Royse City Independent School District

FACILITIES MANAGEMENT REVIEW

Conducted by SCRS, Inc. and Facility Engineering Associates, Inc. for the Legislative Budget Board

February 2009

LEGISLATIVE BUDGET BOARD

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February 6,2009

Mr. Randy Hancock
Superintendent
Royse City Independent School District

Dear Mr. Hancock:

The attached report reviews the management and performance of the Royse City Independent School District's (RCISD) facilities operations.

The report's recommendations will help RCISD improve its overall performance as it provides services to students, staff, and community members.

The Legislative Budget Board engaged SCRS, Inc. and Facility Engineering Associates, Inc. to conduct and produce this review, with LBB staff working in a contract oversight role.

The report is available on the LBB website at http://www.lbb.state.tx.us.

Respectfully submitted,

John O'Brien
Director
Legislative Budget Board

cc: Mr.Don Palmer
Ms. Rhonda Phillips-Black
Mr. Charlie Carroll
Mr. Mike Stone
Ms. Julie Stutts
Mr. Jerry Richardson
Mr. Bobby Summers

ROYSE CITY INDEPENDENT SCHOOL DISTRICT FACILITIES MANAGEMENT

Texas school districts are challenged with providing instructional services in the most cost-effective and productive manner possible. Effective and efficient programs and a well-designed instructional program determine how well a district meets its goal of educating children. In support of this goal, the facilities organization is tasked with developing effective facilities operations and maintenance programs to provide safe, productive, and clean environments where students can learn.

Royse City Independent School District (RCISD) is a non-metro fast-growing district that encompasses 74.48 square miles and claims a tri-county boundary—that of Rockwall, Collin, and Hunt Counties. The school district is located 30 miles east of Dallas and is mainly composed of residential areas near Interstate 30. From 2003–04 through 2007–08, RCISD has experienced 53.8 percent enrollment growth. Due to the area's aggressive growth, the school district has quickly expanded from the original high school and grade school to a district with eight schools that will quickly be looking at further expansion. With all of the growth and change come an opportunity and a need for improvement in operations and maintenance. Practices and processes that once were sufficient and even advanced for the setting may quickly become antiquated.

The facilities organization is responsible for a diverse set of facilities covering over 860,000 square feet in 14 buildings summarized in **Exhibit 1**.

The facilities organization is led by a Maintenance Director who directly supervises 13 full-time equivalents (FTEs). Currently there are two vacant positions bringing the authorized FTE number to 15. The division of labor is shown in **Exhibit 2.**

RCISD's facilities maintenance/operations budget for 2007–08 was $3,445,937, accounting for 11.59 percent of total district expenditures. RCISD's 11.59 percent is greater than the median allocation of 8.35 percent as published by the American School & University 37th Annual Maintenance & Operations Costs Study. The findings from the Maintenance & Operations Costs Study are not intended to be ideal amounts for allocations. They are published to help in benchmarking expenditures. Numerous factors including, age, overall condition of buildings, and the labor market of the local area will contribute to desired overall expenditure allocations.

EXHIBIT 1
RCISD FACILITIES INVENTORY
MAY 2008

BUILDING	YEAR BUILT	SQUARE FEET
High School	2007	279,390
Middle School	1997	126,464
Intermediate School	1987	18,250
Fort Elementary School (ES)	2004	79,744
Scott ES	2002	82,050
Davis ES	1986	52,163
Vernon ES	2007	83,221
Browning Primary	1990	47,251
Alternative Learning Center	2004	5,000
Disciplinary Alternative Education Program (DAEP)	1975	67,256
Administration Building	1980	4,895
Service Center/Metal Shop	2002	12,450
Agricultural Barn	1994	6,318
Bus Barn	1983	1,488
TOTAL		**860,940**

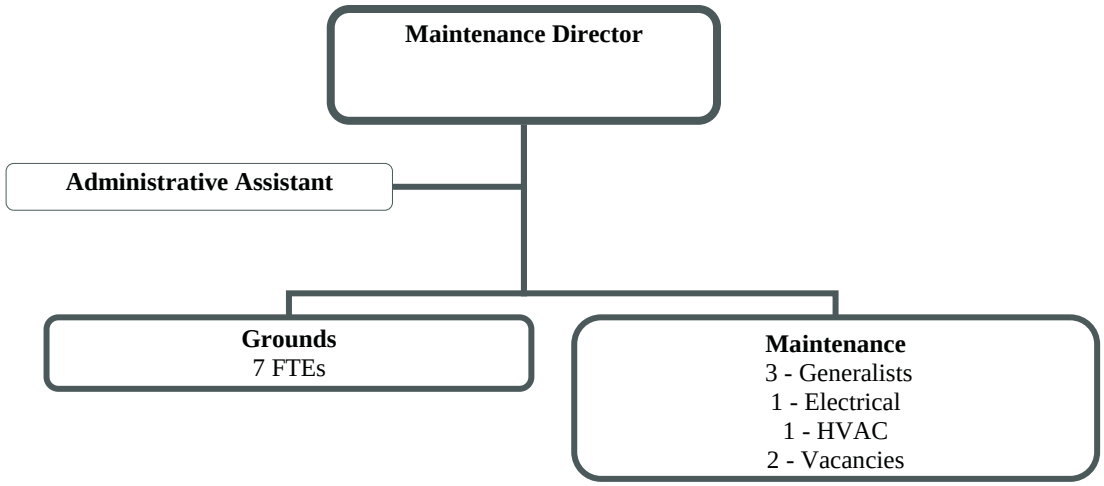
SOURCE: RCISD, Assistant Superintendent Facilities.

The following sections provide a summary of findings and recommendations regarding facilities management issues for RCISD. The information is based on field visits, interviews, document review, and observations completed at the district during May 2008.

ACCOMPLISHMENTS

- Accomplishment #1 – Implemented a district energy management program, including contracting with an energy management consulting firm under a performance-based engagement and hiring an internal energy manager.
- Accomplishment #2 – Developed cost-effective elementary school architectual prototypes.
- Accomplishment #3 – Initiated short- and long-range master plans with alternative scenarios based on variable demographics data for a high-growth school district.

EXHIBIT 2
RCISD MAINTENANCE ORGANIZATION CHART
MAY 2008



NOTES: Full-time Equivalents (FTEs); Heating, Ventilating, and Air Conditioning (HVAC).
SOURCE: RCISD Maintenance Director.

FINDINGS

- Finding #1 – The Maintenance Director is responsible for the direct oversight of 15 maintenance positions with no supervisors. This limits the effectiveness of the maintenance staff.
- Finding #2 – Rapid growth of the district has stressed facilities resources. Facilities staffing levels have not kept pace with the growth and increased space to be maintained.
- Finding #3 – While there are many good facilities initiatives and effective processes, they are informal and lack documentation.
- Finding #4 – There is limited use of facility management information technology to automate work processes. This makes it difficult to track performance and obtain good data to make decisions on a campus basis.
- Finding #5 – The Maintenance Director reported that over 85 percent of their work was in response to requests and corrective in nature. While they do conduct periodic facility inspections and perform filter replacements, they have limited resources to perform preventive maintenance.
- Finding #6 – There is no current process of effectively and objectively assessing facility conditions, identifying deferred maintenance backlogs, or for evaluating future capital needs of the existing facilities.
- Finding #7 – The Maintenance Director indicated that the department had money allocated for training; but there was no internal training program or tracking mechanism for external training completed.

RECOMMENDATIONS

- **Recommendation 1: Restructure the facilities maintenance organization** to meet the needs of the rapidly growing district. This should include hiring or the development and training of supervisors to report to the Maintenance Director.
- **Recommendation 2: Increase maintenance staffing levels** to be in alignment with industry benchmarks and provide adequate resources to properly maintain the growing inventory of facilities.
- **Recommendation 3: Formalize and document facilities planning and maintenance policies and procedures.** This should include, but not necessarily be limited to, formalizing processes for the following:

- master planning;
- school design and performance guidelines;
- value engineering and post-occupancy reviews;
- maintainability reviews during design phases;
- commissioning;
- facilities documentation exchange and control;
- facilities management information standards;
- capital needs assessment;
- preventive maintenance programs; and
- facilities performance measurement (key performance indicators).

- **Recommendation 4: Implement facility management information technology initially in the form of an automated work order management system** (Computerized Maintenance Management System – CMMS). This will support the improvement of effectiveness and efficiency of the management and execution of the facility operations.
- **Recommendation 5: Implement a comprehensive planned maintenance program.**
- **Recommendation 6: Initiate a periodic facility condition assessment (FCA) process** to prepare annual asset management plans/existing facility capital needs forecasts (facility needs assessment).
- **Recommendation 7: Initiate a comprehensive training program** by developing individual training and professional development plans to minimize possible on-the-job accidents, staff inefficiencies, repeat work, and ensure that maintenance personnel are knowledgeable in current Operations and Maintenance (O&M) procedures and techniques.

DETAILED ACCOMPLISHMENTS

ENERGY MANAGEMENT PLAN

Accomplishment #1 – Implemented a district energy management program, including contracting with an energy management consulting firm under a performance-based engagement and hiring an internal energy manager.

RCISD implemented a district energy management program and policy to conserve energy and natural resources while exercising sound financial management. The policy included general guiding statements and specific energy conservation and building management guidelines developed in conjunction with a contracted energy management consulting firm. The conservation efforts focus on reduction of usage without additional capital investment. The district hired an internal energy manager part-time to help with the internal administration of the policy and guidelines. RCISD also purchased an energy management accounting system to aide in the execution of the new policy and guidelines. RCISD hopes to achieve energy savings of over $12,000 a month through the implementation and execution of the policy and guidelines.

Texas Education Code, Chapter 44, Subsection Z, Section 44.902, states the following:

"GOAL TO REDUCE CONSUMPTION OF ELECTRIC ENERGY. The board of trustees of a school district shall establish a goal to reduce the school district's annual electric consumption by five percent each state fiscal year for six years beginning September 1, 2007."

This will require consistent and accurate long-term monitoring of electrical consumption.

It is important for RCISD administrators to know which buildings are the least efficient and the performance of each building at different periods of times of the year. Ideally, metering could be installed that could track such data on a much more frequent basis. In the absence of such technology, an individual could be given the responsibility for the manual recording of such data on a pre-determined schedule. That data could then easily be populated into a simple energy management software application.

The person in charge of energy conservation programs will then be able to share results with school principals, the maintenance director and other key individuals, much like a report card. The district could also choose to involve their students, since school age youth are increasingly interested in energy conservation. Their enthusiasm can provide lively support to any initiative intent on reducing carbon footprints and protecting their environment.

ARCHITECTUAL PROTOTYPE SCHOOLS

Accomplishment #2 – Developed cost-effective elementary school architectual prototypes.

RCISD has developed and built cost-effective elementary school prototypes to reduce upfront design and engineering costs and decrease construction turn-around time during the high growth/high construction period the district has recently experienced. The use of prototype schools has proven effective across the country for districts experiencing the need for multiple schools spread over short durations with limited site restrictions. RCISD has built the same prototype elementary school on three sites across the district. The prototype design

has led to RCISD reportedly achieving the least expensive construction costs (cost/square foot) of all of their local peer districts.

RCISD feels that their design incorporating good functional flexibility and materials has aided in their successful implementation. RCISD has taken steps to try and provide alternatives in regards to aesthetic components in order to maintain individual school identity. The use of architectual prototype designs has eliminated much of the time-consuming design elements and the unknown in the construction process, minimizing change-orders, and therefore, delivering a less expensive school to the community quicker. Use of the same construction manager has also aided in this process.

SHORT- AND LONG-RANGE MASTER PLANS

Accomplishment #3 – Initiated short- and long-range master plans with alternative scenarios based on variable demographics data for a high-growth school district.

RCISD initiated short- and long-range master plans with alternative scenarios based on variable demographics data for a high-growth school district. The master plan has provided the district the data necessary to make informed decisions regarding projected needs for the future. The master plan includes a demographic study as well as a detailed look at current building capacity and utilization. The district has used the information gathered for the master plan to consolidate/reallocate the use of older underutilized facilities in order to terminate the use of leased space.

The alternative scenario analyses have provided, and will continue to provide, flexibility in accommodating changes in growth.

DETAILED FINDINGS

FACILITIES MAINTENANCE ORGANIZATION

Finding #1 – The Maintenance Director is responsible for the direct oversight of 15 maintenance positions with no supervisors. This limits the effectiveness of the maintenance staff.

Recommendation 1: Restructure the facilities maintenance organization to meet the needs of the rapidly growing district. This should include hiring or the development and training of supervisors to report to the Maintenance Director.

Rapid growth of the district has resulted in a lean organizational hierarchy for the current size and needs of the district. RCISD should consider simple restructuring of the facilities maintenance organization to meet the needs of the rapidly growing district. This should include hiring or the development and training of supervisors to report to the Maintenance Director, enabling him to have the time necessary to strategically plan for addressing the needs of the district's facilities. The organizational chart in **Exhibit 3** outlines the suggested restructuring.

If RCISD decides to increase staffing to provide this option, the fiscal impact would be an annual cost of $72,634 ($14.55 X 20.0% Benefits X 8 Hours/Day X 260 Days/Year X 2 full-time equivalents based on RCISD's mid-grade pay for Grade IV - maintenance crew - skilled.

MAINTENANCE AND GROUNDS STAFFING

Finding #2 – Rapid growth of the district has stressed facilities resources. Facilities staffing levels have not kept pace with the growth and increased space to be maintained.

Recommendation 2: Increase maintenance staffing levels to be in alignment with industry benchmarks and provide adequate resources to properly maintain the growing inventory of facilities.

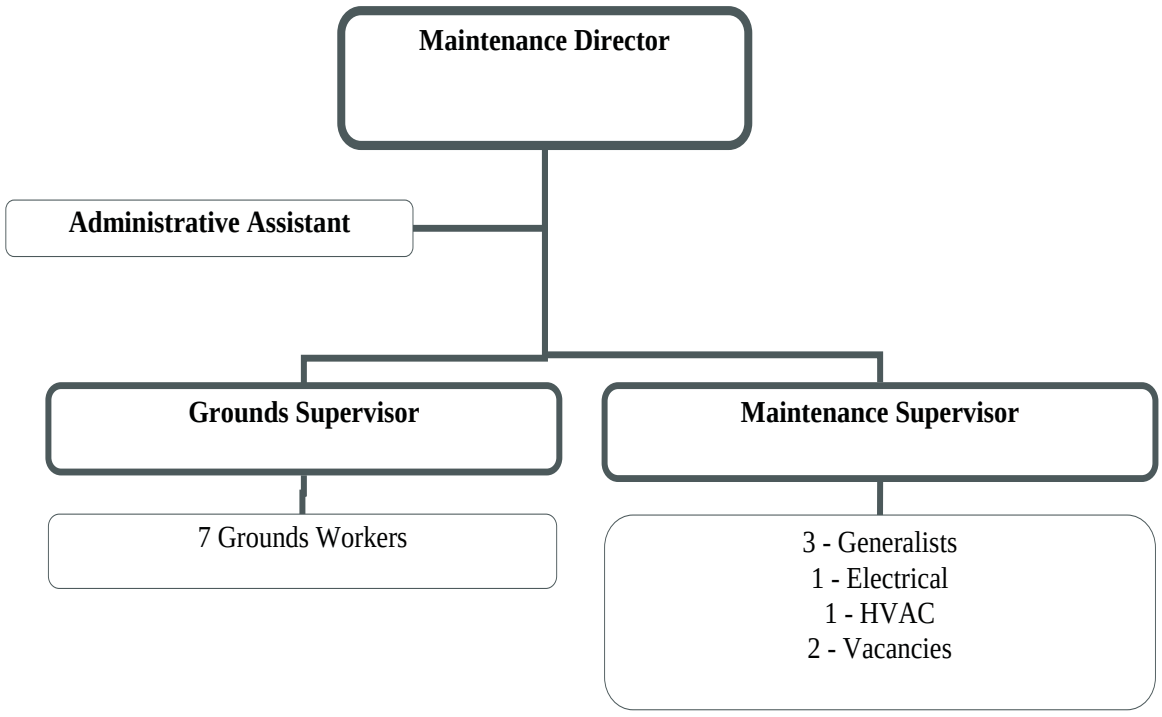
RCISD lacks maintenance and grounds staffing formulas. RCISD's maintenance staffing levels do not meet recommended industry standards.

MAINTENANCE

The district maintains 860,940 square feet of facilities with five full-time equivalent (FTE) maintenance positions. The maintenance department's five FTE's include three general maintenance workers, one electrician, and one Heating, Ventilating, and Air Conditioning (HVAC) technician. Currently there are two vacant positions that would add additional specialized maintenance workers to focus on the kitchen equipment and HVAC. The Maintenance Director currently acts as an additional FTE to help with the work load. The Maintenance Department reports spending approximately 85% of their time responding to demand work orders. Limited planned maintenance is accomplished and preventive maintenance is generally limited to filter changes. Part-time summer help is hired to assist with moving and painting as required.

The district's ratio of maintenance staff to building area maintained per FTE (staff : square foot) is 1:172,188. The standard published in the *American School and University M&O Cost Study* (April 2008) is 1:107,439. Therefore, staffing guidelines would suggest that the district is currently understaffed by three FTEs and underfunded by one FTE according to industry standards (considering funded vacant positions). The district did not provide the review team with any written or verbal staffing guidelines for which maintenance and grounds staffing decisions were made.

EXHIBIT 3
RECOMMENDED RCISD MAINTENANCE ORGANIZATION CHART
AUGUST 2008



NOTE: Heating, Ventilating, and Air Conditioning (HVAC).
SOURCE: RCISD, School Review Surveys, August 2008.

Published staffing guidelines are a good starting point for determining the appropriate number of FTEs; however, they do not take into account the desired level of service. The Association of Higher Education Facilities Officers (APPA) has published Service Level Guides that provide a benchmark standard for service and performance (APPA, 2002). This standard is used extensively in the public sector as a guide for comparing facility condition with the level of effort needed to maintain a desired level of service, as shown by **Exhibit 4**. A modified approach to this measure is often more useful because it allows customers to determine the desired service level for a given facility and then match their expenditures and level of effort to the desired outcome. This approach recognizes that not all facilities need to be maintained to the highest level. It allows the maintenance leadership to evaluate its portfolio and assign variable service levels as customer needs, capital funds availability, and operating budgets dictate.

The review team found that maintenance at RCISD is currently being performed between Level 2 – Comprehensive Stewardship and Level 3 – Managed Care as outlined in **Exhibit 4**. The bolded portions of the exhibit provide the school review's interpretation of the level of service by performance area, based on brief site visits and interviews. RCISD does not maintain comprehensive work records to verify all information; therefore, the exhibit is based on information gathered through observations and interviews.

Upon a general walk-through of the facilities, one will find a comfortable yet variable climate and atmosphere; however, it was made clear through interviews with the Maintenance Director that the preventive maintenance program is limited. Because of the age of the facilities, finishes and equipment at most facilities are like new. Therefore, most capital expenditures over the next five years are related to life-cycle renewal.

The optimal level of service for a curriculum based facility should be a Level 2 – Comprehensive Stewardship (**Exhibit 4**). Although the current level provided is between levels 2 and 3, as the facilities continue to age, this same level of service will be unachievable without the appropriate increase in staff.

Maintaining current staffing levels will only yield between a level 3 and level 4 in the future. Because of the age of the facilities, the maintenance organization has been able to provide a higher level of service with fewer staff.

EXHIBIT 4
RCISD CURRENT MAINTENANCE LEVEL OF SERVICE
MAY 2008

LEVEL	1	2	3	4	5
DESCRIPTION	SHOWPIECE FACILITY	COMPREHENSIVE STEWARDSHIP	MANAGED CARE	REACTIVE MANAGEMENT	CRISIS RESPONSE
Customer Service & Response Time	Able to respond to virtually any type of service, immediate response.	**Response to most service needs, including non-maintenance activities, is typically in a week or less.**	Services available only by reducing maintenance, with response times of one month or less.	Services available only by reducing maintenance, with response times of one year or less.	Services not available unless directed from top administration, none provided except emergencies.
Customer Satisfaction	Proud of facilities, have a high level of trust for the facilities organization.	**Satisfied with facilities related services, usually complimentary of facilities staff.**	Accustomed to basic level of facilities care. Generally able to perform duties.	Generally critical of cost, responsiveness, and quality of facilities services.	Consistent customer ridicule, mistrust of facilities services.
Preventive Maintenance	All recommend preventive maintenance (PM) is scheduled and performed on time.	A well-developed PM program. Occasional emergencies.	Reactive maintenance predominates due to systems failing to perform.	**Limited PM program.**	No PM performed.
Maintenance Mix	All recommend preventive maintenance (PM) is scheduled and performed on time. Emergencies (e.g. storms or power outages) are very infrequent and are handled efficiently.	A well-developed PM program: most required PM is done at a frequency slightly less than per defined schedule. Occasional emergencies caused by pump failures, cooling system failures, etc.	Reactive maintenance predominates due to systems failing to perform, especially during harsh seasonal peaks. The high number of emergencies causes reports to upper administration.	**Worn-out systems require staff to be scheduled to react to systems that are performing poorly or not at all. PM work possible consists of simple tasks and is done inconsistently.**	No PM performed due to more pressing problems. Reactive maintenance is a necessity due to worn-out systems. Good emergency response because of skills gained in reacting to frequent system failures.
Aesthetics, Interior	Like-new finishes.	**Clean/crisp finishes.**	Average finishes.	Dingy finishes.	Neglected finishes.
Aesthetics, Exterior	Windows, doors, trim, exterior walls are like new.	**Watertight, good appearance of exterior cleaners.**	Minor leaks and blemishes, average exterior appearance.	Somewhat drafty and leaky, rough-looking exterior, extra painting necessary.	Inoperable and leaky windows, unpainted, cracked panes, significant air & water penetration, poor appearance.
Aesthetics, Lighting	Bright and clean, attractive lighting.	**Bright and clean, attractive lighting.**	Small percentage of lights out, generally well lit and clean.	Numerous lights out, some missing diffusers, secondary areas dark.	Dark, lots of shadows, bulbs and diffusers missing, cave-like, damaged, hardware missing.
Service Efficiency	Maintenance activities appear highly organized and focused. Service and maintenance calls are responded to immediately.	Maintenance activities appear organized with direction. Service and maintenance calls are responded to in a timely manner.	**Maintenance activities appear to be somewhat organized, but remain people-dependant. Service calls are variable and sporadic, w/out apparent cause.**	Maintenance activities appear somewhat chaotic and are people-dependant. Service and maintenance call are typically not responded to in a timely manner.	Maintenance activities appear chaotic and without direction. Equip. & building components are routinely broken and inoperable. Service calls are never responded to in a timely manner.

EXHIBIT 4 (CONTINUED)
RCISD CURRENT MAINTENANCE LEVEL OF SERVICE
MAY 2008

LEVEL	1	2	3	4	5
DESCRIPTION	SHOWPIECE FACILITY	COMPREHENSIVE STEWARDSHIP	MANAGED CARE	REACTIVE MANAGEMENT	CRISIS RESPONSE
Building Systems' Reliability	Breakdown maintenance is rare and limited to vandalism and abuse repairs.	**Breakdown maintenance is limited to system components short of mean time between failures (MTBF).**	Building and systems components periodically or often fail.	Many systems are unreliable. Constant need for repair. Backlog of repair exceeds resources.	Many systems are non-functional. Repair instituted only for life safety issues.

SOURCES: Maintenance Staffing Guidelines for Educational Facilities, The Association of Higher Education Facilities Officers, 2002; School Review Team.

As stewards of its facilities, the district should make its facilities expectations align with its financial resources. This may also mean that the district does not have to identify a single level of service for all of the criteria. Frequently, school districts spend a great deal of attention to the physical appearance of public spaces, while indicating less concern about system reliability or preventive maintenance. Priorities established at one school district may not match the desires of stakeholders at another.

Once the target level has been identified and accepted by a majority of the constituents, the district can move toward establishing staffing levels and skills to achieve that desired level of service.

Based on published staffing standards and the APPA Level of Service model, RCISD's level of service with 5 FTEs in the future will be between Level 3 – Managed Care and Level 4 – Reactive Management as outlined in **Exhibit 5**. **Exhibit 6** compares RCISD's actual staffing to recommended levels of staffing to achieve the Level 2 service bracket.

If RCISD decides to increase staffing to recommended levels, the fiscal impact, excluding the cost of filling the current two vacancies already budgeted, would be an annual cost of $29,403 ($11.78 X 1.2 (20.0% Benefits) X 8 Hours/Day X 260 Days/Year X 1 FTE) based on RCISD's mid-grade pay for Grade III - maintenance crew semi-skilled.

GROUNDS

The exact acreage of land maintained by RCISD staff was unavailable to the review team; however, RCISD's Director of Maintenance estimates that the seven grounds employees are responsible for approximately 55 mowable acres.

The review team found that grounds maintenance at RCISD is currently being performed at a Level 3 – Managed Care, as outlined in **Exhibit 7**. The bolded portions of the table provide the evaluation team's interpretation of the level of

EXHIBIT 5
RCISD MAINTENANCE FUTURE LEVEL OF SERVICE AND MATCHING STAFFING CRITERIA
MAY 2008

LEVEL	1	2	3	4	5
SQUARE FEET	SHOWPIECE FACILITY	COMPREHENSIVE STEWARDSHIP	MANAGED CARE	REACTIVE MANAGEMENT	CRISIS RESPONSE
860,940	10.68 FTEs	8.01 FTEs	5.77 FTEs	4.17 FTEs	2.78 FTEs

NOTE: Full-time Equivalents (FTEs).
SOURCE: RCISD, School Review Surveys, May 2008.

EXHIBIT 6
RCISD MAINTENANCE ACTUAL VERSUS RECOMMENDED STAFFING PER DESIRED LEVEL OF SERVICE
MAY 2008

SQUARE FEET	CURRENT STAFF	CURRENT LEVEL OF SERVICE	STAFF FOR FUTURE LEVEL OF SERVICE	DESIRED LEVEL OF SERVICE	RECOMMENDED STAFFING	DIFFERENCE ACTUAL VS. RECOMMENDED
860,940	5	Level 3	5.77 FTEs	Level 2	8 FTEs	3 FTEs

NOTE: Full-time Equivalents (FTEs).
SOURCE: RCISD, School Review Surveys, May 2008.

EXHIBIT 7
RCISD GROUNDS CURRENT LEVEL OF SERVICE
MAY 2008

LEVEL	1	2	3	4	5
DESCRIPTION	SHOWPIECE FACILITY	COMPREHENSIVE STEWARDSHIP	MANAGED CARE	REACTIVE MANAGEMENT	CRISIS RESPONSE
Turf Care	Grass height maintained. Mowed at least once every five days and as often as once every three days.	**Grass cut once every five days.**	Grass cut once every ten working days.	Low-frequency mowing scheduled based on species.	Low-frequency mowing scheduled based on species.
Fertilizer	Adequate fertilization applied to plant species according to their optimum requirements.	Adequate fertilizer level to ensure that all plant materials are healthy and growing vigorously.	**Applied only when turf vigor seems to be low.**	Not fertilized.	Not fertilized.
Irrigation	Sprinkler irrigated - electric automatic commonly used. Frequency of use follows rainfall, temperature, season length, and demands of plant material.	Sprinkler irrigated - electric automatic commonly used. Frequency of use follows rainfall, temperature, season length, and demands of plant material.	**Dependent on climate.**	No irrigation.	No irrigation.
Litter Control	Minimum of once per day, seven days/ week.	Minimum of once per day, five days per week.	**Minimum service of two to three times per week.**	Once per week or less.	On demand or complaint basis.
Pruning	Frequency dictated primarily by species and variety of trees and shrubs.	Usually done at least once per season unless species planted dictate more frequent attention.	**When required for health or reasonable appearance.**	No regular trimming.	No pruning unless safety is involved.
Disease and Insect Control	Controlling objective is to avoid public awareness of any problems.	Usually done when disease or insects are inflicting noticeable damage, are reducing vigor or plant material, or could be considered a bother .	**Done only to address epidemics or serious complaints.**	None except where the problem is epidemic and the epidemic condition threatens resources or the public.	No control except in epidemic or safety situations.
Snow Removal	Snow removal starts the same day that accumulations of .5 inch are present.	Snow removed by noon the day following snowfall.	**Done based on local law requirements but generally accomplished the day after a snowfall.**	Done based on local law requirements but generally accomplished by the day following snowfall.	Done based on local law requirements but generally accomplished by the day following snowfall.
Surfaces	Sweeping, cleaning, and washing of surfaces should be done so that at no time does an accumulation of sand, dirt, or leaves distract from the look or safety of the area.	Should be cleaned, repaired, repainted, or replaced when their appearances have noticeably deteriorated.	**Cleaned on complaint basis. Repaired or replaced as budget allows.**	Replaced or repaired when safety is a concern and when budget is available.	Serviced only when safety is a consideration.

EXHIBIT 7 (CONTINUED)
RCISD GROUNDS CURRENT LEVEL OF SERVICE
MAY 2008

LEVEL	1	2	3	4	5
DESCRIPTION	SHOWPIECE FACILITY	COMPREHENSIVE STEWARDSHIP	MANAGED CARE	REACTIVE MANAGEMENT	CRISIS RESPONSE
Repairs	Repairs to all elements of the design should be done immediately.	Should be done whenever safety, function, or appearance is in question.	Should be done whenever safety or function is in question.	Should be done whenever safety or function is in question.	Should be done whenever safety or function is in question.
Inspections	A staff member should conduct inspection daily.	A staff member should conduct inspection daily.	Inspections are conducted once per week.	Inspections are conducted once per month.	Inspections are conducted once per month.
Floral Plantings	Maximum care, including watering, fertilizing, disease control, disbudding, and weeding, is necessary. Weeding is done weekly.	Care cycle is usually at least once per week, but watering may be more frequent. Bed essentially kept weed free.	Only perennials or flowering trees or shrubs.	None.	None.

SOURCE: Maintenance Staffing Guidelines Grounds Management, The Association of Higher Education Facilities Officers, 2002.

service by performance area, based on brief site visits and interviews. RCISD does not maintain comprehensive work records to verify all information; therefore, the exhibit is based on information gathered through observations and interviews.

Based on published staffing standards and the APPA Level of Service model, RCISD's current level of service at 7 FTEs should be above a Level 1 – Showpiece Facility as outlined in **Exhibit 8**. The review team estimates the actual level of service to be an average of Level 3 – Managed Care. The review team suggests a more detailed study of grounds practices and employee efficiency be undertaken to determine the operational efficiency of the grounds department to determine whether the Level of Service can be increased to desired levels or whether staff could be reallocated to additional operational functions. This should be the first priority of the new Grounds Supervisor within the recommended maintenance structure. **Exhibit 9** compares RCISD's actual versus recommended grounds staffing levels of service.

If RCISD decides to decrease staffing to the recommended level of 3, the fiscal impact would be an annual savings of $106,330 ($10.65 X 1.2 (20.0% Benefits) X 8 Hours/Day X 260 Days/Year X 4 FTEs) based on the average state salary for a groundskeeper for districts with enrollments of 3,000 – 4,999 students (TASB/TASA Auxiliary Report 2006–07).

If RCISD increased maintenance staffing, as suggested above, and reduced their groundskeeper staff, it would be a total annual savings of $76,927 ($106,330 – $29,403).

POLICIES AND PROCEDURES

Finding #3 – While there are many good facilities initiatives and effective processes, they are informal and lack documentation.

Recommendation 3: Formalize and document facilities planning and maintenance policies and procedures.

RCISD lacks formal and documented processes for many of their facilities planning, maintenance, and management efforts. While there are many excellent facilities initiatives and effective processes, they are informal and lack appropriate standards and documentation. The lack of formal and documented processes appears to be the result of rapid growth and expansion of the school facilities. The success of the informal processes that have served the district well in the past will be more and more difficult to achieve as the district continues to grow. RCISD should formalize and document facilities planning and maintenance policies and procedures to ensure effective planning, construction, operation and maintenance of the facilities. This should include formalizing processes for the following:

- master planning;
- school design and performance guidelines;
- value engineering and post-occupancy reviews;
- maintainability reviews during design phases;
- commissioning;
- facilities documentation exchange and control;

EXHIBIT 8
RCISD GROUNDS CURRENT LEVEL OF SERVICE AND MATCHING STAFFING CRITERIA
MAY 2008

LEVEL	1	2	3	4	5
MOWABLE ACRES	SHOWPIECE FACILITY	COMPREHENSIVE STEWARDSHIP	MANAGED CARE	REACTIVE MANAGEMENT	CRISIS RESPONSE
55	3.13 FTEs	2.35 FTEs	1.70 FTEs	1.22 FTEs	0.81 FTEs

NOTE: Full-time Equivalents (FTEs).
SOURCE: RCISD, School Review Surveys, May 2008.

EXHIBIT 9
RCISD GROUNDS ACTUAL VERSUS RECOMMENDED STAFFING PER DESIRED LEVEL OF SERVICE
MAY 2008

MOWABLE ACRES	CURRENT STAFF	CURRENT LEVEL OF SERVICE	STAFF FOR CURRENT LEVEL OF SERVICE	DESIRED LEVEL OF SERVICE	RECOMMENDED STAFFING	DIFFERENCE ACTUAL VS. RECOMMENDED
55	7 FTEs	Level 3	1.70 FTEs	Level 2	3 FTEs	(4) FTEs

NOTE: Full-time Equivalents (FTEs).
SOURCE: RCISD, School Review Surveys, May 2008.

- facilities management information standards;
- capital needs assessment;
- preventive maintenance programs; and
- facilities performance measurement (key performance indicators).

The implementation of formal and documented processes for facilities management could result in significant cost avoidance and increased staff efficiencies. While there is effort required to document the processes, it is generally small in comparison to the potential cost savings. Examples of potential cost avoidance and savings are presented in each of the following subsections.

MASTER PLANNING

One of the district's accomplishments is their short and long-range planning effort. Currently, short- and long-term planning is conducted primarily by the school superintendent and the chief financial officer with some support from the primary architectural firm and construction manager. The planning consists of reviewing enrollment projections and developing alternative scenarios of schools and school configurations to meet the needs of the rapidly growing school district. In addition to current planning efforts, a more formalized master plan should be considered. Other factors should be considered including: facility condition, life cycle analyses, long-term capital needs requirements, budgets, timelines, and impact of maintenance programs.

A school facility master plan is the "blueprint" for decision-making throughout the school district. It is a formal way of communicating the district's needs, priorities, and intentions to all stakeholders. The master plan also establishes the necessary documentation for stakeholders, funding authorities, and the community to approve funding. As such, the process of master planning established a forum through which interested members of the community can voice their opinions to school administrators. This collaborative planning process helps the community feel that their views are valued.

Good master plans include short- and long-term objectives linked to the mission and vision of the school district. A more detailed master plan would include the following:

- introduction;
- master plan definitions;
- district strategic objectives (drawn from the district's strategic business plans);
- annual expenditures summary;
- historical school development and renewal;
- historical enrollment;
- enrollment projections;
- projected enrollment vs. permanent capacity;
- enrollment configurations;
  - o current district grade configuration;
  - o anticipated grade configuration changes; and
  - o anticipated effects on facility needs

- anticipated school boundary changes or consolidation of schools within the district;
- economic environment of the district;
- other community factors that will affect school facility needs;
- general facility data;
- campus educational adequacy summaries;
- portable buildings used for academic purposes;
- review of maintenance practices and impact;
- facility condition assessment data;
- 10- to 20-year modernization/replacement program;
- prioritization of capital projects (new schools and renovations);
- cost assumptions;
- development options/alternatives;
- recommendations; and
- project specific timelines.

Carefully developed and comprehensive master plans provide information to the community and stakeholders that aids in the approval of bonds and funds sufficient to adequately maintain school facilities. Comprehensive master plans also provide adequate documentation to allow decision-makers to objectively and equitably prioritize needs and make better facility decisions.

DESIGN GUIDELINES

RCISD has been proactive in developing architectual prototype school designs to maximize the return-on-investment of school construction. These prototypes include a number of excellent concepts as a result of consensus planning efforts. However, with the completion of four new schools and another about to begin, construction has been completed without the aid of documented detailed school district education specifications or design guidelines. The current process does consider many of the design guideline concepts recommended by architects and the National Center for Education Statistics (NCES). This includes the development of school prototypes and continuous improvements to the prototypes. As the school district grows and key staff change over time, the collection of the intellectual knowledge of "what works best" in the schools will be critical. Failure to more formally document the improvements may lead to repeating mistakes of the past.

The best way to capture valuable intellectual knowledge regarding best practices in school design and use is to develop design guidelines or district education specifications for school design. The practice of developing the guidelines can and should incorporate the architect, teachers, facilities staff, school Superintendent, Chief Financial Officer (CFO), and Construction Manager. The design guidelines should include: space and layout standards, materials, furnishings, mechanical systems, building automation systems, and other specialty construction.

VALUE ENGINEERING

Value engineering is defined by the General Services Administration as an organized effort directed at analyzing designed building features, systems, equipment, and material selections for the purpose of achieving essential functions at the lowest life cycle cost consistent with required performance, quality, reliability, and safety.

Value engineering is conducted informally by the construction manager and CFO of RCISD as part of the Construction Manager Agent process. It is currently more focused on cost control than long-term life-cycle value. There appears to be limited information captured from post-occupancy reviews and maintainability of the schools. A more formal value engineering process would link the reviews with commissioning results, post-occupancy surveys, and long-term performance measured via the facilities maintenance department. Post occupancy input from principals, teachers, and school staff can lead to higher performing schools over time. Formalizing this process would lead to greater long-term value and enhanced functionality of the schools.

We recommend that a more detailed and documented value engineering process be implemented to help achieve essential school functions at the lowest life cycle cost consistent with required performance, quality, reliability, and safety. Value engineering is typically conducted in two phases. In the design phase, value engineering considers alternative design solutions to optimize the expected cost/value ratio of projects at completion. Concentrating value engineering efforts in the early stages of project design often affords greater savings and allows a change of direction, if appropriate, without affecting project delivery schedules. Emphasis is on obtaining maximum life cycle value for initial investments of the project. In the construction phase, contractors are encouraged to draw on their experience to propose changes that can reduce costs while maintaining or enhancing quality, value, and functional performance.

MAINTAINABILITY REVIEWS

Many of the schools (both new and old) have maintenance issues that may have been resolved by minor changes

incorporated through a review of the designs by personnel familiar with the maintenance of the schools. There is currently limited involvement from the Maintenance Director in the review of school concept and design drawings. We recommend that facility maintenance and performance reviews by the Facilities Director and Energy Manager be incorporated and documented. These reviews generally lead to reduced maintenance costs and often lower capital renewal costs over time.

It is generally accepted that the operations and maintenance costs of schools are in the range of two to four times the cost of construction over the life of a facility. Yet, most of the focus continues to be on design and construction. Even value engineering tends to primarily consider the reduction of first-time costs over the long-term maintainability of building systems. The potential to significantly impact the long-term operating costs should be enough to include the Maintenance Director in the review of systems and materials to be used in new schools.

COMMISSIONING

RCISD does perform some aspects of a formal commissioning process. The Construction Manager works with the various school contractors to test and inspect systems, as well as to train RCISD facilities maintenance staff on the correct operation of the various systems. However, there is a lack of formal processes when the Construction Manager turns over a new facility to RCISD for use and occupancy. The principals and school staff reported several issues with the HVAC systems within the first couple years of use in many of the newer schools visited.

Commissioning, in its most basic form, is the process of ensuring that building systems are operating in accordance with the design intent and the owner's requirements. More specifically, commissioning:

- defines the building systems performance criteria;
- provides a validated baseline for building performance; and
- provides a means of tracking and evaluating building performance over time.

New buildings and systems often do not operate as intended. When these systems do not operate correctly, they create problems for building occupants and for those managing the facility. Commissioning these systems ensures the building is performing as initially specified.

Commissioning is typically performed in new and existing buildings for a few key reasons:

- to verify that new or existing building systems are operating as designed;
- to identify unexplained rises in energy use;
- to identify an unexplained increased number of thermal comfort complaints; and/or
- to achieve Leadership in Energy and Environmental Design (LEED) certification for buildings.

Commissioning can uncover many building system errors that may not otherwise be found. Issues identified that may save money and improve efficiency, include the following:

- ductwork disconnected from diffusers sending conditioned air to the above-ceiling space instead of the space to be conditioned;
- Variable Air Volume (VAV) box re-heat valves stuck open, causing over-heating of zones;
- un-insulated conditioned air ductwork located in unconditioned spaces;
- fans rotating backwards;
- lighting controls programmed incorrectly causing lights to stay on longer than necessary;
- cross-connected HVAC sensors, causing systems to over-heat and over-cool;
- clogged filters;
- improperly installed condensate drainage systems resulting in pooling water on the roof and creating the potential for roof damage;
- non-working duct smoke detectors; and
- non-working emergency and exit lights.

Because these problems were discovered and corrected as part of the commissioning process, building owners gained systems that performed as designed and were safer. They also increased energy efficiency and thermal comfort, cost less to operate, improved the overall safety, and had fewer tenant complaints. With a properly executed commissioning plan, districts can improve building performance, operate systems more efficiently, reduce operating costs, and decrease occupant complaints.

DOCUMENT MANAGEMENT

Currently, the Construction Manager provides electronic copies of school design drawings, specifications, and some Operations and Maintenance (O&M) manuals in Adobe pdf format on CDs. No one from the Maintenance Department knows what information is stored on the CDs. Due to the relatively young age of most of the schools, this has not yet presented any problems. However, there is a significant amount of valuable information on the CDs that could be of

value and avoid costs over time. Proper formatting, organization, referencing and use of the data on the CDs will not only help maintenance staff improve processes and efficiency, but aid architects and planners in minimizing future renovation costs, and possibly improve the functionality and safety of the schools.

Experience has shown that institutional organizations and government agencies across the U.S. spend billions of dollars unnecessarily to re-collect or regenerate facilities data and information that has already been created in the past. This is information needed to properly operate, maintain, and improve facilities over their life cycle. Today, this information is also used by first responders in cases of emergency and decision-makers to make better decisions about facilities. Easy access to the data is essential.

There are several key issues to making this information useful. The data needs to be complete, comprehensive (right level of detail), standardized, well organized, and readily accessible. Best practices include providing specifications for designers and contractors to follow to generate and format the data. At a minimum, the facilities data compiled for every new school facility should include:

- project specifications;
- design drawings;
- design factors/ assumptions;
- shop drawings;
- as-built drawings;
- submittals;
- warranties;
- construction photographs;
- commissioning reports;
- general system/ equipment descriptions;
- general operating instructions; and
- equipment inventories;
- equipment attributes;
- installation instructions;
- set-up/calibration instructions;
- equipment O&M manuals;
- start-up/shut down procedures;
- spare parts data;
- wiring diagrams;
- Material Safety Data Sheets (MSDS) ;
- preventive maintenance procedures;
- facility plan with ESO* locations

*ESO = Emergency Shut-Off (including electrical disconnects and valves).

Organization and formatting of the data on the CD should make it easy to find the information listed. Currently, documents and drawings on the CDs are not well organized and labeled. Placing documents in directories labeled as 'Specifications', 'Drawings', and 'Preventive Maintenance Procedures' is best. Drawings should also be labeled and stored as complete sets by architectural system. O&M Manuals should be filed in accordance with Construction Specifications Institute (CSI) Masterformat or Omniclass guidelines. The equipment inventories and preventive maintenance procedures should be in a flat file format or database that can be easily migrated into a computerized maintenance management system (CMMS).

INFORMATION STANDARDS

Implementation of an automated work order system requires careful forethought and development of data standards to ensure long-term usability of the system. Many computerized maintenance management (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 RCISD, 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 should be established to provide the framework for data management. Most often, CSI Uniformat or Omniclass 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. Use and enforcement of these standards increases the quality of the data, optimizes the system performance, and enables better reporting. Decisions about school funding, renovation, modernization, and infrastructure improvements need to be supported by high-quality and timely data.

PERFORMANCE MEASUREMENT

The development of sound data information standards and automating processes enhances facilities performance measurement and the accuracy of key performance indicators (KPIs). The objectives of automating work processes are: to increase performance, measure facilities performance, and provide better information to make the best decisions regarding facilities.

The current performance measurement at RCISD is limited in scope and requires time-consuming manual data generation via spreadsheets. The performance measurement data provided to us included general budget information and School District Target data. This data consisted of limited benchmark information regarding operational costs and capital expenditures per square foot. There are great opportunities to improve facilities performance through the development of more specific KPIs aligned with the mission and vision of RCISD.

Measuring facilities operations' performance in today's environment is the route to credibility. The focus must be on prevention, not cure, and there must be recognizable aims 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 key performance indicators (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 RCISD'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, and construction and renovation activities;
- process: indicators that measure how efficiently the department is performing its key process and tasks; and
- 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.

CAPITAL PLANNING

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 a large collection of aging buildings. Deferred maintenance backlogs continue to grow, while the toll it has taken on facilities is reaching critical levels. Current research and data support the need for better facility capital investments and asset management to:

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

FACILITY MANAGEMENT INFORMATION TECHNOLOGY

Finding #4 – There is limited use of facility management information technology to automate work processes. This makes it difficult to track performance and obtain good data to make decisions on a campus basis.

Recommendation 4: Implement facility management information technology initially in the form of an automated work order management system (Computerized Maintenance Management System – CMMS).

Facility management information technology at RCISD is currently limited to an e-mail trail of work requests. The work requests are categorized by campus within the e-mail client and kept for an unspecified duration. Craftspersons are dispatched by the Maintenance Director via Nextel radios. There is no feedback mechanism available to the Maintenance Director after work has been completed, therefore impeding his ability to track performance and make informed decisions.

There are two general categories of facility management information technology: Computerized Maintenance Management Systems (CMMS) and Computer-Aided Facility Management (CAFM) systems. Both CMMS and CAFM systems handle work management processes, with CAFM system's additional space management capabilities. CMMS are much more efficient at managing requests through their life-cycle when compared to paper-based tracking tools. CMMS have become increasingly affordable and easy to use. Their purpose is to automate and manage work requests as efficient as possible and provide the basic information districts need to make informed and timely decisions. The benefits of automation continue to increase and include:

- better management data;

- increased efficiency;
- asset/equipment history tracking;
- organized Facility Management (FM) data & information;
- expedited decision making;
- improved maintenance quality/labor tracking;
- improved communication;
- reduced operating costs; and
- enhanced use of facility space.

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.

Recommendations include the following:

1. *The CMMS should be network- or 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 are able to customize the system to fit their needs as necessary. In terms of utility, a good CMMS program will:*
   - *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 captured on a per-building basis (or, even better, on a per task basis).*
2. *At a minimum, work order systems should account for:*
   - *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 computerized maintenance management (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 RCISD, 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 should be established to provide the framework for data management. Most often, CSI Uniformat or Omniclass 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. Use and enforcement of these standards increases the quality of the data, optimizes the system performance, and enables better reporting.

Developing a strategic 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 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 technology plan include the 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 do's and don'ts?
- What should be included in the plan?
- Have we set up implementation expectations in the strategic plan?

In order to start this type of project, the district should assemble a formal Technology Advisory Team (TAT). The team should consist of an integrated team of facility representatives from the district. Each individual on the TAT has an opportunity to provide input regarding his/her specific area of expertise or requirements of the selected system. The TAT will be responsible for designating an interested, motivated and talented Champion to lead them. To be successful the TAT must be empowered, authoritative, consistent, diversely representative, interested, and knowledgeable. The TAT is responsible for overseeing implementation and optimization, data integrity and application stewardship, adjudicating resource allocation, evaluating and recommending future needs and requirements. The TAT is also responsible for maintaining the data and data standards. The TAT must be who "owns" the technology vision. The TAT must also be the vehicle for maintaining momentum.

The district should consider a TAT consisting of a:

- Maintenance Director;
- Information Technology Manager(s);
- Chief Financial Officer; and
- Customer Representative.

The following are issues that the TAT will need to understand:

- Who are the customers?
- Who needs to commit to the objectives of the plan?
- What are the roles of staff, vendors and/or consultants in preparing a plan?
- Have we set up the right expectations in the strategic plan?
- How do we make our Information Technology (IT) work for us?
- How do we gain commitment?
- Is our FM department IT savvy?
- What are the true costs?
- Who owns the database?
- Who is responsible for standards?

The team that does the planning should also lead the implementation and on-going management of the technology initiative. Typically, the team that selects the strategic goals will be a little smaller than the one that follows through with the implementation. However, in the case of small to medium districts like RCISD the team may not change size.

While it is not essential for every interested stakeholder to participate on the planning team, it is essential for all of them to commit to the goals and desired outcomes. They will only do so if they know their interests have been taken into account in the decision-making process.

Once established, the team must take a look at what the strategic objectives of the organization are and then mirror them with the technology they are trying to implement. A close evaluation of the existing service level should be made to benchmark the current status of the organization. Next, the district needs to determine its preferred service level (see previous discussions on this topic). Finally, the team must link the organization's technology goals to help achieve the desired service level.

Typical facilities 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 take and avoid so the benefits are achieved from FM technology while maintaining cost control:

- Go through the discipline of identifying detailed functionality from FM technology that would benefit both Plant Operations' clients and staff;
- Emphasize training;
- Understand all costs;
- Ask simple questions about how things are done;
- Test applications yourself; do not just watch demonstrations;
- 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% solutions; and
- Agree on realistic goals.

Make sure you do not:

- over-populate the database;
- try to use a large project to cover costs;
- set vague objectives such as "improve productivity;"
- structure the implementation to avoid conflict;
- select a technical implementation leader unskilled in negotiation;
- assume that interviewing users reveals exactly what they need; and
- emphasize incremental improvement if what is really needed is fundamental change.

If you choose to evaluate CMMS systems, good general procurement practices should ensure acquisition of the appropriate system. However, the following recommendations are offered:

- Obtain a short list of two or three vendors;
- Visit at least two reference sites;
- Use a predetermined scorecard for evaluation;
- Weigh evaluation criteria;
- Have vendors demo at your facility; and
- Provide incentives for value engineering.

There are many types of CMMS packages available on the market today, including some that are freeware.

COMPREHENSIVE MAINTENANCE PROGRAM

Finding #5 – The Maintenance Director reported that over 85 percent of their work was in response to requests and corrective in nature. While they do conduct periodic facility inspections and perform filter replacements, they have limited resources to perform preventive maintenance.

Recommendation 5: Implement a comprehensive planned maintenance program.

RCISD's maintenance program is insufficient to provide the long-term stewardship needed to preserve the district's breakdown maintenance, corrective actions, responding to demand work requests, periodic facility inspections, and filter replacements. There was little evidence of preventive maintenance (PM) being performed on equipment beyond that described above, with little historical documentation of the work performed. RCISD has not yet realized the impact of not performing the appropriate maintenance because of the relatively new age of facilities; however, continuing to neglect investing in a formalized maintenance program will result in inordinate expenditures and a shortened useful life of building systems and schools.

With few exceptions, preventive maintenance (PM) 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 benefits:

- Managers, not equipment, plan shop technician's activities and time.
- Planning of work allows labor, parts, materials and tools to be available when needed.
- 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.
- 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.

- 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.

Passive Monitoring: Passive monitoring (e.g., corrective, reactive, or breakdown maintenance) does have a place in facility operations, but should be limited to equipment that has been evaluated to have no risk of business interruptions or consequences of direct or indirect damage to facilities. "Run-to-failure" plans can be cost effective where the cost of PM over the life cycle of the equipment is greater than the loaded cost of equipment replacement.

Preventive Maintenance: Preventive Maintenance is interval-based work that is planned and scheduled to allow maximum efficiency, minimize excessive labor and parts replacement and prolong the useful service life of equipment. A comprehensive PM program allows the building systems to operate at full efficiency for their useful life and can prevent expensive repairs due to equipment failure. PM programs are also required to preserve most equipment warranties. PM is deemed appropriate for equipment where abrasive, erosive, or corrosive wear takes place, or material properties change due to fatigue.

Preventive Maintenance should be scheduled to be performed at specific frequencies and completed at times in the aging process of the equipment where it can be restored with minimal investment. This proactive approach through such tasks as filter replacements, belt tightening/changes, cleaning, etc., ensures that the equipment ages as slowly as possible.

Predictive Maintenance (also referred to as condition-based maintenance or predictive testing and inspection – PT&I): Predictive testing and inspection (PT&I) should be implemented as a part of the overall RCM program. Equipment operating conditions should be monitored during the PT&I inspections and trends developed to help determine the need for additional PM and the optimum time for equipment overhaul or replacement.

The best use of PT&I is to implement simple visual/audible and non-destructive procedures (e.g., temperature and pressure readings) to record conditions at a specific time (snap shot) when the equipment is inspected at the time of PM. When a series of condition records (snap shots) are compiled, a trend analysis can be developed. This trend analysis is the basis of PT&I and can provide factual data to support capital expenditure decisions regarding building systems.

Specific PT&I methods that have proven to be effective are listed herein:

- Airborne Ultrasonic Testing – Most rotating equipment and many fluid system conditions will emit sound patterns in the ultrasonic frequency spectrum. Changes in these ultrasonic wave emissions are reflective of equipment condition. Ultrasonic detectors can be used to identify problems related to component wear as well as fluid leaks, vacuum leaks, and steam trap failures.
- Infrared Thermography – Infrared (IR) thermography can be defined as the process of generating visual images that represent variations in IR radiance of surfaces of objects. IR tries to detect the presence of conditions or stressors that act to decrease a component's useful or design life. Many of these conditions result in changes to a component's temperature that can be detected with IR.
- Motor Circuit Evaluator (MCE) Testing – MCE is used during acceptance to evaluate the condition of motor power circuits. Any impedance imbalances in a motor will result in a voltage imbalance. Voltage imbalances in turn will result in higher operating current and temperatures, which will weaken the insulation and shorten the motor's life.
- Vibration Analyses (Rotating Equipment) – Equipment which contains moving parts vibrates at a variety of frequencies. These frequencies are governed by the nature of the vibration sources, and can vary across a wide range or spectrum. If any of these components start to fail, its vibration characteristics change, and vibration analysis is about detecting and analyzing these changes.
- Lubrication Oil Analyses – Oil analysis (OA) is the sampling and laboratory analysis of a lubricant's properties, suspended contaminants, and anti-wear additives. *OA* is performed during routine preventive maintenance to provide meaningful and accurate information on lubricant and machine condition. By monitoring oil analysis sample results over the life of a particular machine, trends can be established which can help eliminate costly repairs.
- Water Chemistry Analysis – The use of chemistry to determine the chemical make-up of water used in hydraulic systems to help identify existing or future problems. This analysis should include pH, conductivity, Phenolphthalein and Methyl Purple alkalinity, hardness, iron (and any metals specific to the system), Sulfate, Nitrate and Ammonia.

Determination of the right type of maintenance for various equipment types can be determined by following a logic-tree decision-making process as shown in **Exhibit 10**.

The district should implement a comprehensive maintenance program to improve the stewardship of their facilities and increase the total cost of ownership of their assets. A comprehensive maintenance program includes the right mix of preventive maintenance (PM), predictive maintenance (PdM), and reactive maintenance (i.e., passive monitoring) components.

To develop a comprehensive maintenance program, RCISD 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 from which to work. Knowing the age and condition of equipment is a prerequisite for maintaining it properly. For more about facilities asset identification and assessments see Recommendation #6.

Step 2: Prioritizing Maintenance Activities – Once the facilities data has been compiled, the logic tree described in **Exhibit 10** 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 weighted against the cost impact of deferring the maintenance.

Information should be obtained during the data collection process to associate a priority with each system and asset in each district facility. Criticality of each asset should be determined through a review of the system's function, area served, and importance of reliability. The criticality assessment provides the means for quantifying how important the function of a system and its components are relative to the identified mission. A numerical ranking of one through ten can be adopted and applied in accordance with **Exhibit 11**. The equipment can then be prioritized based on its criticality of maintaining functionality of the facilities or other predetermined district mission needs. Prioritization becomes increasingly important as available resources become scarce.

The criticality factors for each piece of equipment in conjunction with the logic tree (**Exhibit 10)** can then be used to determine and adjust the level of service attributed to each piece of equipment based upon available resources.

Step 3: Developing Job Plan & Estimating Completion Times – Once the criticality analysis is complete and the appropriate maintenance methods established for each type of equipment and by location, maintenance tasks for all equipment types should be compiled.

Maintenance tasks should be based on manufacturers' recommendations and/or job plans developed by industry standard publications such as R.S. Means, General Services Administration (GSA), and 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/CAFM system (See Recommendation #4).

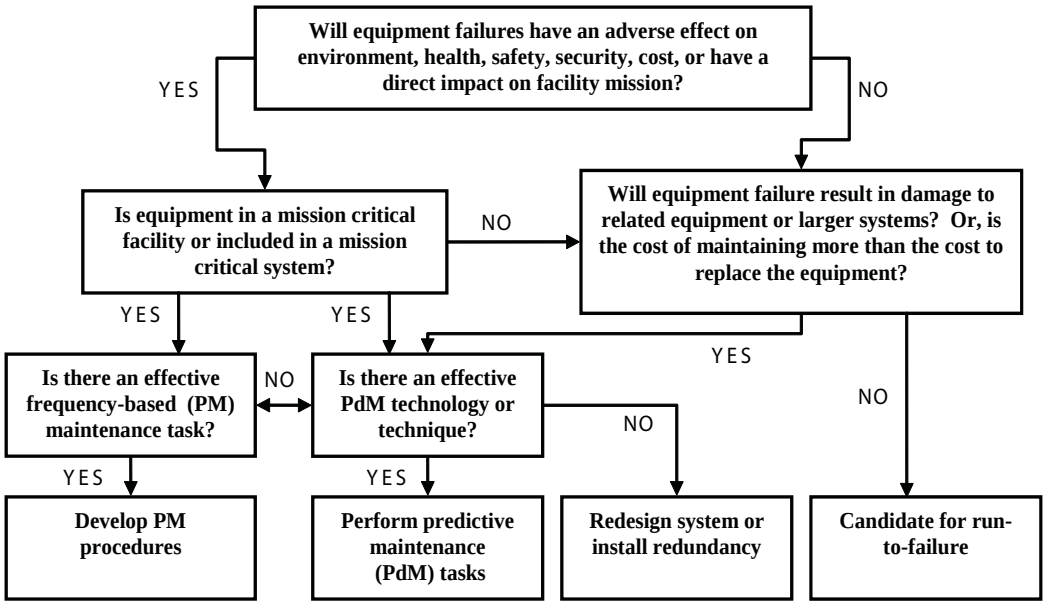
In addition to specific tasks, standard performance times and frequencies, the job plans should also describe a process for resolving maintenance problems and the specific tools and materials needed. Some problems will be simple and the appropriate corrective action can be included among the other information in the task list. Other problems may not have an obvious solution, and in these cases the responsibility and process for addressing the problems 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 to adjust the frequency of tasks to fit staff availability. Because resources are finite, the Maintenance Director 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.

The fiscal impact of creating a comprehensive maintenance program is limited to the internal allocation of resources to inventory and to set up the job plans, and the purchase of industry standard job plans if the district does not already have access to these resources. Because of the relative newness of the district's facilities, pertinent equipment information can be abstracted from construction documents with relative ease. The associated maintenance tasks and times are provided by industry standard publications.

If internal resources are not capable or able to accomplish this task, additional resources (i.e. consultants) could be hired to aide in the data collection and program set up. Outside consultants could typically be procured for $.05/ square foot to aide in the data collection and program setup. Multiplying $.05/ square foot times the district's total square

EXHIBIT 10
RELIABILITY CENTERED MAINTENANCE LOGIC TREE
MAY 20



NOTES: Preventitive Maintenance (PM); predictive maintenance (PdM).
SOURCE: Adapted from National Aeronautics and Space Administration, Reliability Centered Maintenance Guide for Facilities and Collateral Equipment, February 2000.

EXHIBIT 11
CRITICALITY/SEVERITY ASSESSMENT CATEGORIES
MAY 2008

RANKING	EFFECT	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 the mission may need to be reworked or process delayed.
5	Moderate	Moderate disruption to facility function. 100% of the mission may need to be reworked or process delayed.
6	Moderate to High	Moderate disruption to facility function. Some portion of the mission is lost. Moderate delay in restoring function.
7	High	High disruption to facility function. Some portion of the 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 may occur with warning.
10	Hazard	Potential safety, health, or environmental issue. Failure will occur without warning.

SOURCE: National Aeronautics and Space Administration, Reliability Centered Maintenance Guide for Facilities and Collateral Equipment, February 2000.

footage (860,940 square feet) equates to approximately $43,047.

Computerized Maintenance Management Systems (CMMS) focus on such preventive maintenance programs for school districts of all sizes. These systems can not only help schedule services on equipment, they can also track costs and activities associated with each asset entered into the system. The right system will help management identify the particular skills they need at various times of the year, allowing them to manage and balance workloads.

FACILITIES CONDITION ASSESSMENT PROGRAM

Finding #6 – There is no current process of effectively and objectively assessing facility conditions, identifying deferred maintenance backlogs, or for evaluating future capital needs of the existing facilities.

Recommendation 6: Initiate a periodic facility condition assessment (FCA) process to prepare annual asset management plans/existing facility capital needs forecasts (facility needs assessment).

The rapid growth of the district has placed emphasis on the design and construction of new schools and facilities, as well as the expansion of existing buildings. This focus has resulted in a neglect of practices to identify needs and adequately maintain older buildings. This has not presented major issues to date due to the overall relative young age of the schools. However, as these schools age, capital planning procedures should be implemented to ensure the effective maintenance and repair of the schools. Failure to do so could result in significant unanticipated capital expenditures, increases in deferred maintenance backlogs, and deteriorating school conditions.

There is no formal planning process for projecting and funding short- and long-range capital replacement items, such as roofing systems, pavements, mechanical/electrical/plumbing (MEP) and life safety systems in the schools. Currently, the only process reported included the preparation of a single table listing the general condition of building systems for the eight owned and one leased facility. The table identified the years of service and condition of building systems (including structure, foundation, plumbing, electrical, HVAC, floors, network wire, and roof) as poor, fair, good, or excellent.

The RCISD limits its informal planning process to the refinement of enrollment projections and development of alternative scenarios for school design and construction. There has been little thought to formalizing procedures to plan for capital expenditures of existing schools that will enable informed decisions regarding maintenance and repair of the existing facilities. Five of the eight school buildings were constructed within the last ten years (since 1998). Of the remaining three, one will be converted to the main administration building, one will be replaced by a new intermediate school, and the last is a recently renovated elementary school.

While the current enrollment projections and school design planning is valuable, RCISD should initiate a periodic facility condition assessment (FCA) process to prepare annual asset management plans and forecast future facility capital needs. Comprehensive facilities master plans should include the following elements:

- a review of the district construction and improvement plans;
- five- to ten-year projections of enrollment by school, grade, and year;
- an analysis of school capacity over the planning period;
- a public input process to obtain community desires and needs;
- a five- or ten-year capital plan for existing facility maintenance and repair;
- a review of funding strategies; and
- an ongoing review and monitoring process for the plan.

The most important factor to achieve success in assessing the condition of school facilities is to evaluate needs without bias. There are a multitude of reasons to conduct FCAs. Some of the more common outcomes include:

- developing and justifying long-term or short-term capital budgets;
- identifying backlogs of deferred maintenance;
- identifying and prioritizing specific capital project needs;
- independently validating capital improvement project requirements; and
- verifying equitable distribution of capital funds among multiple schools.

The primary challenge that public educational facilities across the country have faced is that they have historically underfunded maintenance of capital assets. Compounded by a portfolio of aging schools and infrastructure and the need to constantly modernize building systems and technologies, educational facilities are accumulating backlogs of capital expenditures. Taken together, the accumulated backlog of

maintenance and repair is generally referred to as "deferred maintenance."

Concern about the deterioration of educational environments led to a number of collaborative studies by both educational and government associations. The identification and reduction of deferred maintenance has been the primary driving force of asset management programs for educational facilities. The studies also led to the development of the Facility Condition Index (FCI), one of the most recognized metrics for facilities asset management performance measurement.

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 an asset management program include:

- 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); and
- user-friendly information management system that prioritizes deferred maintenance (DM) and capital renewal (CR).

The goal of an asset management program is to conduct facility condition assessments and create a facility investment plan that is:

- rational;
- repeatable;
- recognizable; and
- credible.

Asset management plans should independently validate funding requests and provide consistent and credible information to aid in appropriately allocating funding for major facility maintenance projects. The plans should support funding decisions to ensure equitable distribution of funds among schools and ensure proper stewardship of the facilities.

The benefits of preparing facility asset management plans by conducting baseline facility condition assessments (FCAs) include:

- obtaining objective and credible data to make informed facilities investment decisions through prioritizing needs;
- streamlining facilities management processes and reducing the total cost of ownership;
- improving the condition of school facilities;
- extending the life of assets through proper maintenance and repair funding and decisions;
- minimizing safety and security risks at school facilities;
- minimizing the disruption to teachers and students caused by facility system failures;
- enabling optimal use of facilities and infrastructure in support of the educational mission; and
- improving overall stewardship of facilities and maximizing return-on-investment for district stakeholders.

If internal resources are not capable or able to accomplish this task, additional resources (i.e. consultants) could be hired to aide in the comprehensive assessment and program set up. Outside consultants could typically be procured for $.10/square foot to aide in the assessment. Multiplying $.10/square foot times the district's total square footage (860,940 square feet) equates to approximately $86,094.

COMPREHENSIVE TRAINING PROGRAM

Finding #7 – The Maintenance Director indicated that the department had money allocated for training; but there was no internal training program or tracking mechanism for external training completed.

Recommendation 7: Initiate a comprehensive training program by developing individual training and professional development plans to minimize possible on-the-job-accidents, staff inefficiencies, repeat work, and to ensure that maintenance personnel are knowledgeable in current Operations and Maintenance (O&M) procedures and techniques.

RCISD does not currently have a formal training or professional development program. Limited training is offered outside of basic safety training and required certification training. RCISD's 2008 budget did indicate funds specifically set aside for training. A review of prior year's budgets indicated that only a small portion of the budget, if any, was used by staff for 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.

Best practices show that 2-5% of a facility department's overall personnel 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.

Training is the opportunity to educate the 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.

Generally, there are four basic areas of training focus:

- training new employees in the maintenance and use of the facilities and grounds;
- training current employees who have changed task or function;
- training all employees when new statutes need to be enforced; and
- training all employees when new equipment or tools are purchased.

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:

- sharing 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);
- hiring expert staff or consultants to provide on-site supervision during which they actively help staff improve their skills while still on-the-job;
- developing training facilities, such as training rooms in which equipment and techniques can be demonstrated and practiced;
- offering tuition reimbursement programs which provide educational opportunities to staff who might not otherwise be motivated to improve their knowledge and skills; and
- building 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:

- utilizing current staff to perform training with respect to their expertise; and
- compounding the effects of training by having employees who have attended training report to those who were unable to attend due to resource restrictions.

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 participant's knowledge and awareness to areas outside their specific job duties, yet still related to the overall well-being of the organization.

Such topics might include:

- asbestos awareness;
- energy systems;
- building knowledge;
- first aid;
- emergency response;
- biohazard disposal;
- technology use;
- universal precautions;
- right-to-know;
- first responder awareness; and
- first responder operations.

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, effective, and keeps teachers, staff, students, and visitors healthy and safe.

The best training evaluations are the summaries of work orders related to the focus of the training (see Recommendation #4 regarding implementation of a Work Order System). Have the number of requests for "the problem area" decreased since training was instituted in regards to that area? Have safety incidents related to facilities decreased? Those items in the work plan that can be directly tied to training issues should be set up on a tracking system to monitor on a regular basis.

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

RCISD should develop individual staff training plans for each employee. The Maintenance Director should conduct formalized training specific to all job operations and safety related to their staff's functions. Clear documentation of training should be referred to and reviewed periodically to ensure that consistent and updated training is provided and to measure safety improvement practices. It is also recommended that facility management staff document all safety related training conducted and that these documents be stored at a designated document center for easy access and reference for management and employees alike. Any training provided to the facility organization should be video taped for future reference and training opportunities.

As best practices show that 2-5% of a facility department's overall personnel budget should be spent on training and development, based on 5% of their personnel budget, RCISD should spend approximately $21,875 annually on training for their Maintenance Department.

Exhibit 12 identifies what training is typically included in a comprehensive training program, as well as indications of how such training is generally delivered and who should receive it. This should be used as a guideline to prioritize and select appropriate topics to meet the needs of RCISD.

EXHIBIT 12
TRAINING GUIDELINES
AUGUST 2008

	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 & Control	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 & ID	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 (FEA).

FISCAL IMPACT

RECOMMENDATION	2009–10	2010–11	2011-12	2012–13	2013–14	5–YEAR (COSTS) OR SAVINGS	ONE TIME (COSTS) OR SAVINGS
1. Restructure the facilities maintenance organization.	($72,634)	($72,634)	($72,634)	($72,634)	($72,634)	($363,170)	$0
2. Increase maintenance staffing levels.	$76,927	$76,927	$76,927	$76,927	$76,927	$384,635	$0
3. Formalize and document facilities planning and maintenance policies and procedures.	$0	$0	$0	$0	$0	$0	$0
4. Implement facility management ininformation technology initially in the form of an automated work order management system.	$0	$0	$0	$0	$0	$0	$0
5. Implement a comprehensive planned maintenance program.	$0	$0	$0	$0	$0	$0	($43,047)
6. Initiate a periodic facility condition assessment process.	$0	$0	$0	$0	$0	$0	($86,094)
7. Initiate a comprehensive training program.	($21,875)	($21,875)	($21,875)	($21,875)	($21,875)	($109,375)	$0
TOTAL	**($17,582)**	**($17,582)**	**($17,582)**	**($17,582)**	**($17,582)**	**($87,910)**	**($129,141)**

ROYSE CITY INDEPENDENT SCHOOL DISTRICT INSTRUCTIONAL FACILITIES ALLOTMENT

RCISD undertook a capital improvement plan funded by bonded indebtedness to provide an adequate number of facilities and space to provide educational services for the students and anticipated growth. The district has seen significant growth in the past five years. RCISD student enrollment grew by 1,450 students or 53.8 percent from 2003–04 through 2007–08. During the same period, taxable values have grown by $521,524,178 or 134.9%. **Exhibit 13** presents the enrollments and taxable values from 2003–04 through 2007–08.

Growth is expected to slow for 2008–09 and 2009–10 due to the slowdown in the housing market. However, the most recent enrollment forecast projects an annual growth rate of more than 6 percent for the next 10 years. If this forecast is correct, the district enrollment will increase to 5,812 students in 2012–13 and 8,310 students in 2017–18. The demographic report for March 2008 lists 205 homes that were vacant or under construction, 1,665 vacant developed lots and 4,742 planned lots in RCISD.

In 2003, the voters passed a bond proposition to fund phase one of a new high school, a new elementary school and renovations to existing facilities. The voters passed a $67.6 million bond proposition in October 2005 to fund the expansion of the high school, two new elementary schools, an early childhood center, an auditorium and fine arts center at the high school, a football stadium, land for future school sites and renovations to existing facilities.

In January 2008, the district held a series of community and staff meetings to determine the appropriate grade level configurations for the district. As a result of the meetings, the board adopted a grade level configuration that eliminated the need for the early childhood center included in the 2005 bond in February 2008. The adopted grade configuration is elementary—early childhood through grade 4, intermediate—grades 5 and 6, junior high—grades 7 and 8, and high school—grades 9 through 12.

When complete, the revised plan will provide a total of four elementary schools, two intermediate schools, one junior high school and one high school. **Exhibit 14** presents the capacity after completion of the projects of each grade level configuration and the projected enrollment for 2009–10. Based on this configuration and the planned use of the remaining 2005 bonds, the district will provide capacity for forecasted enrollment growth upon completion of the projects.

The 2005 bond program will also provide the district with a new stadium, auditorium and fine arts center, land for future sites and renovations to existing facilities. **Exhibit 15** presents the revised projects and budgets for the 2005 bond. These budgets include all costs of the revised program, including

EXHIBIT 13
RCISD ENROLLMENTS AND TAXABLE VALUES
2003-04 THROUGH 2007-08

DESCRIPTION	2003–04	2004–05	2005–06	2006–07	2007–08
Enrollment	2,694	2,901	3,274	3,795	4,144
Taxable Value	$386,478,757	$497,989,681	$598,906,094	$756,179,730	$908,002,935

SOURCES: Texas Education Agency, CPTD Tax Final and Student Enrollment, 2003–04 through 2006–07 and State Comptrollers Office, School and Appraisal Districts Property Value Study 2007, July 2008.

EXHIBIT 14
RCISD PROJECTED ENROLLMENT AND CAPACITY
2009–10

GRADE LEVEL CONFIGURATION	PROJECTED ENROLLMENT	STATED CAPACITY	REMAINING CAPACITY
Elementary Schools	2,083	2,640	557
Intermediate Schools	709	1,150	441
Junior High School	680	1,050	370
High School	1,271	1,500	229
TOTAL SCHOOLS	**4,743**	**6,340**	**1,597**

SOURCE: RCISD, Facilities Projection, February 2008.

EXHIBIT 15
RCISD REVISED 2005 BOND PROGRAM
MAY 2008

PROJECT	REVISED BUDGET
Land Acquisitions	$1,440,000
Renovations	$3,683,404
High School Additions	$8,454,935
New Elementary	$12,480,495
Stadium	$17,535,696
Auditorium & Fine Arts	$6,974,428
Intermediate School	$16,000,000
TOTAL	**$66,568,958**

SOURCE: RCISD, 2005 Bond update, May 2008.

cost of construction, construction management, architecture fees and other associated costs.

RCISD uses the construction manager agent (CMA) method to construct buildings and complete renovations to existing facilities. The district negotiated a fixed fee schedule for the projects included in the 2005 bond program. The fixed fee included all costs associated with the construction project, including general conditions and overhead and profit. **Exhibit 16** presents the estimated construction cost, related CMA fee and calculates a percentage cost for the CMA fee.

Construction costs have increased significantly from 2005 to 2008 due to demand for a variety of products used in the construction of buildings. RCISD included inflation in the budget for the projects, but the actual construction costs for some of the projects were above the budget. **Exhibit 17** compares the estimated cost and actual cost for construction of additions and new facilities.

In order to control costs, the district uses prototype buildings. The elementary school built in the 2003 bond is the same plan as the elementary schools included in the 2005 bond. The district negotiated a fee structure with the architect based on a percentage of the cost of the construction for new designs of 6 percent of the cost and for architectual prototypes of 5 percent of the cost. The district negotiated a payment schedule for the architectural services that reflects certain benchmarks in the design and construction process (**Exhibit 18)** that reflects industry standards.

EXHIBIT 16
RCISD CONSTRUCTION MANAGER AGENT (CMA) FEES – ORIGINAL BUDGETS
AUGUST 2005

PROJECT	ESTIMATED CONSTRUCTION COST	CMA FIXED FEE	CMA FEE AS A PERCENTAGE OF ESTIMATED COSTS
Renovations	$2,800,000	$205,000	7.3%
High School Additions	$7,785,000	$525,000	6.7%
New Elementary #4	$10,955,000	$712,000	6.5%
New Elementary #5	$11,998,000	$780,000	6.5%
Stadium	$14,674,000	$954,000	6.5%
Auditorium & Fine Arts	$5,262,000	$365,000	6.9%
Pre-Kindergarten Facility	$7,400,000	$500,000	6.8%
TOTALS	**$60,874,000**	**$4,041,000**	**6.6%**

SOURCE: RCISD, Construction Management Services, August 2005.

EXHIBIT 17
RCISD CONSTRUCTION COSTS
2005 BOND PROJECTS

PROJECT	TOTAL ESTIMATED COST	ACTUAL CONSTRUCTION COST	SQUARE FOOTAGE	ACTUAL COST PER SQUARE FOOT
High School Additions	$7,785,000	$7,488,951	57,055	$131.36
New Elementary #4	$10,955,000	$10,955,885	83,380	$131.40
Stadium	$14,674,000	$14,559,945	n/a	n/a
Auditorium & Fine Arts	$5,262,000	$6,296,144	19,700	$319.60

NOTE: Not applicable (n/a).
SOURCE: RCISD, Chief Financial Officer, July 2008.

EXHIBIT 18
RCISD ARCHITECTURE FEES PAYMENT SCHEDULE
MAY 2008

PHASE	PERCENTAGE PAYABLE
Schematic Design	15%
Design Development	20%
Construction Document	40%
Bidding or Negotiation	5%
Construction	20%

SOURCE: RCISD, 2005 Architect Contract, May 2008.

The district negotiated a turn key pricing structure with the financial advisor that also includes the fee for the bond counsel. The fee is approximately 50¼ basis points (0.5025%) of the par amount of the bonds issued. The fee for the issuance of the 2006 bonds was $125,574 based on a par amount of $24,982,204 and the fee for the 2007 bonds was $125,629 based on a par amount of $24,999,903.

Texas school districts have three major funding sources to repay bond funds used for facilities construction: revenues from local taxes, the existing debt allotment (EDA) and the instructional facilities allotment (IFA). Local interest and sinking (I&S) taxes are levied based on the amount required to fund the district's debt service payments after any funding received from EDA or IFA.

The state's EDA program provides tax rate equalization for local debt service taxes. By providing a guaranteed yield on I&S taxes levied to pay the principal of and interest on eligible bonds, the program guarantees a specific amount of state and local funds per student for each cent of tax effort per $100 of assessed valuation. The guaranteed yield for EDA provides $35 per student in average daily attendance (ADA) per penny of tax effort. The EDA program operates without applications, has no award cycles and is available only to repay bonded debt. The EDA program is available to all districts. It is also intended to help fund debt related to both instructional and non-instructional facilities.

The state's IFA program provides assistance to school districts in making debt service payments on qualifying bonds or lease-purchase agreements. Bond or lease-purchase proceeds must be used for the construction or renovation of an instructional facility. The IFA program operates with applications and has award cycles. The award cycles include the property wealth per student of the districts as a criteria in ranking the districts for funding.

RCISD levied a $0.31 tax rate per $100 valuation in 2007–08 to pay the district's debt service payments. In 2007–08, the district received $1,755,579 in EDA funding and $226,418 in IFA funding to assist in making the district's debt service payments. The IFA funding received by RCISD is from the Round 5 (June 2000) application cycle and is received by RCISD until the bonds are paid in full. The district applied for IFA but did not receive IFA funding from Round 7 (June 2004) of $317,862 and Round 8 (June 2006) of $375,666. **Exhibit 19** presents the I&S tax rate, taxable values and a calculated tax levy for RCISD from 2003–04 through 2007–08.

RCISD received more local revenue (**Exhibit 20**) than 100 percent of the calculated I&S levy (**Exhibit19**) from 2003–04 through 2006–07 due to a high collection percentage, penalties and interest and investment interest. In 2007–08, RCISD budgeted $2,808,619 in local revenues which is less than the tax levy of $2,814,809. In addition, RCISD has received IFA (Round 5) and EDA funding to assist in the payment of debt service. **Exhibit 20** presents the debt service fund expenditures and revenue for 2003–04 through 2007–08.

IMPACT

RCISD reported that not receiving IFA had no direct impact on the capital improvement plan, because the district did not anticipate receiving IFA funding in either Round 7 or Round 8. RCISD only included local revenues and EDA funding in developing the 2003 and 2005 bond proposals. However, in order to fund the proposals without IFA assistance, the district proposed multiple sales, a bond structure and a higher I&S tax rate that allowed the district to make the payments without exceeding the 50 cent cap on I&S tax rates.

RCISD issued the authorized bonds in three sales in order to time the receipt of the proceeds with the start of the projects

EXHIBIT 19
RCISD INTEREST AND SINKING (I&S) TAX RATE, TAXABLE VALUES, AND I&S TAX LEVY
2003–04 THROUGH 2007–08

DESCRIPTION	2003–04	2004–05	2005–06	2006–07	2007–08
Tax Rate	$0.25286	$0.37850	$0.35200	$0.29310	$0.31000
Taxable Values	$386,478,757	$497,989,681	$598,906,094	$756,179,730	$908,002,935
Tax Levy	$977,250	$1,884,891	$2,108,149	$2,216,363	$2,814,809

SOURCE: RCISD, Tax Rate Resolution, CPTD Taxable Values, Calculation by Consultant, May 2008.

EXHIBIT 20
RCISD DEBT SERVICE FUND
2003–04 THROUGH 2007–08

DESCRIPTION	2003–04	2004–05	2005–06	2006–07	BUDGET 2007–08
Debt Payments	$2,504,415	$3,207,433	$3,871,053	$4,112,274	$4,511,678
State Funding	$630,938	$1,202,831	$1,918,532	$1,925,773	$2,030,625
Local Revenue	$1,012,938	$1,944,008	$2,251,392	$2,418,138	$2,808,619

SOURCE: RCISD, Annual Audit Reports, 2007–08 Budget, May 2008.

and reduce interest costs and required debt payments. The district issued the bonds in 2006 and 2007 and plans to issue the remaining authorization in 2008. The district incurred issuance costs that aggregated more than the costs associated with a single bond issue; however, the district saved interest costs with the separate issues.

For the 2005 bond program, the district used capital appreciation bonds (CAB) to defer the debt service payments while taxable values increase. CABs are bonds that do not require principal and interest payments annually, but accrete interest over the life of the bond until maturity and payment is due. The CABs from the 2006 series are callable in 2015 and the 2007 series are callable in 2016 at their accreted value. Many growing districts with increasing property values use this structure to add capacity to their debt in order to fund capital acquisitions.