that identifies actions that will reduce the probability of unanticipated equipment failure that are the most cost-effective. The principle is that the most critical facilities assets receive maintenance first, based on their criticality to the mission of the facility or organization dependent on that asset. Maintainable facilities assets that are not critical to the mission are placed in a deferred or "run to failure" maintenance category, and repaired or replaced only when time permits or after problems are discovered or actual failure occurs.

A streamlined RCM maintenance process allows organizations to use their scarce personnel and funding resources to support the most critical assets that have the highest probability of failure to the organization's mission. Streamlined RCM programs have several clear benefits:

1. Managers, not equipment, plan shop technicians' activities and time.
2. Planning of work allows labor, parts, materials and tools to be available when needed.
3. Equipment part replacements are minimized. The probability that bearings need only lubrication and not replacement is maximized. PM also minimizes the potential need to not only replace bearings, but the shaft, rotating parts, bearing housings, casings, and possibly motors.
4. Managers/schedulers have time to evaluate what other work could be done at the same time and location as the planned PM, optimizing shop productivity.
5. Engineers can study equipment maintenance histories to implement changes that could improve equipment performance or energy efficiency.

The following sections further define the various aspects of a streamlined RCM program that could enhance the TUSD facilities organization's current PM processes. An effective streamlined RCM program incorporates the optimal mix of PM, PT&I, scheduled inspections, and reactive (corrective) maintenance to maximize the reliability and performance of building systems. Proper documentation of work histories will aid in performing root-cause analyses and the ability to engineer problems out of the systems.

In its purest form, RCM is about optimizing maintenance. The primary focus of RCM is on maximizing the reliability of building systems with cost-effective and efficient processes in performing maintenance. There are both short-term considerations and long-term cost saving implications. In our experience, the added costs of talented maintenance staff and tools to implement the RCM program are more than offset by the short-term efficiencies and long-term life extension of building systems. A summary of some of the benefits of RCM are:

- Increased Equipment Uptime / Reliability
- Greater Safety and Environmental Integrity
- Improved Operating Performance
- Improved Energy Performance
- Cost-effective Maintenance
- Extended Useful Life of Assets
- Comprehensive Maintenance Database
- Improved Motivation
- Better Teamwork and Scheduling

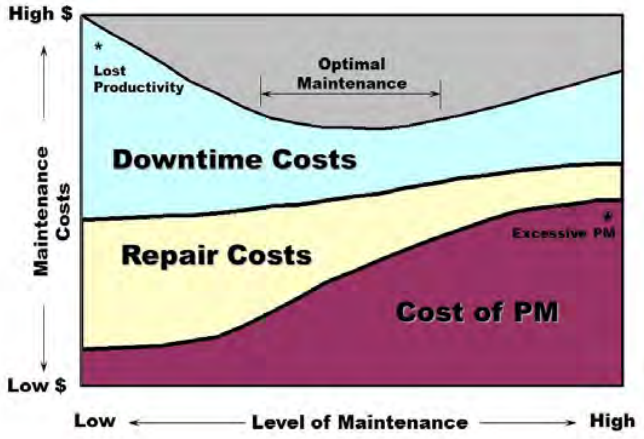
As a simple example, consider the situation of an air-handling unit failing. The cost of the actual maintenance and repair is fairly low compared to the costs associated with disruption of productivity in the areas being served by the unit. Due to the limitations on facilities staffing levels, this condition is all too common in public school environments. Data and benchmarks show that facilities organizations continue to be too reactive in nature.

The key for any facilities organization is to find the optimal level of maintenance to provide the desired level of service with the available resources at hand. This includes maximizing the return-on-investment for contracted maintenance services. While many organizations strive to be more proactive, it is often done by diving in full force without regard to the cost of implementing comprehensive PM programs. There are even some valuable industry publications that have published tables indicating metric targets of 100 percent PM to achieve a level of service of showpiece facilities[29].

[29] APPA (2002). *Maintenance Staffing Guidelines for Educational Facilities*. APPA. Alexandria, VA.

Consider the following figure.

Figure G-1. Graphical Representation of RCM



Many school facilities organizations still struggle with a majority of their work being reactive. It is not uncommon to find O&M organizations showing work order data that indicates PM to corrective maintenance (CM) ratios in the 10 to 20 percent range. This condition is representative of the left-hand side of Figure F-1, where the cost of PM labor is low and the costs of reactive labor and repair costs are relatively high. In addition, the downtime costs associated with lost productivity and loss of maintenance productivity are at the highest levels. The result is that the overall maintenance and repair costs (including loss of equipment life and value) are highest.

At the other end of the spectrum, to the right-hand side of Figure G-1, there are substantial PM costs. It requires skilled, trained, and enough competent staff to maintain equipment at a comprehensive level. In fact, there is a point of diminishing returns. We have had experience with some facilities organizations that have taken it too far in their effort to establish best practice maintenance programs. Excessive PM costs money and can introduce inefficiencies and even equipment failures. While good PM programs do minimize repair costs, there are still associated downtime costs to pull equipment and systems offline to accomplish traditional PM procedures.

The goal is to dial into the 'sweet-spot' where reliability of the plant equipment and building systems is maximized at the lowest overall cost of maintenance. To accomplish this requires the introduction of experience-based maintenance practices and predictive testing and inspection techniques. R.S. Means, GSA, and others have developed and published preventive maintenance practices (maintenance plans) to optimize PM. To further dial into the optimized zone requires the introduction of PT&I processes to maximize the return on labor investments.

The optimal maintenance zone shown in the chart also considers run-to-failure approaches for non-critical and less expensive assets that may cost more to maintain than replace should they fail. Consider the example of small fractional horsepower in-line circulation pumps that are in non-critical systems.

The long-term costs of performing standard scheduled maintenance will most likely exceed the cost to replace the pump should it fail. This practice is typically referred to as “run-to-failure”.

This optimization helps to minimize maintenance cost while also minimizing the potential and/or reality of equipment downtime which carries a significantly higher cost potential. Best-in-class maintenance processes can be determined by an “optimal maintenance” analysis as part of a reliability-centered maintenance (RCM) program. While it may be difficult to determine the precise RCM optimization, or location on the RCM graph shown in Figure G-1, measuring system reliability, equipment performance, and maintenance staff productivity can help show enhanced performance.

The implementation of RCM has been successfully completed at several large educational and municipal facilities. It is a complex endeavor that requires a lot of elements to come together to work effectively. The overall process of implementing streamlined RCM can be summarized as follows:

1. ID Systems and Equipment to Maintain
2. Determine Criticality and Performance
3. Evaluate Probability of Failure
4. Determine Failure Modes and Effects
5. Select Best Maintenance Plans
6. Implement Maintenance
7. Optimize Program

Step 1 – Identify Systems and Equipment

The first step of the process is to develop a comprehensive listing of building systems. The building systems should been classified in accordance with a standard building classification system (e.g., the ASTM Standard E-1557 UNIFORMAT II, CSI Uniformat, or OmniClass). Specific maintainable equipment lists can be compiled using a combination of industry standard resources and O&M experience. Some of the resources used to identify maintainable equipment included: ANSI/ASHRAE Standard 180 Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems (ASHRAE, 2008), NASA Standardized Facilities Preventive Maintenance Work Task Guide (NASA. 2001), R.S. Means Facility Maintenance and Repair Cost Manual (R.S. Means, 2012), and the GSA Public Buildings Maintenance Standards (PM Guidelines, 2013).

The equipment inventory should be established to provide a basis for maintenance, as well as capital renewal and asset management. An accurate inventory is required to create the scope of work for either internal maintenance service provision or O&M contracting. An accurate equipment inventory creates better alignment of estimates and O&M contractor bids, reduces turnaround times for O&M contractor bids, and produces more accurate and complete O&M contractor bids.

Step 2 – Determine Criticality and Performance Standards

The second step of the process includes a criticality assessment of the TUSD school building systems to provide a means for quantifying the importance of systems and equipment to the mission of the

schools. This also includes a review of the performance standards and function of the building systems.

The criticality assessment should be conducted in phases due to the relevance of building-specific parameters that impact the analysis. An initial identification of criticality/severity categories has been completed for various types of equipment at this stage. However, not all equipment of a category (or type) has the same level of importance in a specific building. The criticality of each system and piece of equipment are dependent on the importance of the areas served and the relevance to the TUSD mission.

Take for example two air-handling units in a school building. An air-handling unit serving a classrooms will most likely have a higher level of impact (criticality rating) than a unit serving storage or support areas with respect to a failure occurring. Thus, the criticality or severity category ranking would be different for the same equipment types.

In addition to the areas served, criticality of the equipment is also impacted by the design of the systems and the inherent redundancy of equipment within the system. Systems with redundant equipment and excess capacity may be less critical than systems with no or limited redundancy. Final determination of the criticality codes for each piece of maintainable equipment in the inventory must be reviewed and revised as appropriate based on the specific building conditions.

Criticality assessments provide the means for quantifying how important a system function is relative to the identified facility mission. Table G-1 provides a method for ranking system criticality[30]. This system, adapted from the automotive industry, provides ten categories of Criticality/Severity. While it is not the only method available, it has been widely adopted due to its intuitiveness. The categories can be expanded or contracted to produce a site-specific listing.

These general criticality categories were employed in the development of the RCM program at NASA, Smithsonian, and other educational facilities. The criticality codes should be associated with every asset within the CMMS. These should also be developed by personnel familiar with the TUSD school buildings and mission. These criticality factors need continual review based on the function of the building systems at each school.

[30] Reliability, Maintainability, and Supportability Guidebook. Society of Automotive Engineers (1995)

Table G-1. Recommended Criticality/Severity Codes

Score	Effect	Criticality Comment
1	None	No reason to expect failure to have any effect on safety, health, environment, or mission.
2	Very Low	Minor disruption to facility function. Repair to failure can be accomplished during trouble call.
3	Low	Minor disruption to facility function. Repair to failure may be longer than trouble call but does not delay mission.
4	Low to Moderate	Moderate disruption to facility function. Some portion of mission may need to be reworked or process delayed.
5	Moderate	Moderate disruption to facility function. 100% of mission may need to be reworked or process delayed.
6	Moderate to High	Moderate disruption to facility function. Some portion of mission is lost. Moderate delay in restoring function.
7	High	High disruption to facility function. Some portion of mission is lost. Significant delay in restoring function.
8	Very High	High disruption to facility function. All of mission is lost. Significant delay in restoring function.
9	Hazard	Potential safety, health, or environmental issue. Failure will occur with warning.
10	Hazard	Potential safety, health, or environmental issue. Failure will occur without warning.

Step 3 – Evaluate Probability of Failure

The probability of failure (or probability of occurrence of failure) is based on initial work in the automotive industry and adapted to facilities. Historical building system and equipment data has been compiled and reviewed by NASA, DoD, DOE and the Society for Maintenance and Reliability Professionals (SMRP). This data provided a baseline for determination of probability of failure codes and rankings used in previous facilities and are recommended for TUSD.

This probability of failure analysis also requires an iterative approach. As more experience for the specific building systems, equipment, environmental, and local factors is documented, the probabilities may be adjusted.

'Failure' is defined as the inability of equipment to do what its users want it to do. This definition treats failure as it applies to a building system as a whole. In practice, this definition is vague because it does not distinguish clearly between the failed state and the events that caused the failed state (failure modes). It is also does not take into account the fact that each piece of equipment may have more than one function, and each function often has more than one desired standard of performance[31].

As an example, the function of the chilled water pump may be to pump water at a specific temperature from a chiller to a number of air-handling units at not less than 500-gpm. If the chilled water pump delivers water from the chiller to the air-handling units at less than 500-gpm then the pump has failed.

Step 4 – Determine Failure Modes and Effects

The previous two steps to determine the equipment criticality and probability of failure are used to conduct the failure modes and effects analysis (FMEA). We recommend that the criticality codes be used in conjunction with the predetermined probability of failure codes for each type of equipment to calculate a maintenance action code (MAC). The MAC can simply be a product of the two parameters. These MACs can then be entered into a CMMS as a performance criterion and identified on work orders

[31] Moubray (1997).

generated for proactive maintenance to aid in the prioritization and scheduling of work activities.

The desired outcome of the FMEA process is to enable prioritization of maintenance activities to enhance performance and maximize reliability. This can effectively be accomplished via the introduction of maintenance action codes associated with planned work activities. To do this, the criticality codes are used in conjunction with predetermined probability of failure codes developed for each type of equipment to calculate a maintenance action code (MAC). These MACs will be identified on work tasks generated for proactive maintenance.

MAC = (Probability of Failure) x (Criticality)

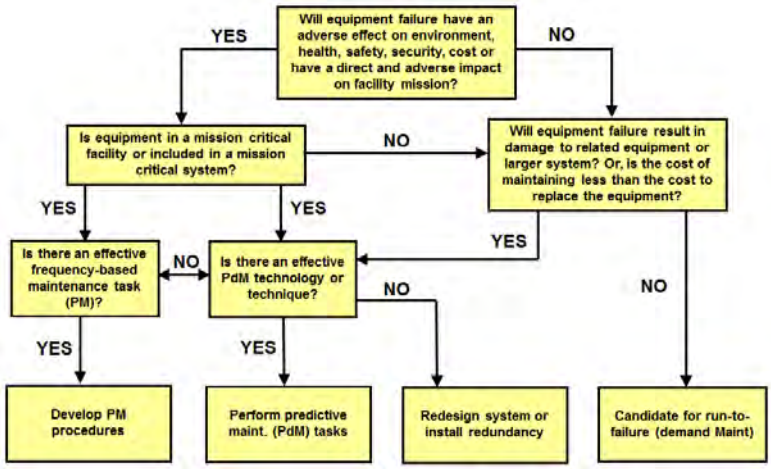
MAC data also requires constant attention and review to ensure that the right systems are being maintained based on criticality of the systems to support the mission.

Step 5 – Develop Best Maintenance Plans

Once the equipment inventory has been completed and FMEA has been conducted, the selection of the best maintenance job plans can be made. The recommended approach is to follow previous RCM implementations that use a RCM logic tree, or matrix, to develop the details of the program. An RCM logic tree carefully considers and answers the following questions:

- What does the system or equipment do; what is its function?
- What functional failures are likely to occur?
- What are the likely consequences of these functional failures?
- What can be done to reduce the probability of the failure, identify the onset of failure, or reduce the consequences of failure?

Figure G-2. RCM Logic Tree (NASA, 2000)



Answers to these four questions help guide RCM program designers through the logic tree to determine the optimal maintenance approach for the equipment or system. Note that there are only four possible outcomes as depicted in the logic tree:

- Develop PM procedures
- Perform predictive maintenance (PdM tasks)
- Redesign system or install redundancy
- Candidate for run-to-failure (demand maintenance)

The R.S. Means PM Standards include significant revisions and updates to PM standards. The Standards also include the incorporation of some PdM procedures; primarily infrared thermography for electrical equipment.

Step 6 – Implement Maintenance Program

There are several parameters that require discussion, review and agreement upon before you can fully integrate RCM requirements into a CMMS and enable the implementation of the RCM program at the TUSD. A key element to successful RCM/CMMS integration and implementation is in properly engaging TUSD facilities staff. The objectives are to enhance the building system performance and extend the life of the equipment at an optimal cost.

There may be a limited number of O&M contractors who would be able to successfully implement the Predictive Testing & Inspection (PT&I) requirements (e.g., oil analysis, ultrasonic testing, IR thermography, etc.) recommended for TUSD facilities. In similar cases, PT&I has been effectively incorporated via Regional or National contracting vehicles by contractors who specialize in these processes. Careful oversight and coordination is required in these cases to ensure cost savings and avoid duplication in efforts due to coordinating contractors.

In previous RCM projects we have calculated a potential savings of 15 to 20 percent in labor costs by optimizing maintenance through RCM processes. Using more predictive testing and inspection (PT&I) methods can clearly save on labor requirements.

There are several additional overall considerations to optimize maintenance whether or not the RCM services are contracted or performed using in-house personnel. Recommended RCM considerations during operations include:

- **Keep eyes and ears open** to the overall environment. Some of the best PT&I methods are by looking, listening, and smelling. Maintain a proactive preventive maintenance mindset.
- **Be proactive.** Don't just walk by something that is broken and not report it or fix it. Don't assume someone else will see it and fix it. The best maintenance service is provided by identifying things and fixing them before visitors or managers notice them. And they will!
- **Conduct hazard analyses prior to maintenance activities.** Understand confined entry issues, hazmat requirements, and electrical shock or arc-flash hazards. Consider not only safety to

yourself but others that may be around the work area.

- **Follow lock-out/tag-out procedures.** Safety is always the first concern.
- **Safety first.** Follow safety procedures. Just because you have done it right a thousand times means you will do it right every time. Accidents happen – be mindful.

These concepts should be communicated and good practices incentivized whenever possible. The next steps in the process are to take responsibility, working with others, and holding each other accountable. Best RCM practices that should be communicated to maintenance technicians include:

- **Follow RCM procedures** – Remember, it is not only the use of specific PT&I tools like accelerometers, ultrasonic probes, IRT cameras, laser alignment devices, etc. It is also about using your senses to determine if there are impending problems. Don't just walk by deficient or under-performing equipment thinking that someone else will fix it. Similarly, don't just do the same PM procedure on equipment that you don't think needs it. Talk to your supervisor and make recommendations for revising and improving the RCM program.
- **Maintain data in the CMMS** – Data requirements for the RCM program include both information in a CMMS and PT&I results. Both of these data sets help supervisors and managers make the right decisions about maintaining, repairing or replacing equipment. The data on assets, PM and MACs also need to be maintained to make sure maintenance technicians are *doing the right maintenance on the right equipment at the right time*.
- **Seek opportunities to advance technical skills** – While PM is absolutely critical, the introduction of more PT&I tasks will reduce some of the tedious preventive maintenance tasks. There are many (and will be more) opportunities to learn how to use cutting-edge technologies in support of the PT&I work tasks. Seek out opportunities to learn and use these technologies and advance technical skills.

Implementing effective and consistent RCM practices will help lead to the desired results.

Step 7 – Measure Performance and Optimize the Program

Remember the outcome of an optimized RCM program, and holding each other accountable to implement the RCM philosophy will result in:

- **Increased reliability of equipment and systems** – Few facilities organizations can claim maintenance programs as robust and effective as fully-implemented and streamlined RCM programs. Maximizing the reliability of building systems that support the overall institution's mission is key.
- **Data for informed decisions** – In addition, the implementation of RCM processes includes the recording and maintaining of important data. This data generates valuable information and knowledge to make informed decisions about TUSD school facilities.

- **"World-Class" services and high-performance facilities** – The ultimate goal that will be achieved through the implementation of RCM for the TUSD is the operation and maintenance of high-performance facilities. It starts with facilities personnel implementing the RCM program. Everyone plays a vital role in implementing this maintenance philosophy. High-performance facilities require a high-performance facilities organization and successful integration of RCM with the CMMS.

Root Cause Failure Analysis (RCFA)

To reduce failures we must understand as much as we can about why systems have failed historically (RCFA) and how systems may fail and the effects those failures may have on the mission or operation, for failure mode and effects analysis (FMEA's). The intent of conducting RCFAs is NOT to find fault and blame someone. There is often a reluctance to perform RCFAs because of this perception. We must take the people factor out. RCFA conclusions at SI are general in nature. They do not lay blame. RCFAs are conducted to learn from failures and help avoiding similar problems. We know failures are going to occur – it is important to conduct RCFAs to learn how to do things better!

RCFA, initially is a reactive method of problem detection and solving. This means that the analysis is done after an event has occurred. By gaining expertise in RCFA it becomes a pro-active method. This means that RCFA is able to forecast the possibility of an event even before it could occur.

The recommended process for conducting RCFAs is as follows:

1. Identify the function of equipment
2. Note environmental conditions
3. Interview mechanics familiar with maintenance
4. Research maintenance history through CMMS
5. Gather evidence / data
6. Identify effective solutions that prevent recurrence
7. Implement the recommendations

Linking equipment to specific work orders for tracking history of maintenance would allow further analysis of performance, repairs and costs, and planning for replacements. When maintenance staffing levels are limited it is often difficult to move beyond a reactive mode of responding to equipment problems and failures. On most TUSD schools, with aging buildings, increasing backlogs of deferred maintenance and an expanding footprint, this challenge is even more pressing. However, it may also present another good opportunity to take advantage of a pool of talented staff/contractors and a proven approach of systematic RCFA.

The premise of RCFA is to reduce failures by understanding as much as we can about why systems have failed historically. RCFA also considers how systems may fail and the effects those failures may have on the mission or operation. The intent of conducting RCFAs is not to find fault and blame someone. There is often a reluctance to perform RCFAs because of this perception. RCFAs are conducted to learn from failures and help avoiding similar problems.

We recommend that a formal RCFA process be developed and implemented at the TUSD. Recommended steps to implement RCFA processes would include:

1. Establish ownership. Our experience has shown that the most successful approaches develop a culture where everyone in the maintenance organization is responsible to understand the process and conduct RCFAs. Shop supervisors should be responsible for overseeing and documenting RCFAs with support from the WCC.

2. Provide training. Most maintenance staff conduct some level of informal failure analysis almost on a daily basis. The problem is that the information and knowledge is generally not transferred to the larger organization and most often lost. Training can be simple. It should focus on documentation and following the process bulleted above.

3. Use the tools available. For RCFA to work effectively, everyone must capture relevant data regarding equipment maintenance in the CMMS. Supervisors, with support from a senior or systems engineer, can then gather the evidence and identify solutions. The PT&I technologies discussed earlier often provide critical data in validating the underlying issues. There is a growing database of success stories regarding the ability of ultrasonic and infrared testing and vibration screening tools to help diagnose the root cause of failures.

The investment to establish a formal root cause failure analysis program is limited to internal staff time once the PT&I tools are in place and the CMMS implementation and training are completed. Ongoing investment requires staff training and small investments of time to conduct each analysis. In our experience, the payback period is almost always less than a year where facilities fully implement a formal RCFA process. All it takes is the identification, communication and elimination of the root cause of one or two systematic failure patterns to generate a positive return on investment.

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Appendix H – Summary of School Energy Utilization Index and Energy Cost

School	FY 2012/2013 EUI (kBtu/GSF)	FY 2012/2013 Energy Cost/GSF
BANKS ES	54	$1.53
BLENMAN ES	47	$1.47
BLOOM ES	42	$1.92
BONILLAS BASIC CURRICULUM ES	55	$6.22
BOOTH/FICKETT MAGNET K-8	44	$2.04
BORMAN PRIMARY MAGNET ES	61	$1.47
BORTON PRIMARY MAGNET ES	58	$1.44
BRICHTA ES	40	$0.05
BROADWAY ALTERNATIVE BRIDGE	0	$0.08
CARRILLO INTERMEDIATE MAGNET ES	41	$1.57
CARSON MS	52	$1.32
CATALINA MAGNET HS	57	$1.66
CAVETT ES	46	$0.62
CHOLLA MAGNET HS	71	$2.26
COLLIER ES	68	$1.55
CORBETT ES	46	$1.34
CRAGIN ES	38	$2.84
DAVIDSON ES	77	$1.84
DAVIS BILINGUAL MAGNET ES	47	$1.35
DODGE MAGNET MS	57	$2.05
DOWNTOWN ALTERNATIVE HS	0	$1.56
DRACHMAN K-6 MONTESSORI MAGNET	43	$1.30
DRAKE ALTERNATIVE MS	29	$0.92
DUNHAM ES	61	$1.47
FORD ES	47	$0.00
FORT LOWELL ES	0	$1.59
FRUCHTHENDLER ES	52	$1.90
FT LOWELL/TOWNSEND K-8	56	$2.67
GRIDLEY MS	75	$2.55
GRIJALVA ES	78	$1.64
HENRY ES	43	$1.06
HOHOKAM MS	36	$1.83
HOLLADAY INTERMED MAGNET ES	55	$1.96
HOLLINGER K-8	57	$1.85
HOWELL ES	52	$3.64

School	FY 2012/2013 EUI (kBtu/GSF)	FY 2012/2013 Energy Cost/GSF
HOWENSTINE HS	123	$1.73
HUDLOW ES	48	$1.90
HUGHES ES	46	$0.00
JOHNSON PRIMARY MAGNET ES	36	$0.00
KEEN ES	0	$1.62
KELLOND ES	46	$1.40
LAWRENCE 3-8	41	$2.23
LINEWEAVER ES	57	$1.87
LYNN/URQUIDES ES	64	$1.89
LYONS ES	53	$1.32
MAGEE MS	48	$1.98
MALDONADO ES	73	$1.45
MANSFELD MS	66	$1.84
MANZO ES	46	$1.35
MARSHALL ES	36	$1.57
MARY BELLE MCCORKLE PRE K-8	63	$2.29
MARY MEREDITH K-12/ROSEMONT	106	$1.58
MAXWELL K-8	58	$2.09
MENLO PARK ES	70	$2.18
MILES ELC K-8	60	$2.67
MILLER ES	90	$1.65
MISSION VIEW ES	54	$2.23
MORROW ED CENTER	73	$2.19
MORROW ED CENTER BLDG C	78	$1.52
MYERS-GANOUNG ES	46	$1.80
OCHOA ES	46	$1.81
OYAMA ES	51	$0.00
PACE ALTERNATIVE HS	0	$1.32
PALO VERDE MAGNET HS	55	$0.81
PASS ALTERNATIVE HS	16	$1.45
PISTOR MS	56	$1.41
PUEBLO GARDENS K-8	55	$1.27
PUEBLO MAGNET HS	43	$0.22
REYNOLDS ES	4	$0.24
RINCON/UNIVERSITY HS	44	$0.00
ROBERTS ES	0	$1.40
ROBINS K-8	37	$2.09
ROBISON ES	60	$0.28
ROGERS ES	6	$1.53

School	FY 2012/2013 EUI (kBtu/GSF)	FY 2012/2013 Energy Cost/GSF
ROSE K-8	52	$2.13
ROSKRUGE BILINGUAL MAGNET K-8	72	$1.18
SABINO HS	50	$1.67
SAFFORD K-8	57	$1.74
SAHUARO HS	81	$1.50
SCHUMAKER ES	52	$2.09
SECRIST MS	57	$1.63
SOUTHWEST ALTERNATIVE MS/HS	0	$1.59
STEELE ES	49	$2.82
TOLSON ES	46	$3.22
TUCSON MAGNET HS	66	$1.71
UTTERBACK MAGNET MS	50	$2.01
VAIL MS	73	$2.25
VALENCIA MS	78	$1.49
VAN BUSKIRK ES	44	$0.15
VAN HORNE ES	3	$1.65
VESEY ES	48	$1.46
WAKEFIELD MS	47	$2.45
WHEELER ES	48	$1.71
WHITMORE ES	32	$1.91
WRIGHT ES	66	$0.18
WRIGHTSTOWN ES	3	