

# **REVERSING THE CYCLE OF DETERIORATION**

**in the Nation's  
Public School Buildings**



**October 2014**

# Reversing the Cycle of Deterioration in the Nation's Public School Buildings

COUNCIL OF THE GREAT CITY SCHOOLS



## Table of Contents

Introduction .....	1
Chapter 1. Determining the Relationships among School Building Conditions, Student Achievement, School Safety, and Community Relations .....	5
Chapter 2. Calculating School Building Life-Cycle Investments, Life-Cycle Costs, and the Costs of Deferring Maintenance .....	11
Chapter 3. Facilities Condition Assessment and Major Repair/Replacement Program Planning .....	21
Chapter 4. Identifying Successful Strategies and Methods Used in Maintaining School Buildings and Equipment .....	27
Chapter 5. Determining Correct Methods and Amounts for Allocating Resources to Maintain School Buildings and equipment .....	39
Chapter 6. Creating a Model for Effective Community Relations .....	47
Chapter 7. Mining Resources for Maintaining School Buildings and Equipment .....	53
Facilities Task Force .....	63
About the Council .....	70



## Foreword

The Deferred Maintenance Task Force Report – “Reversing the Cycle of Deterioration in the Nation’s Public School Buildings” – is the culmination of two years of work by over two dozen school facilities and finance executives from member districts and industry, all of whom offered their considerable expertise pro bono.

Simply put, the report describes how school districts, financially squeezed over long periods of time, made economic decisions that reduced the most cost-effective types of maintenance work: preventive and predictive maintenance. The result of those decisions “to save money” will, in the long term actually increase the amount and frequency of much more expensive breakdown repair and replacement work.

As funds continued to be inadequate, the higher costs of breakdown repair work are forcing districts to make fewer repairs, which accelerates the deterioration of buildings and component systems. Ultimately, districts experienced and will continue to experience premature failure of buildings and systems, and are forced to borrow large sums of capital funds (with their accompanying debt service costs) to upgrade and/or replace facilities. Sadly, new buildings are likely to receive the same lack of preventive and predictive maintenance, thereby repeating the cycle of deterioration.

The report contains contemporary references that link the conditions of school buildings to student achievement and a variety of other issues. It also provides information and references to a variety of strategies that have proven successful in reversing the cycle of deterioration.

The Council of the Great City Schools expresses its profound appreciation for the work of the Task Force that was co-chaired by Bruce Husson, retired Superintendent, Sweetwater Union High School District and former Assistant Superintendent, Business Services, San Diego Unified School District; and Fred Schmitt retired Chief Finance Officer, Norfolk Public Schools. The Council urges its member districts to carefully review the report and embrace and employ the concepts described in it.

Michael Casserly  
Executive Director  
Council of the Great City Schools

Robert Carlson  
Director, Management Services  
Council of the Great City Schools



# Reversing the Cycle of Deterioration in the Nation's Public School Buildings

## Introduction

Across the nation, large urban school districts are experiencing premature and rapidly accelerating deterioration of school buildings. The conditions of buildings and equipment, most importantly in classrooms and school support spaces, are deteriorating to the point of hindering the core mission of schools: educating children.

Data from multiple authoritative sources reveal that the deteriorating condition of schools has a direct and significant impact on the achievement of students and the effectiveness of teachers. References to such research will appear throughout this report.

Further, the lack of effective planned, predictive, and preventive maintenance of facilities significantly increases the rate of decay, and significantly increases the overall costs of maintaining buildings and equipment at the level that allows them to effectively serve their occupants and to achieve their designed life expectancy.

Note: References to “maintenance” throughout this report focus on planned, predictive, breakdown, and replacement work. For the purposes of this report, custodial, landscape, and utilities costs are not included or considered.

**“Deferred Maintenance”** is a term that will be used throughout this report. Deferred maintenance is a measure of the preventive and regular maintenance, minor and capital repairs, and capital system and component replacements that are needed to extend the life of the facility to achieve its projected life expectancy but that have been postponed to a future date beyond the recommended service interval or breakdown.

Deferred maintenance is calculated by subtracting the accumulated expenditures for preventive and regular maintenance, minor and capital repairs, and capital system and component replacement from the current replacement value of a facility accumulated over the projected life of the facility—usually factored as a 25- to 50-year facility life.

Deferred maintenance results in

- a) increased overall costs of managing and operating facilities;
- b) increased incidence of unplanned and more costly urgent and emergency repairs;
- c) increased incidence of disruptions to delivering instructional programs;
- d) increased risk of defaults on warranties of equipment and building components; and
- e) premature failure of buildings and equipment, requiring significant and often unbudgeted capital expenditures and their accompanying debt-service costs.

**Appendix I-1** is a February 2011 report by the 21<sup>st</sup> Century School Fund summarizing the scale and conditions of United States public school buildings and grounds. Arguably the most compelling statistic presented is that, nationwide in 2010, school districts had an estimated \$271 billion of deferred maintenance in their buildings and grounds, averaging \$4,883 per student. More recent data will no doubt show increases in both of those numbers. The report also

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

indicates a top-level list of issues relating to what differences facility conditions make to children and adults. This topic will be covered in greater detail in Chapter 1.

**Appendix I-2** is a March 2014 report by the U.S. Department of Education Institute of Education Sciences titled, "Condition of America's Public School Facilities, 2012-1."

**Appendix I-3** is a January 2013 report by the Center for Green Schools titled "2013 State of our Schools Report". The report summarizes the conditions of schools in the United States and provides top-level assessments of the impacts and effects of those conditions.

At its annual Chief Operating Officer conference in April 2013, the Council of the Great City Schools (Council) established a focused agenda on the subject of facilities management. In attendance were representatives of 56 Council member and other school districts and representatives of 14 companies that serve school districts in the capacity of providing facilities management support. Over the course of two days, the conference produced a large amount of information relevant to the issues stated above and set in motion a process to

- a) inform the nation's school districts and public about the magnitude of the issues;
- b) recommend strategies and tactics to reverse the deterioration cycle;
- c) improve the management of school buildings and equipment;
- d) inform school districts about traditional and nontraditional funding sources for managing buildings and equipment; and
- e) recommend strategies for school districts to consider in order to make more effective use of operating and capital resources dedicated to managing buildings and equipment.

**Appendix I-4** is a report that summarizes the discussions at the 2013 COO Conference, and outlines a course of action to be undertaken by the Council over the next year.

The process began with the establishment of a Deferred Maintenance Task Force (DMTF), comprised of representatives of Council member school districts and private companies. The task force is co-chaired by Bruce A. Husson, retired superintendent of Sweetwater Union High School District and former assistant superintendent, business services of San Diego Unified School District, San Diego, California; and by Frederick J. Schmitt, retired chief financial officer of Norfolk Public Schools, Norfolk, Virginia. The membership roster of the DMTF, followed by a compendium of bios of the task force members, is included in this section of the report as **Appendix I-5**.

The DMTF agreed to organize the project into two phases. Phase 1 was "Defining the Problem." It consists of the first three chapters:

Chapter 1: "Determining the Relationships between Building Conditions and Student Achievement, School Safety and Community Relations"

Chapter 2: "Calculating School Building Life-Cycle Investments, Life-Cycle Costs, and the Costs of Deferring Maintenance"

Chapter 3 is "Facilities Condition Assessment and Major Repair/Replacement Program Planning"

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

The DMTF organized itself into subgroups according to the three chapters of Phase 1. From April to September 2013, the DMTF conferred seven times via conference calls and innumerable times within and among the chapter subgroups via e-mail and telephone in order to assemble the information contained in Phase 1 of the project.

Following the presentations at the 2013 CFO Conference and the CGCS Fall Conference, the DMTF proceeded with Phase 2 of the project – “Road Map to Solutions” (Chapters 4–7 of the report).

Chapter 4: “Identifying Successful Strategies and Methods Used in Maintaining School Buildings and Equipment”

Chapter 5: “Determining Correct Methods and Amounts for Allocating Resources to Maintain School Buildings and Equipment”

Chapter 6: “Creating a Model for Effective Community Relations”

Chapter 7: “Mining Resources for Maintaining School Buildings and Equipment”

The development of Phase 2 commenced at the COO Conference in April 2014 and proceeded through September. As happened with Phase 1, the development of the four chapters was accomplished by subgroups of the DMTF. During the Phase 2 development the DMTF met seven times via conference calls and met many more times in meetings of the subgroups.

### **Deferred Maintenance Task Force Co-Chairs:**

***Bruce Husson***, Retired Superintendent, Sweetwater Union High School District, Chula Vista, CA, and former Assistant Superintendent for Business, San Diego Unified School District, San Diego, CA.

***Fred Schmitt***, retired Chief Financial Officer of Norfolk Public Schools, Norfolk, VA.

### **References and Resources**

**Appendix I-1:** PK-12 Public School Facility Infrastructure Fact Sheet; February 2011; 21<sup>st</sup> Century School Fund, Washington, DC

**Appendix I-2:** Condition of America’s Public School Facilities, 2012-13; U.S. Department of Education, Institute of Education Sciences, March 2014, Washington, DC

**Appendix I-3:** 2013 State of our Schools Report, March 2013, U.S. Green Building Council, The Center for Green Schools, Washington, DC

**Appendix I-4:** Council of the Great City Schools, 2013 Annual Chief Operating Officers Conference Report, April 2013, Orlando, FL

**Appendix I-5:** Council of the Great City Schools Deferred Maintenance Task Force Roster, October 2014

# Reversing the Cycle of Deterioration in the Nation's Public School Buildings

# Reversing the Cycle of Deterioration in the Nation's Public School Buildings

By the  
Council of the Great City Schools

## Chapter 1. Determining the Relationships among School Building Conditions and Student Achievement, School Safety, and Community Relations

### Introduction

Many educators maintain that the debate over how to improve education in the United States has ignored one critical element: the physical condition of schools. Students and teachers are held accountable for their performance, but it is extremely difficult to raise levels of academic achievement when teaching and learning take place in crumbling, antiquated facilities (Yeoman, 2012; American Federation of Teachers, 2006).

Studies have concluded that low-income and minority children are more likely to attend schools that are in poor physical condition (American Federation of Teachers, 2006; Earthman, 2004; Schneider, 2002). The 21st Century School Fund reported that from 1995 to 2004, the country's most disadvantaged students received about half of the funding for their school buildings (\$4,800 per student) as their more affluent peers (\$9,361 per student). In addition, districts with predominantly white students spent significantly more on their school facilities than districts with predominantly minority students. Spending on school construction from 1995 to 2004 ranged from an average of \$5,172 per student in districts with the highest concentration of minority students to \$7,102 per student in districts with the highest concentration of white students (Filardo et al., 2006).

Numerous studies have concluded that students in substandard school buildings perform at lower levels than students in newer, functional buildings. Researchers have found that **students in deteriorating school buildings score between 5 to 11 percentile points lower on standardized achievement tests than students in modern buildings**, after controlling for income level. In addition, some experts believe that the negative impact of substandard school buildings may be cumulative and continue to increase the longer the student attends an older, deteriorating school (Filardo et al., 2011; Hatfield, 2011; Cash & Twiford, 2010; Wilson, 2008; Earthman, 2004; U.S. Department of Education, 2000).

In 2011, a study was conducted in New Haven, CT, on the relationship of school construction, test scores, enrollment, and home prices. The study found strong evidence that the school construction program there led to sustained gains in reading scores for elementary and middle school students. Trends in reading scores were flat in the years leading up to construction but turned upwards in the year of construction and continued to increase for at least the next six years.

In the sixth year following the year of construction, student scores rose by 0.027 standard deviations for each \$10,000 of per student construction expenditure. For a student receiving the average level of construction expenditure, this corresponds to a total score gain of 0.21 standard

deviations in reading scores. These gains are large, but not implausibly so; roughly speaking, they are of similar magnitude to those experienced by students who enroll in high-performing charter schools. There is weak evidence of a corresponding increase in math scores.

Housing prices and neighborhood public school enrollment also responded positively to school construction. Elementary and middle school construction raised home values by 1.3 percent per \$10,000 of per-student expenditure, and the number of school zone residents attending public school rose by up to 4.4 percent per \$10,000. As with the estimated effects upon reading scores, the timing of these changes coincided with the occupancy of completed buildings.

Taken together, the student outcome, home price, and enrollment results suggest that families, and in particular families with children, place a high value on school infrastructure investment. If families only valued infrastructure insofar as it improved education production, this would imply that raising school value-added by 0.1 standard deviations would raise neighborhood home prices by 4.7 percent and enrollment of neighborhood residents in public schools by 16.2 percent. Since school construction also changes neighborhood amenities in other ways, these values should be interpreted as upper bounds on the true elasticity of the component effects.

The following sections of this report provide more detail of the impact of inadequate conditions on student achievement.

### **Student Achievement**

1. HVAC / Indoor Air Quality: Students in non-air conditioned buildings have been found to perform 3 to 12 percentile points lower on measures of student achievement than students in air conditioned buildings (Earthman, 2004).

2. Lighting: During the 1970s and 1980s, many schools were built with no windows, in order to save energy. Use of fluorescent lamps was common. However, most experts now agree that controlled daylight, combined with appropriate artificial lighting when needed, provides students with the best lighting conditions (Baker & Bernstein, 2012; Cash & Twiford, 2010; American Federation of Teachers, 2006; Schneider, 2002).

Studies conducted to determine how much of the increase in student performance can be attributed directly to lighting conditions have produced varying estimates, ranging from 0.3 percent to 26 percent (Baker & Bernstein, 2012). Hatfield (2011) reported on a series of studies that analyzed standardized reading and mathematics scores among students exposed to different lighting conditions. Students exposed to the most daylight were found to have a 21 percent increase in performance compared to students exposed to the least daylight. The original study controlled for student demographics and years of teacher experience and was replicated in three different school districts, then verified by a re-analysis of the data two years later.

3. Acoustics: Research shows that there is a correlation between appropriate acoustical conditions and student achievement. Studies have found that high levels of noise both inside and outside of the classroom have a negative impact on student performance (Baker & Bernstein, 2012; Earthman, 2004).

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

In substandard school buildings, old air conditioning, electrical, and plumbing systems contribute to ambient noise. New and renovated schools are equipped with quieter HVAC systems and often include absorptive acoustical treatments for classroom walls, floors, and ceilings that reduce disruptions from adjacent classrooms or nearby facilities, such as highways, airports, or construction sites (Hatfield, 2011).

According to Earthman (2004), a California study found that third grade students in noisy buildings were 0.4 years behind in reading and 0.2 years behind in math compared with students in quieter classrooms. Sixth grade students in noisy buildings were 0.7 years behind in reading. The American Federation of Teachers (2006) reported that speech recognition by regular education students under noisy conditions can drop from an average of 95 percent to as low as 30 percent.

4. Overcrowded Schools: A report from the Los Angeles Unified School District in August 2012 shows that achievement gains are most robust for elementary students who escaped severe overcrowding by moving to a new elementary school. Relative to the rate of learning for the average LAUSD student, this subset of students enjoyed achievement gains equivalent to about 65 days of additional instruction per year.

5. Teacher Perception: Studies have found that teacher satisfaction (and by implication, performance) is influenced by the condition of the school building (Cash & Twiford, 2010; Filardo, 2008; Rudd et al., 2008).

Corcoran and colleagues (1988, as cited in U.S. Department of Education, 2000) reported that the physical condition of the school building had a direct effect on teacher morale, sense of personal safety, feelings of effectiveness in the classroom, and the general learning environment. The researchers also found that “where the problems with working conditions are serious enough to impinge on the work of teachers, they result in higher absenteeism, reduced levels of effort, lower effectiveness in the classroom, low morale, and reduced job satisfaction. Where working conditions are good, they result in enthusiasm, high morale, cooperation, and acceptance of responsibility.”

Researchers have found that control over environmental factors in the classroom has a strong influence on teacher morale. Teachers who have the ability to control light levels, sun penetration, acoustical conditions, temperature, and ventilation consistently report higher levels of job satisfaction (Buckley et al., 2004; Schneider, 2002; U.S. Department of Education, 2000).

6. Teacher Retention: Researchers have concluded that the physical condition of the school facility is an important predictor of teachers' decisions to leave their current position. Studies have consistently found that quality teachers are attracted to and remain longer at higher quality school buildings (Yeoman, 2012; Filardo et al., 2011; Buckley et al., 2004).

Buckley and colleagues' (2004) study of Washington, DC teachers found that the quality of the school facility was one of many factors influencing teacher retention rates. The researchers reported that the physical condition of the school facility was a significant predictor of retention rate. As the perceived quality of the school improved, the probability of retention increased. In fact, the poor physical condition of a facility played a larger role in teachers' decisions to leave a school than did dissatisfaction with pay.

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

Among Washington, DC and Chicago teachers who graded their schools as a “C” or lower, more than 40 percent said that poor conditions led them to consider changing schools and 30 percent were thinking about leaving the teaching profession. The percentages were even higher for teachers who had experienced health problems related to substandard school buildings: Approximately 65 percent of such teachers in Washington, DC and 50 percent of such teachers in Chicago reported that they were considering changing schools, and approximately 40 percent of the teachers in both cities said they were thinking about leaving the teaching profession (Schneider, 2003).

7. Student Attitudes: Experts agree that deteriorating schools affect student morale. Studies indicate that student attitudes become more positive after they move into new or renovated school buildings (Filardo et al., 2011; Cash & Twiford, 2010; Wilson, 2008; Earthman, 2004; U.S. Department of Education, 2000). The American Federation of Teachers (2006) noted: “The failure to invest in school buildings sends a cynical message of indifference to students, rather than showing them that we value their education.”

Although it is not possible to establish a causal link between improved school attitudes and new or renovated school buildings, findings suggest a strong association between new surroundings and improvements in students' perceptions of their educational experience. Pre- and post-move surveys administered to high school students by Rudd and colleagues (2008) found that the greatest improvements in attitudes were in students' feelings of safety and pride. The proportion of students who said they felt safe at school most or all of the time increased from 57 percent to 87 percent. The proportion of students who said they felt proud of their school increased from 43 percent to 77 percent.

### Community Relations

8. Economic Impact: The cost to taxpayers of allowing schools to deteriorate increases greatly when communities continue to defer maintenance of building systems. Studies indicate that every \$1 of preventive maintenance that is deferred will result in \$4 of expenditures to ultimately repair or replace those building systems.

9. Increased Property Values: Research shows that improving the condition of educational facilities will have a substantial positive effect on property values and home prices in affected neighborhoods and will lead to increases in the population of families with children attending public schools.

Research from a study in California indicates that when a school district has underinvested on school facilities, passing a referendum causes immediate, sizable increases in home prices, implying a willingness on the part of marginal homebuyers to pay on the part of marginal homebuyers of \$1.50 or more for each \$1 of capital spending. These effects do not appear to be driven by changes in the income or racial composition of homeowners, and the impact on test scores appears to explain only a small portion of the total housing price effect. (See Appendix 1-4.)

## School Safety

Millions of students attend structurally deteriorating schools that put their health and safety at risk on a daily basis. According to the Government Accountability Office and the American Society of Civil Engineers, (as cited in Filardo et al., 2011), school districts have been under-spending on maintenance and repair for many years. Substandard school buildings frequently have moldy environments, inadequate fire alarms and fire safety, inadequate ventilation, insufficient lighting, noisy classrooms, no wiring for technology, peeling paint, and crumbling plaster (Yeoman, 2012; Filardo et al., 2011; Earthman, 2004; U.S. Department of Education, 2000).

10. HVAC/Indoor Air Quality: The American Lung Association (as cited in Hatfield, 2011) reported that in 2008, 14.4 million school days were lost in the United States due to absences caused by asthma. Asthma is often attributed to persistent exposure to the airborne pollutants and poor ventilation.

Studies show that good ventilation is particularly important for children, especially those less than 10 years old, because they inhale a greater volume of air in proportion to their body weights than adults do. Dust, mold, bacteria, and allergens found in deteriorating schools can cause major harm to young respiratory systems (Hatfield, 2011; Schneider, 2002; U.S. Department of Education, 2000).

11. Harmful intrusions: Recent intrusions and attacks at schools have heightened awareness and demand for increased security measures to provide a safe haven for students and teachers. Such demands rely on higher levels of technology, monitoring and alarm capabilities, and designs of buildings and spaces that secure occupants from intruders.

*Carl Nicoleau*, Chapter 1 Team Leader; Assistant Superintendent, Miami-Dade County Public Schools, Miami, FL

*Tracy Richter*, Chief Executive Officer, DeJong-Richter, Dublin, OH

*Valerie Wilson*, School Business Administrator, Newark Public Schools, Newark, NJ

## References and Resources

**Appendix 1-1:** United States Department of Education Report: Impact of Inadequate School Facilities on Student Learning (3/31/2005)

**Appendix 1-2:** IZA Discussion Paper: The Effect of School Construction on Test Scores, School Enrollment, and Home Prices (November 2011)

**Appendix 1-3:** Information Capsule Volume 1204, Miami-Dade County Public Schools: The Impact of School Buildings on Learning (August 2012)

**Appendix 1-4:** PACE Policy Brief 12-2, School of Education, Stanford University: New Schools, Overcrowding Relief, and Achievement Gains in Los Angeles – Strong Returns from a \$19.5 Billion Investment (August 2012)

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

**Chapter 2. Calculating School Building Life-Cycle Investments, Life-Cycle Costs, and the Costs of Deferring Maintenance**

**Introduction**

The nation’s school districts spent an average of \$51 billion per year in capital outlay on school construction, land and existing structures over fiscal years 2009 to 2011 (Exhibit 1 below). Over this same period, school districts nationally spent an additional \$49 billion per year on operations and maintenance from their operating budgets.<sup>1</sup> Cumulatively, from capital and operating funds, school districts are spending nearly \$100 billion a year on school facilities.<sup>2</sup>

<b>Capital Outlay Public School Districts</b>						<i>\$(000) 's</i>			
United States	Total	Construction	Land and existing structures	Equipment		Interest on debt	Payments to other governments	Operations and maintenance of plant	Enrollment
				Instructional	Other				
2008-09	68,044,563	54,653,349	4,188,206	2,225,407	6,977,601	17,140,633	1,962,847	49,438,271	48,238,962
2009-10	59,356,069	46,950,951	3,239,070	2,442,797	6,723,251	17,630,225	1,673,206	48,678,859	48,242,775
2010-11	52,341,652	41,345,378	2,688,771	2,176,366	6,131,137	17,787,097	2,856,507	48,636,216	48,275,975
<i>Average</i>	<i>59,914,095</i>	<i>47,649,893</i>	<i>3,372,016</i>	<i>2,281,523</i>	<i>6,610,663</i>	<i>17,519,318</i>	<i>2,164,187</i>	<i>48,917,782</i>	<i>48,252,571</i>

Even with this level of spending, the American Society of Civil Engineers gives the nation’s K-12 public school infrastructure a “D” grade, and the amount of deferred maintenance in the nation’s public schools is estimated to be anywhere from \$271 billion to \$542 billion, depending upon whether school facilities are depreciated over a 50- or a 25-year life cycle.<sup>3</sup>

Deferred maintenance is high because the funding for maintenance and operating costs for the nation’s public school buildings has historically been sparse, leading to decaying infrastructures, crumbling facilities, and inadequate support for current teaching and learning technology. This situation of insufficient maintenance funding prevents capital assets from achieving their designed life expectancy, and results in a premature need for sizeable and more costly capital improvement programs to replace buildings, equipment, and systems that were neglected beyond repair and into failure. These poor conditions create obstacles to teaching and learning and undermine all of the other considerable investments being made in education.

Deferring preventive and routine maintenance in order to reduce operating expenditures shifts maintenance costs to the capital budget, thus adding debt service costs to the cost of deferred maintenance. The annual interest on debt for all capital outlay averaged \$17.5 billion from FY 2009 through FY 2011.

There is a critical need to reverse this chronic cycle of deferring maintenance from already strained operating budgets. The policies and practices that underpin deferring maintenance result in higher emergency and reactive maintenance expenditures from the operating budget. These

<sup>1</sup> Operations and maintenance of plant includes utilities, custodians, and facilities maintenance and repair, as well as security and safety services and the central office management functions associated with facilities management.

<sup>2</sup> SOURCE: Annual Survey of Local Government Finances - School Systems, Tables 7 and 9.

<sup>3</sup> “Deferred maintenance” is the work that should have been done for the various components and systems of a facility to ensure that the facility can be fully utilized to meet its designed life expectancy.

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

same policies and practices transform and accelerate otherwise routine, inexpensive work into more costly major repairs and premature replacement, sometimes moving projects into the capital budget. There must be a paradigm shift in the way district facilities are managed and funded.

The intent of this chapter is

- a) to provide public school districts with a better understanding of the added cost of deferring maintenance on the overall life-span and total life-cycle costs of the facility;
- b) to illustrate how to estimate how much deferred maintenance a district has accumulated without necessarily conducting a full building condition assessment;
- c) to demonstrate how to generate a rough estimate of how much operating and capital funding a district should be spending to responsibly keep its facilities in good repair; and
- d) to identify some key conditions that must be met to ensure high quality facilities, even with intense fiscal constraints.

### **Added Cost of Deferring Maintenance: An Ounce of Prevention is Worth a Pound of Cure**

This old adage applies very well to the maintenance of school facilities. When facility systems (roof, HVAC, life safety, security, etc.) are not maintained, such systems follow an accelerated deterioration curve and fail prematurely, sometimes years before their designed life expectancy. Deferring maintenance magnifies many times over the costs of maintaining a school facility.

As stated in this report's introduction, deferred maintenance is a measure of the preventive and regular maintenance, minor and capital repairs and capital system and component replacements that are needed to extend the life of the facility to achieve its projected life expectancy, but that have been postponed to a future date beyond the recommended service interval or breakdown.

Deferred maintenance results in

- a) increased overall costs of managing and operating facilities;
- b) increased incidence of unplanned and more costly urgent and emergency repairs;
- c) increased incidence of disruptions to delivering instructional programs;
- d) increased risk of defaults on warranties of equipment and building components; and
- e) premature failure of buildings and equipment, requiring significant and often unbudgeted capital expenditures and their accompanying debt-service costs.

The added cost of managing facilities that can be attributable to deferring maintenance is a function of

- a) which component or system is being neglected;
- b) the age of the component or system;
- c) how long the component or system has been neglected or poorly maintained;
- d) the intensity of the component's or system's use or exposure;
- e) the design and engineering quality of the component and system;
- f) the technical complexity of the component or system; and
- g) the quality of the component's or system's initial installation.

Because so many factors affect facility conditions, the incremental cost for deferring maintenance can vary greatly. In one school district, a water supply valve failed and flooded a

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

school, causing nearly half a million dollars in damage. If the valve had been checked as part of routine maintenance and replaced when it showed signs of stress, the cost to the district would have been insignificant.

Repairing an asset lowers the cost of the maintenance work and extends the life of the system or component. Identifying facilities management practices that plan, schedule and perform on-time routine and preventive maintenance provides the greatest return on investment (ROI).<sup>4</sup>

In Exhibit 2 below, the “Design-Life Curve” illustrates an asset originally costing \$100,000 with a life expectancy of 25 years. The replacement threshold is the economic moment where replacement is justified over continued repair. With adequate preventive maintenance, the asset life to the replacement threshold is 23 years; without preventive maintenance the replacement threshold is reached five years earlier. Over the life of the asset, the amount saved by deferring maintenance in the short-term comes at a significant price; over the 50-year life of a typical school, deferring maintenance will result in an additional capital replacement cycle.

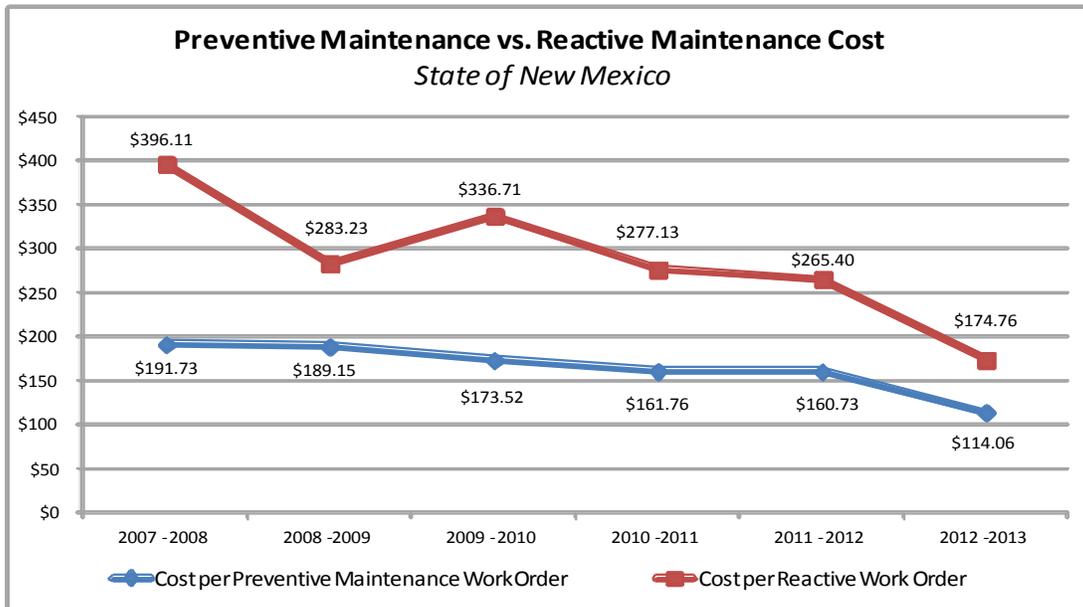
The Design-Life Curve illustrates the basic foundation for the facility condition index described in Chapter 3. In year 18 of this example, the asset has lost 75 percent of its life-cycle value and has an FCI of 75. However, with preventive maintenance it only loses 12 percent and has an FCI of 12.



Preventive Maintenance (PM) reduces breakdown maintenance work hours, and greatly reduces, if not entirely eliminates, disruption to teaching and learning. The New Mexico School Building Authority, in analyzing the cost of reactive versus preventive maintenance work orders, found that PM work orders, on average, cost considerably less than reactive work orders.

<sup>4</sup> <http://www.fmlink.com/Marketplace/WhitePapers/Articles/old/MACTEC-070907.html>

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings



New Mexico data is consistent in both range and magnitude (+/-10%) with maintenance expense data given in 'Types of Maintenance Programs' Chapter 5 of **Federal Energy Management Program (FEMP), Operations & Maintenance Best Practices: A Guide to Achieving Operational Efficiency**, r3.0, Aug 2010.

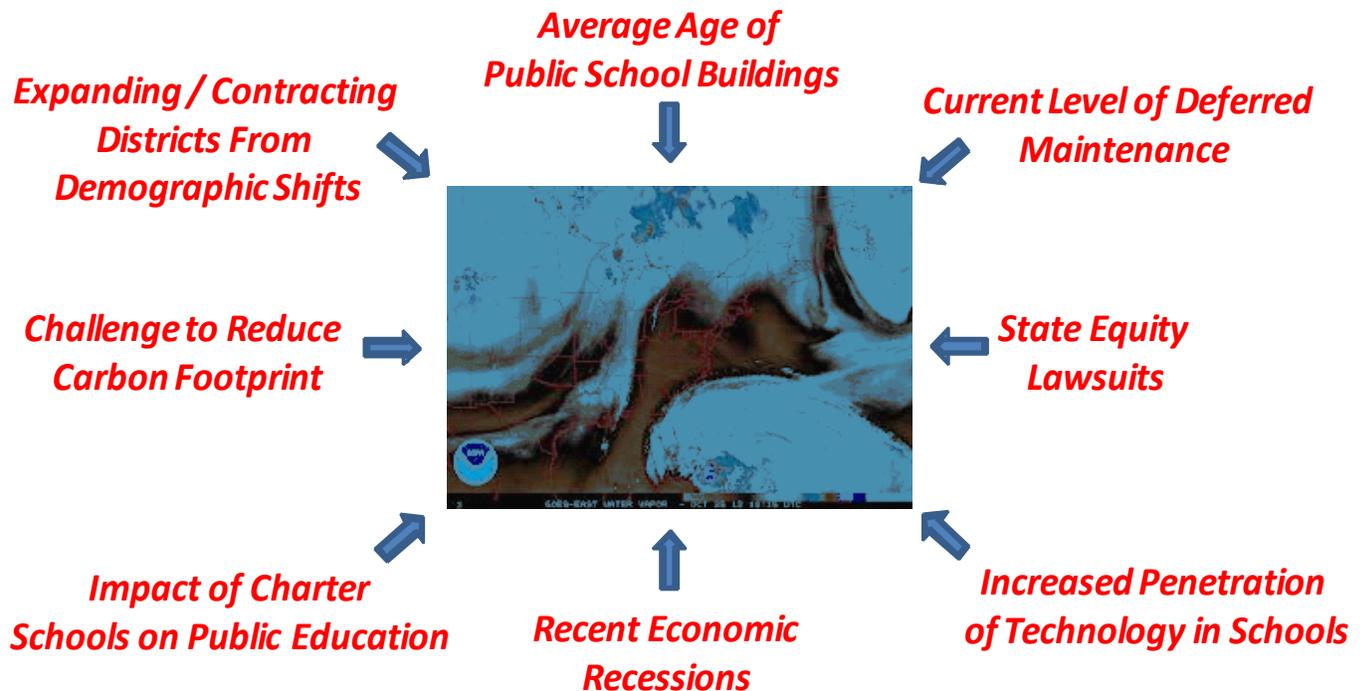
Some accumulation of deferred maintenance is realistically inevitable. However, a properly structured and funded preventive maintenance program will minimize the rate of decay and minimize risk until the next capital replacement cycle.

### Managing Facilities Infrastructure Risk

Superintendents, CFOs, and school boards weigh the overall district mission, risks and opportunities when planning and budgeting district expenditures. Facilities managers are critical advisors who know and understand the needs of specific facilities. They are entrusted to manage the work associated with the daily maintenance and repairs of schools and to know when to consider capital replacement investments.

Unfortunately funding preventive maintenance is not given proper weight in the budget prioritization process. Several credible studies infer that the state of public K-12 facilities may be reaching a tipping point whereby school districts are risking their core mission of educating students as an increasing percentage of a district operating budget must be shifted to reactive work orders and to premature capital replacement and its accompanying debt service.

The components of a “perfect storm” in the future economic prospects for public education are depicted in the following diagram. The greater risks of reduced future funding, coupled with the greater risks of increasing demands for such funding, cement the argument that facility management must be cost effective.



1. The average age of public school buildings in the United States is over 40 years old, and growing older each year.<sup>5</sup>
2. Current cost estimates range up to \$542 billion in deferred maintenance for our nation's public schools.<sup>6</sup>
3. Over the past several decades, there have been lawsuits filed in 45 states involving school funding, with varying results.<sup>7</sup>
4. Schools now must respond to increased competition from new technology innovations, including massive open online courses (MOOCs) and other innovative training options.<sup>8</sup>
5. The recent economic recession and resulting impact on state and federal budgets has presented facilities maintenance organizations with further productivity challenges.
6. Charter schools are having a measurable impact on public and private schools across the country.<sup>9</sup>
7. There is the expectation for school districts to be responsible leaders and to reduce the carbon footprint of school facilities.
8. There is volatility and resulting operational challenges from expanding and contracting enrollment due to regional population shifts.

### **Tools to Understand and Manage Risk**

Chapter 1 of this report clearly connects the condition of a facility to the core mission of teaching and learning; however, all too often policy and budget officials fail to properly weight preventive maintenance when they prioritize district spending. This report provides several tools to assist district leaders as they evaluate, benchmark, establish and execute preventive maintenance

<sup>5</sup> <http://www.ed.gov/blog/2011/09/the-presidents-plan-for-the-economy-and-education/>

<sup>6</sup> <http://centerforgreenschools.org/stateofschools>

<sup>7</sup> <http://www.schoolfunding.info/litigation/litigation.php3>

<sup>8</sup> <http://www.usatoday.com/story/news/nation/2012/11/18/more-on-board-with-online-education-trend-of-moocs/1713079/>

<sup>9</sup> <http://www.cato.org/publications/policy-analysis/impact-charter-schools-public-private-school-enrollments>

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

budgets. This report presents some simple formulas for assessing the adequacy of district spending on school facilities relative to mission and risk. Using these tools will help school districts do a better job of incorporating school facilities into their educational and financial decision-making processes.

### ***Tool #1: Know Recommended Levels of Maintenance Spending for the District***

With district financial data and just a few facility data points, a district can establish how much it should be spending, on an annual basis, to maintain its facilities.<sup>10</sup> In its study, *Committing to the Cost of Ownership: Maintenance and Repair of Public Buildings*, the National Research Council recommends that owners spend between 2 percent and 4 percent of the current replacement value of a building every year on maintenance, with maintenance including routine and preventive maintenance and repairs, as well as capital replacements and renewals of major systems as they reach their expected life. A 2 percent spend rate assumes the facility has a 50-year life expectancy, and a 4 percent spend rate assumes the facility has a 25-year life expectancy.

Where school facilities are well maintained, a district allocates operating budget funds of 1.5 percent to 2 percent of the current replacement value of assets for preventive and routine maintenance and minor repairs. In addition to operating budget expenditures for facilities maintenance and repair, a well-managed school district will allocate another 1 percent-2 percent for systems replacements and even entire school replacement if it is determined that replacing a facility may be more cost effective than modernizing it.

Note: These rates are for “maintenance”. They should not be confused with a similar rate of 2 percent - 4 percent (again, depending on whether building life expectancy is estimated to be 50 or 25 years, respectively) that should be set aside for building **replacement** at the end of the expected life cycle. Most districts do not accumulate such an allocation, relying instead on more expensive capital bond programs to fund such projects. This strategy, often born of necessity due to lack of funding, results in the extra cost of debt service.

Using a \$204 per gross square foot (GSF) replacement value nationally, and dedicating just 1.5 percent of the current replacement value toward preventive and routine maintenance and minor repairs, U.S. school districts should be spending about \$20 billion per year to maintain their existing facilities. If the same assumptions are applied to the Council of Great City Schools inventory of 771,144,000 GSF of facilities, then this cohort of districts should be spending about \$2.4 billion annually on preventive and routine maintenance and minor repairs. When applied to a school district with 11.5 million gross square feet of space, this district should be spending \$35.2 million a year on preventive and routine maintenance and minor repairs.<sup>11, 12</sup>

In addition, if the district applies 2 percent toward capital systems and facilities replacement, the total annual spending for maintenance should be \$47 billion, nationally; \$5.4 billion for the Great City Schools cohort; and \$82 million for the sample district. Exhibit 4, the table below, illustrates these comparisons.

---

<sup>10</sup> It also needs the information and data from a condition assessment, the strategic framework associated with enrollment, utilization, and educational priorities and educational facility master plans to effectively plan and manage facilities.

<sup>11</sup> [http://centerforgreenschools.org/Libraries/State\\_of\\_our\\_Schools/2013\\_State\\_of\\_Our\\_Schools\\_Report\\_FINAL.sflb.ashx](http://centerforgreenschools.org/Libraries/State_of_our_Schools/2013_State_of_Our_Schools_Report_FINAL.sflb.ashx)

<sup>12</sup> <http://www.peterli.com/spm/pdfs/SchoolConstructionReport2013.pdf>

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

Metric	National		Council of Great City Schools		Per Average CGCS District	
Gross Square Feet (GSF) <sup>[11]</sup>	6,600,000,000		771,144,000		11,509,612	
Number of Students <sup>[11]</sup>	50,000,000		6,900,000		102,985	
Number of Schools <sup>[11]</sup>	100,000		11,684		174	
Number of Districts <sup>[12]</sup>	13,600		67		1	
Estimated Construction Cost per Square Foot <sup>[11]</sup>	<b>\$204</b>		<b>\$204</b>		<b>\$204</b>	
Current Replacement Value ( CRV ) [GSF * Est Const \$]	\$1,346,400,000,000		\$157,313,376,000		\$2,347,960,836	
Current Estimated Deferred Maintenance Backlog <sup>[11]</sup>	\$542,000,000,000		\$63,327,280,000		\$945,183,284	
Facility Condition Index ( FCI ) [Def Maint backlog / CRV]	40.3%		40.3%		40.3%	
	Nation		Council of Great City Schools		Per Average CGCS District	
<b>Annual Maintenance Renewal &amp; Repair Target</b>	1.5%	2.0%	1.5%	2.0%	1.5%	2.0%
Maintenance Renewal/Repair Target	\$20,196,000,000	\$26,928,000,000	\$2,359,700,640	\$3,146,267,520	\$35,219,413	\$46,959,217
Per Gross Square Foot...	\$3.06	\$4.08	\$3.06	\$4.08	\$3.06	\$4.08
Per Student...	\$404	\$539	\$342	\$456	\$342	\$456
Per School...	\$201,960	\$269,280	\$201,960	\$269,280	\$201,960	\$269,280
Per District...	\$1,485,000	\$1,980,000	\$35,219,413	\$46,959,217	\$35,219,413	\$46,959,217

### ***Tool #2: Estimate the District’s Deferred Maintenance Backlog***

When it is not possible to inspect every facility and its systems and components, deferred maintenance can still be estimated. It can be calculated by subtracting the accumulated expenditures for preventive and regular maintenance, minor and capital repairs, and capital system and component replacement from the current replacement value of a facility accumulated over the projected life of the facility—usually factored as a 25-year (4 percent) to 50-year (2 percent) year facility life.

Appendix 2-1 shows a detailed example of how to model a financial analysis of deferred maintenance backlog. This Estimate of Deferred Maintenance U.S. Public School Buildings 1995-2008 provides an approach that can be applied to a state or district, not just to the nation. When possible, a full facilities condition assessment (described in Chapter 3) should be used, as it provides districts with the most comprehensive, contemporary tool for predicting and planning resource needs and work. However, there are times and periods between full district assessments when districts can reasonably rely on the kind of estimated deferred maintenance backlog described herein.

In an estimated backlog, the recommended level of maintenance spending is compared to the actual expenditures of the district for routine and preventive maintenance, repairs and capital renewals and replacements on existing facilities. As in the example in Appendix 2-1, the annual accumulated difference between the recommended spending and the actual spending will constitute the deferred maintenance backlog. The more “actual” data used in the analysis the more accurate the estimate of deferred maintenance backlog will be. Rather than using estimates, the district should use the actual gross square footage of its inventory and its actual spending for maintenance, repair and capital renewals. These data should be readily available in most districts. In addition, district-specific estimates for current replacement value should also be used, since labor and market conditions can vary greatly from district to district.

**Challenge of More Space and Less Funding**

Increases to the district’s facility inventory in square feet (enrollment growth) or of square footage per FTE student (enrollment decline) complicate funding building operations, including PM. When full operating and maintenance funding is not provided for the new inventory, either the new buildings will receive inadequate preventive maintenance or the existing inventory will receive less operating, repair and preventive maintenance funding. Conversely, in a declining enrollment environment with maintenance funding tied to FTE student allocations, as it commonly is, the funding per square foot will decrease without a corresponding reduction of actual space, thus reducing the actual available funding per square foot of district-owned space.

In both cases the effective space increase leaves districts with less funding for maintenance and operations. Tangentially, the complexity of modern HVAC, security, and life safety systems requires a specialized trade labor pool to maintain the assets, which requires either a higher paid in-house staff or higher cost outsourcing.

Data from Albuquerque Public Schools (APS) illustrate this challenge well (see Exhibit 5, below). Between 2007 and 2013, APS added 5.3 million gross square feet (GSF) of new school facilities space—a 56 percent increase—but reduced its total maintenance and operations budget by 20 percent. In 2007, the school district was spending \$35,005,840 on maintenance and operations—about \$3.74 per GSF; in 2013 the district was spending \$28,115,946, or \$1.92 per GSF of space—a 49 percent reduction. If the district were spending at 2 percent of replacement value over a 50-year life expectancy, in 2013 it would have spent \$3.70, not \$1.92 per GSF. While providing this low level of funding, the district reduced its in-house technicians by 51 FTEs, a 23.6 percent decrease, but increased its contractor costs by 52 percent.

Metric	2007	2013	Change	Change %
District Square Footage	9,350,500	14,624,261	5,273,761	56%
Total M&O Budget*	\$ 35,005,840	\$ 28,115,946	\$ (6,889,894)	-20%
M&O Technicians	303	252	-51	-17%
M&O Work Orders	49,869	61,221	11,352	23%
Contractor Costs	\$ 5,657,848	\$ 8,615,103	\$ 2,957,255	52%
Preventive Maintenance Expenditures	\$ 1,777,360	\$ 5,507,883	\$ 3,730,523	210%
District Utility Expense	\$ 14,976,208	\$ 19,447,970	\$ 4,471,762	30%
M&O per Square Footage	\$ 3.74	\$ 1.92	\$ (1.82)	-49%
* Includes salaries and benefits				

**Conclusion: Key Conditions for Effective Facilities Management**

School district budgets are rarely funded to provide the recommended operations and maintenance funding needed to adequately care for the district’s inventory of facilities. This situation forces facilities managers to triage reactive work orders and preventive maintenance based on less than optimal criteria. Over time, this deficit in funding substantially raises the life-cycle cost of the building.

Unfortunately, statutes, policies and/or the political climate may even create an incentive to defer preventive and routine maintenance. Some districts can shift costs to the state by neglecting

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

preventive maintenance, and consequently converting what would have been a routine repair cost into a capital replacement cost, thereby having the state pay a greater share of the cost of the work. Other districts are setting budget priorities that neglect facilities, leaving future school boards to solve the problems of deteriorated facilities. This is neither a fiscally efficient way to operate or maintain facilities, nor a practical way to manage the total costs of ownership of the public's assets.

Merely increasing operating and capital funding for facilities does not necessarily create the environment for optimal school facilities conditions. Stable and sufficient funding is just one element of a well-managed facility program. The other elements are

- a) up-to-date, accurate, and complete information on facility inventory, condition, utilization, and design;
- b) regular and participatory master, capital, and maintenance planning;
- c) transparent and efficient decision making linked to data and planning;
- d) honest and effective program, project, and facilities management;
- e) stable and sufficient funding for custodial, maintenance, and capital needs; and
- f) a system of internal controls and external oversight to ensure that the information, planning, decision making, management, and funding are aligned to the public interests.

It is imperative that districts understand their facility needs and take action to capture the data to support those needs. Healthy, safe, and educationally adequate facilities contribute significantly to teaching and learning, economic development, a sense of community, real estate values, and a reduced burden on the taxpayers.

*John Dufay*, Chapter 2 Team Leader; Executive Director of Maintenance and Support Operations, Albuquerque Public Schools

*Mary Filardo*, Executive Director, 21<sup>st</sup> Century School Fund

*Paul Gerner*, Associate Superintendent, Clark County School District

*Lee Prevost*, President and Co-Founder, SchoolDude.com

### References and Resources

**Appendix 2-1:** Estimate of Deferred Maintenance Repairs and Renewals of U.S. Public School Buildings 1995-2008

**Appendix 2-2:** Determining the Economic Value of Preventive Maintenance – Jones, Lang, LaSalle

**Appendix 2-3:** Maintenance vs. Renewal: 4-to-1 Cost Differential, SchoolDude.com, 2013

**Appendix 2-4:** An Ounce of Prevention is Worth a Pound of Cure, SchoolDude.com, 2013

**Appendix 2-5:** Before the Roof Caves in II: A Predictive Model for Physical Plant Renewal, Rick Biedenweg and Robert Hutson, Stanford University, 1980

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

**Appendix 2-6:** What You Always Wanted to Know About the 2 percent Rule, but Were Afraid to Ask, Office of the Superintendent of Public Instruction, Washington, 2002

**Appendix 2-7:** Facilities Maintenance & Operations, Classified Adequacy Staffing Report, Office of the Superintendent of Public Instruction, Washington, 2010

**Appendix 2-8:** Managing Service Demand – Balancing Stewardship & Service, SchoolDude.com, 2011

### **Chapter 3. Facilities Condition Assessment and Major Repair/Replacement Program Planning**

#### **Background**

Historically, funding for school district maintenance and operating costs has been inadequate. This has led to prematurely deteriorating or failing infrastructure that houses students, staff and community. Numerous studies exist that indicate what levels of funding should be sufficient to effectively accomplish planned, preventive, and ongoing maintenance of school buildings and equipment, so that such components achieve their designed life expectancy. Nevertheless, when facing economic pressure that requires funding cuts, school districts typically declare that the cuts must be made “farthest from the classroom,” which usually translates into “non-instructional” operations. Services such as maintenance of buildings and grounds almost always fall into that category.

Ironically, the diminution of resources to regularly and routinely maintain classrooms actually places in jeopardy the ongoing viability of being able to use such spaces. Further, research reveals that by deferring planned, preventive, and routine maintenance of buildings and equipment, the total cost of ownership of those components increases significantly. Worse, buildings and equipment that do not receive adequate planned, preventive, and ongoing routine maintenance require more—and more frequent—emergency repairs (which are more costly than planned, preventive, and ongoing routine maintenance), and ultimately fail prematurely, which then requires significant capital investment to replace the failed components.

Faced with deteriorating facilities, school boards and administrators are sometimes pressured by parents, staff and community members to make decisions that are taken out of context of the real and prioritized needs for repairs and replacement. Decisions made in such context blur the distinction between “noise” and “need,” thereby exacerbating an already bad situation by performing work on buildings and equipment that might not be as high a priority as other facilities.

The intent of this chapter is to provide districts with a method of analyzing and prioritizing the condition of facilities in ways that adhere to pre-defined and board-approved rationales and industry standards in order to maximize the effective use of scarce resources to manage the district’s investments in capital facilities.

There are a number of ways to create an economic model to fairly allocate resources to manage facilities. Many are very general, such as allocating 1.5 percent to 2 percent of the Capital Replacement Value (CRV) of facilities per year, assuming a building has an effective life expectancy of 50 years. Another example is a more granular approach, allocating resources to building components, based on the designed life expectancy of each component. The problem with using general models such as these is that actual current conditions are typically not considered, and this creates a disconnect between the resources and the needs.

This chapter describes the most detailed method of analyzing, categorizing, and prioritizing needs for preventive, predictive, and ongoing maintenance. It also describes methods for predicting and scheduling major repair and replacement projects. The objectives of these methods are to effectively predict, plan, and level the use of resources year to year; to reduce

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

surprise failures; and to minimize crisis response management, which is the most expensive kind of facilities management.

The model described herein provides a template to plan for, conduct, and manage the results of Facilities Condition Assessments (FCAs) and Facilities Condition Indexes (FCIs). The document will provide insight on FCA planning and implementation and consequent management of Major Repair and Replacement (MRR) programs.

### **Facilities Condition Assessment**

Facility “needs” include structures and/or equipment that are either in disrepair or that have reached the end of their useful life. Failure to repair or replace the structures or equipment could cause progressive deterioration of the facility condition or performance and could render spaces uninhabitable. This document outlines a more rigorous and accurate approach to assessing and managing school district facilities to help gauge and sustain the specific and overall conditions of district facilities.

The first step in this process is to plan for a formal Facilities Condition Assessment (FCA). The FCA starts with a plan of execution. The FCA plan should include the follow steps:

- Categorize district facility needs based on sources of funding to address them. (Appendix 3-1).
- Prioritizing deficiencies based on safety, code compliance, preservation of assets, enhancements to the educational environment, etc. (Appendix 3-2)
- Select a uniform method to categorize systems/components (reference American Society of Testing and Material, Uniformat II)
- Create facilities assessment forms to be used by facilities assessors (ease of use by assessors should be considered).
- Select schools to be assessed. Selection could be based on either the district's entire inventory or a subset. If districts decide to start with a subset of their inventory they should consider the following:
  - a. Sampling of representative schools from each level (elementary, middle, high)
  - b. Quantity and types of buildings (permanent vs. portable, etc.)
  - c. Site age
  - d. Square footage
  - e. Types of construction
- Identify the assessment team (either a team of professional consultants or in-house staff).
- Provide assessors with detailed site information (i.e., site maps, space utilization, and square footages).
- Provide assessors with training to assure all are evaluating facilities on the same scale, and all facilities are graded equitably

It is important to have the aforementioned plan in place prior to beginning FCAs at individual schools. There are various levels of assessments in which districts can engage. At a minimum, FCAs should include the following:

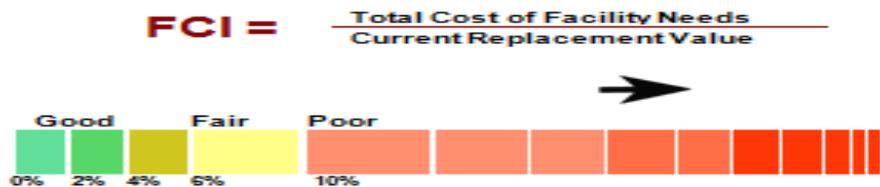
## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

- A comprehensive facility audit documenting all building system/component deficiencies at the sites by discipline—architecture, structural, mechanical, electrical, civil—using the information provided above.
- Compilations of field assessment data, including populating spreadsheets and/or an FCA database, estimates of the potential repair costs, photos and written reports with analyses and recommendations.
- Finalization of the FCA report.

### Facility Condition Index

After the assessments are complete and the total facility needs have been quantified in dollars (either all sites or a subset of sites that can be extrapolated across the district) a numerical rating system can be applied that translates the assessments into a rational measure of the facility needs and provides a means of gauging the condition of the facility. The result of this analysis is known as a Facility Condition Index (FCI).

Facility Condition Index (FCI) is a national standard typically derived by dividing the total cost of facility repair needs by the Current Replacement Value (CRV), resulting in a percentage figure. According to the Association of Physical Plant Administrators (APPA), as cited in its Capital Renewal and Deferred Maintenance Programs Guide, an FCI less than 5 percent is good; between 5 percent and 10 percent is fair; and greater than 10 percent is poor.



This method of measurement is useful in managing the district’s overall facility needs. The reviewed and compiled assessment data is the basis for developing a Major Repair and Replacement (MRR) program.

### Major Repair and Replacement Program

This information will help districts in both short- and long-range planning. Factors that should be considered in developing and managing the district’s MRR Program are:

- Funding strategies to help reduce the district’s current FCI to an acceptable level under 7 percent.
- Yearly inflation rates based on the local economy.
- Deterioration rate of district facilities. The rate should be based on the district’s CRV. Deterioration rates can range as building types, age of facilities, and location all factor into the rate of deterioration. For instance, a 50-year-old wood-framed structure in a severe climate would deteriorate faster than a new concrete-constructed facility in a mild climate. Districts with large asset inventories may elect to use a linear approach recommended at 2 percent a year, or may decide on a weighted approach based on the factors outlined above.

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

- Routine Facility Condition Assessments. As facilities continue to age and deteriorate over time, districts should consider a programmatic approach in identifying and validating the condition of their facilities. A good business practice would involve performing FCAs on a five-year recurring cycle. This would equate to assessing 20 percent of the facilities inventory each year.
- Integration of best business practices regarding technology, including but not limited to the following:
  - Computer Assisted Design (CAD)/Building Information Management (BIM) for creating and storing As-Built record documents,
  - Graphic Information System (GIS) and Facility Management System to incorporate maps, overlays, space planning, and
  - Computerized Maintenance Management System (CMMS) to record asset inventory data, facility system performance trending, etc.

All of these items will have a direct impact on determining the district's current and future condition, as well as funding strategies. It is important that the district review its current process and procedures to ensure the FCA/MRR program is being used effectively and maintained properly.

A districtwide Facility Condition Index and Major Repair Replacement Funding Model (Appendix 3-3) is provided for districts to use in determining appropriate MRR funding allocation strategies to reduce their FCI score. The model incorporates deterioration, inflation, and changes to the building area over time and calculates the CRV and districtwide FCI automatically.

### **Conclusion**

It is imperative that districts understand their facility needs and take action to capture the data to support those needs. The information provided herein is a good starting point. However, additional consideration should be given to continuous improvement, including, but not limited to, utilizing current technology and integrating technology platforms to enable enhanced facility planning at all levels.

### **Recommendations**

Districts are strongly encouraged to:

1. Conduct a comprehensive FCA and continue to validate the conditions through routine assessments on a five-year recurring cycle.
2. Apply the FCI methodology to provide a means of determining districtwide facilities needs.
3. Develop a comprehensive MRR Program to meet needs identified over time.
4. Integrate best business practices regarding the use of current technology.

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

**Lee Dulgeroff**, Chapter 3 Team Leader; Executive Director, Facilities Planning, San Diego Unified School District, San Diego, CA

**Doug Eveland, Ph.D.**; Chief Technology Officer, Gafcon, Inc., San Diego, CA

**William (Bill) Lewis**, Chief Operating Officer, Charleston County School District, Charleston, SC

**Sean Olcott**, Manager of BIM Services, Gafcon, Inc., San Diego, CA

**Bryan Ehm**, Senior Project Manager, Gafcon, Inc., San Diego, CA

### References and Resources

**Appendix 3-1:** Examples of Facility Needs Categories

**Appendix 3-2:** Examples of Priority Guidelines

**Appendix 3-3:** Backlog and Funding Model Template

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

**Chapter 4. Identifying Successful Strategies and Methods  
Used in Maintaining School Buildings and Equipment**

**Overview**

For several decades, public K-12 facilities maintenance has been severely underfunded. The lack of resources has reduced effective planning and deferred or eliminated predictive and preventive maintenance. This has significantly increased the rate of decay in public school facilities.

M&O	FY2006	FY2007	FY2008	FY2009	FY2010	Average 2006-10	Avg Per Student
Total	\$ 45,914,868	\$ 48,495,811	\$ 49,438,271	\$ 48,678,859	\$ 48,636,216	\$ 48,232,805	\$ 999

Competition for public education funding is intense and the demands on school districts to raise academic performance of students means that facilities divisions are being asked to do more and more with less and less. For these reasons, it is imperative that the stakeholders and decision makers have accurate information to make the right decisions regarding maintaining their assets. Although many things can hinder an effective asset management program, strategies exist that can support managers in providing an effective approach.

This chapter articulates various strategies in school building maintenance that can provide facilities and maintenance managers with an effective means of managing a large portfolio of assets with limited resources. The primary strategy is to move from the reactive, breakdown maintenance approach to a preventive and predictive model. In order to move towards a more predictive approach, it is necessary to understand the current condition of the facilities’ assets. This can be done several ways, either through a comprehensive facilities condition assessment (see chapter 3 and page 5 of this chapter) or through a parametric approach (see chapter 5).

An excellent reference providing details of the concepts described in this chapter is Appendix 7-1: “Planning Guide for Maintaining School Facilities,” a dated (2003) but still very relevant resource produced by the School Facilities Maintenance Task Force, the National Forum on Education Statistics, and the Association of School Business Officials International (ASBO) and sponsored by the National Center for Education Statistics and the National Cooperative Education Statistics System

**Introduction**

The two main purposes of a school district’s Maintenance and Operations (M&O) division are to support quality teaching and learning and to preserve valuable district assets. Facility *operations* manage the building systems that create the physical environment, including: heating and cooling, power and lighting, sanitation and cleaning, and mowing athletic fields, etc., while *maintenance* services, repairs, and replaces the building systems. Because building systems create the environment that fosters teaching and learning, when the facility is not properly operated or maintained, the facility becomes a barrier to teaching and learning; however, when properly funded and attentively operated and maintained, the facility supports and enhances quality teaching and learning.

### Maintenance Classifications

There are four basic categories of school facilities maintenance: reactive/responsive (includes emergency work), preventive maintenance (scheduled inspections and service), predictive maintenance, and maintenance planning.

**Reactive Maintenance** (RM) examples include the dreaded main water line break that shuts down a school and the much less disruptive window that won't close properly. Reactive work requests are typically unforeseen and usually generated by the schools. Historically, most work orders have been reactive; however, progressive districts have been focusing more and more attention on preventive maintenance, predictive maintenance, and maintenance planning—an advanced approach that is considerably more responsible, efficient, and cost effective. School districts are moving away from an antiquated philosophy of “if it's not broken, then don't think about it.”

**Preventive Maintenance** (PM) is the foundation for effectively managing facilities assets. A good PM program ensures that equipment and systems perform reliably and efficiently and obtain their anticipated longevity. Preventive maintenance aims to maintain equipment in optimal condition, reduce the risk of system breakdowns and emergency repairs, and optimize the operating costs. As the name implies, PM work is carried out on schedule *before* failure occurs thereby extending the life and performance of equipment. The word ‘preventive’ says it all. See Appendix 4-1, beginning on page 74.

The objectives and benefits of a PM program include

- achieving a uniform maintenance standard based on a set criteria and schedule;
- maximizing the use of available resources (manpower, funds, time);
- providing a historical record of maintenance tasks, labor hours, materials, and costs;
- improving system and equipment reliability;
- decreasing replacement of parts and full replacements due to failure;
- decreasing service interruptions and downtime;
- increasing longevity of systems and equipment; and
- accruing less deferred maintenance (discussed in chapter 2)

Districts that fail to perform adequate PM lose the above benefits and bear the additional cost and inconvenience associated with system and equipment failures. Persistent failures also negatively reflect on the M&O department and the district as a whole. Additional opportunity costs include

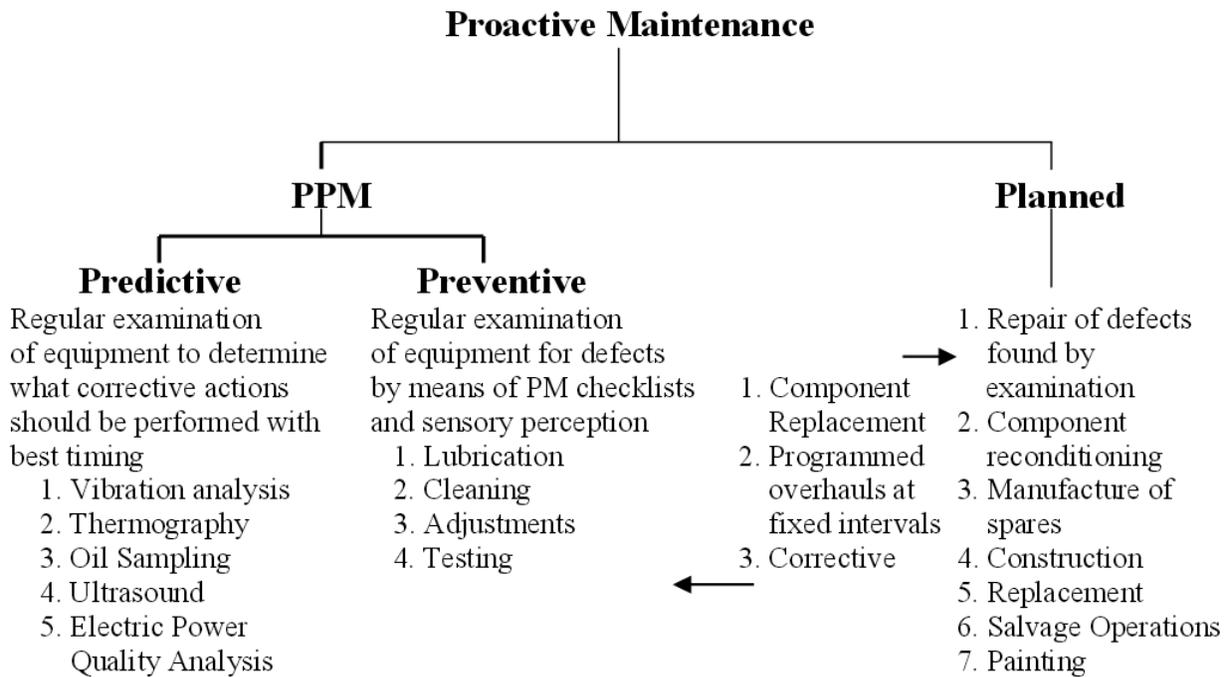
- interference with learning and teaching due to service interruptions;
- consequential damage to collateral systems or spaces including mold and mildew;
- voiding valuable systems and equipment warranties;
- uncontrollably spiraling labor hours needed to maintain equipment as failures compound;
- reduced labor productivity and frustration caused by failure reoccurrences; and
- potential impact to occupancy approval if life safety systems or indoor air quality (IAQ) are compromised.

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

In the discussions of preventive maintenance, the topic of ‘life-cycle cost’ or “cost” is raised repeatedly. In this context, both are a function of three considerations: initial purchase price, maintenance costs, and equipment life expectancy. The Total Maintenance Cost of an asset is the sum of materials and labor necessary for repairs and for preventive maintenance (PM) and the opportunity cost of lost production. In the case of a school, lost production includes unproductive teachers and other school staff and interruption to student learning while the equipment is in disrepair. Appendix 4-2 develops the economic rationale for the value of preventive maintenance.

**Predictive maintenance** is the complement of preventive maintenance and is based on the performance measures including age, use, and maintenance history. It also considers prescriptive measures and the manufacturer’s performance specifications. The goal of predictive maintenance is to align maintenance intervals with maintenance needs, based on analytical criteria. Certain types of equipment can self-report and self-diagnose maintenance needs and emerging problems and alert maintenance personnel prior to system component damage or failure. Less automated equipment and systems can also benefit from predictive maintenance by tracking their use, performance, service maintenance, repairs, and part replacements from initial purchase throughout the life of equipment.

**Planned maintenance** includes maintenance tasks that are scheduled based on asset age or type and may be influenced by other factors in the maintenance or capital budget into the foreseeable future (1-3 years).



*Source: United States Department of Energy*

### **Helpful Facilities Management Aids**

Preventive maintenance is a process that districts should institute for the numerous reasons listed. Several software applications are available as tools to support the process. They are generally classified as Computer Aided Facilities Management (CAFM), which is used for space inventory, planning and management; or Computerized Maintenance Management System (CMMS) software, which supports asset tracking and work order tracking, including maintenance scheduling; and Facilities Condition Assessment (FCA) software, which captures the current condition of space and educational adequacy and forecasts the district's capital needs over a planning period. Collectively, the data produced by these systems provide the district with an understanding of its particular portfolio of facilities and helps it make data-supported decisions or recommendations. A brief description of each of these management tools follows.

#### ***Computer Aided Facilities Management (CAFM)***

The International Facility Management Association (IFMA) defines facility management as “the practice of coordinating the physical workplace with the people and work of the organization. It integrates the principles of business administration, architecture, and the behavioral and engineering sciences.” Thanks to the introduction of the personal computer in the late 1980s, CAFM was developed, which automated the collection, tracking, and interpretation of facilities management information.

According to the IFMA, the broad classifications include

- annual and long-range facility planning;
- facility financial forecasting;
- real estate acquisition and/or disposal;
- work specifications, installation, and space management;
- architectural and engineering planning and design;
- new construction and/or renovation;
- maintenance and operations management;
- telecommunications integration, security, and general administrative services; and
- technology integration.

More specifically, examples of facilities data tracked by a school district might include the following:

- Strategic Planning – real estate, business operations, forecasting future space requirements, and altering facilities to conform to contemporary laws, codes and educational programs
- Space Planning and Management – allocations, inventory, classifications
- People Management – students, parents, staff, vendors
- Maintenance Management – reactive, preventive, predictive, and planned maintenance
- Emergency Management – disaster planning and recovery, safety
- Capital Project Management – new construction and major renovation (Capital Master Plan)
- Lease Management – property financial data
- Asset Management – depreciation, equipment, furniture, telecommunications, technology
- Building Information Modeling integration – interaction with other applicable programs

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

- Sustainability – energy performance and conservation, building certifications (LEED, Energy Star)

### ***Computerized Maintenance Management System (CMMS)***

A CMMS software package maintains a computer database of information detailing the organization's maintenance operations. CMMS packages can be web-based, hosted by a software development company that sells and services the product (such as SchoolDude.com, SAP, or Archibus), or LAN-based on district-hosted servers. Districts use off-the-shelf software packages, such as Maximo. Also, with support from information technology consultants or with in-house IT capacity, districts have developed systems of their own that have automated maintenance and work processes.

CMMS systems are an essential tool for helping M&O divisions monitor, plan, manage, schedule, inventory, track, forecast, and perform maintenance tasks more effectively. CMMS packages focused on maintenance can produce reports documenting

- status summaries of maintenance activities;
- prioritization and aging of work;
- location of needs and equipment;
- origin of work and assignment to personnel;
- reason for job (preventive maintenance vs. vandalism);
- labor hours;
- labor costs;
- third party or contractor expenses;
- materials used with related costs; and
- equipment rented

Typically, the more sophisticated the system, the more features and analytics the system provides in communications, security and reporting such as

- graphs, trends, benchmarks/key performance indicators;
- summary vs. detail reporting options;
- notifications and alerts to appropriate parties and personnel; and
- stats for work outside of normal routines (e.g., after-hours facility use or event setup)

### ***Facilities Condition Assessment (FCA)***

Facilities Condition Assessments use a structured process to evaluate the condition of districts' facilities. Many districts assess both the condition of the facilities and their educational adequacy. Together, this data inform decisions about the scope of work and funding needed to bring a facility up to a baseline standard. The results of the FCA are commonly expressed as the Facilities Condition Index (FCI). FCI is a national standard of measure derived by dividing the total cost of facility repair needs by the current replacement value (CRV), with the result represented as a percentage figure. Most districts either utilize an in-house specially trained team or hire architects, engineers, or skilled technicians to perform the FCA and to calculate the FCI. Many districts also find that the structured process, combined with the comprehensive reporting, helps to remove politics from the decision-making process for capital budgeting. See chapter 3 of this report for additional information about the FCA/FCI processes.

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

Districts use commercially available software systems, such as the Jacobs MAPPS, Parsons Comet and IBM Tririga systems because the data needed to calculate the FCI and to build the funding scenarios exceeds the capabilities of spreadsheets.

A facility audit should gather contemporary data on all facilities. Such data should include:

- Age and building construction type.
- The conditions of
  - common grounds and landscaping
  - playgrounds and equipment
  - athletic fields (including irrigation system) and structures
  - parking lots and paved surfaces
  - building infrastructure, which includes
    - mechanical equipment (including HVAC)
    - plumbing systems
    - electrical distribution systems
    - flooring materials and finishes
    - roofs
    - lighting and fixtures
    - ceilings and walls
    - doors and hardware
    - windows
    - technology
    - building content (furniture, appliances, etc.)
    - fire alarms, sprinklers, and extinguishers; and
    - intercom and other electronic systems
- Other considerations, such as security systems and related issues, such as susceptibility to vandalism; compliance with relevant building codes that might have changed since original construction; accessibility, including ADA; and environmental matters such as clean air, asbestos or other contaminants, occupant safety, and energy efficiency.
- Educational adequacy.

Note: The concept of educational adequacy—the ability of a facility to accommodate the intended use in accomplishing the goals of instructional programs—is more a function of architectural/engineering design and construction than of maintenance. However, development and continuous renewal of educational adequacy specifications for facilities design and construction can significantly improve the ability of districts to maintain their facilities economically. It can be usefully to engage a variety of stakeholders to develop the information included in districtwide Generic Educational and Technical Specifications for addressing maintenance issues. Each stakeholder contributes to the process from his or her area of expertise. There can be multiple levels of engagement to gain necessary input from a comprehensive list of stakeholders. The process can include: instructional heads, directors of instruction, O&M managers, staff involved in facilities planning, nutrition services, security, risk management, student health, transportation, playgrounds, functional capacity planning, and various other staff members. They may spend many hours providing valuable information to help bring consistency when it comes to investments in systems (mechanical, security, etc.), and that consistency can help reduce costs in professional development and limit spreading staff too thinly trying to cover

and maintain a multitude of products and systems. Additionally, a consistent revisiting of the generic educational and technical specifications should be performed to ensure the most up-to-date efficiencies in technology and methodology.

Many districts are also expanding the scope of their assessments to include educational adequacy, equipment life-cycle cost, hard and soft project cost, and cost escalation. Most applications also support robust reporting that is needed to support capital funding requests and data migration, which is useful when integration with CAFM or CMMF is desired. Aligning FCA and CMMS data allows the facilities manager to understand the value of aging assets relative to replacement costs, and it serves as a tool in projecting future maintenance needs and budget requirements—essentially a blueprint for maintenance planning.

### **Basic Requirements of a Preventive (and Predictive) Maintenance Program**

The following components, when effectively used, provide the highest probability of delivering a successful PM program:

1. Commitment of executive leadership: Demonstrated by prioritizing budget decisions with the full understanding that the cost of correcting conditions that have been exacerbated by inadequate maintenance is several times greater than the investment in preventive maintenance.
2. Commitment of M&O staff: Requires participation from all service managers, supervisors, technicians, and support personnel.
3. Subject matter expertise: Comprehensive knowledge of equipment, including the process conditions required to yield quality, output, safety, and compliance to standards. Initial training and continuing education must be adequately funded, and resources, including manufacturers' maintenance manuals, must be maintained.
4. Commitment to follow the PM schedule: To be effective, PM must be performed based on a schedule.
5. Staff dedicated to PM work is preferable: Adequate resources are needed to maintain the PM schedule against competing priorities.
6. Tracking and reporting: Measurable results require data; all work orders need to be managed in a CMMS system.

### **Life-Cycle Expectancy is the Driving Force of PM**

It would be remiss to discuss PM without stressing the importance of understanding the life-cycle expectancy of every purchase, whether it be HVAC equipment, a new roof, or electrical ballast. In order for facilities managers to make prudent planning and budgeting decisions, it is imperative to first select the *right* product.

Making the right product choice, HVAC equipment for example, requires considering relevant criteria, such as

- application;
- weather and climate conditions;
- intensity of use;
- compatibility with related components or systems;

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

- energy requirements;
- length of warranty; and,
- most important—the one factor than *can be controlled*—the ability to perform required maintenance.

Budget funds are finite resources. Purchasing the least expensive piece of equipment may initially be alluring; however, over the life of the building, that decision may cost considerably more than a higher quality piece with a greater initial cost. Life-cycle evaluations should factor in both the initial cost and the cost to operate and maintain the equipment over its expected life. For example, lesser quality equipment may consume more power, require more periodic maintenance, offer a shorter warranty, and ultimately may require replacement sooner. Together, these total life-cycle cost considerations should be weighed for all major purchases. Additionally, districts should consider the funding for both the initial expenditure and the continuing expenditures. Often, the latter funding comes from a more finite operations budget; therefore using more readily available capital funds to buy a higher quality piece of equipment may preserve scarce operating funds later.

***PM is the primary factor in extending the life expectancy of any purchase, regardless of the initial price tag.*** It may seem counterintuitive but, PM on the higher quality equipment may be even more important because of the extended life expectancy potential of the higher quality equipment. Preventive maintenance and maintenance records are also required for claims on many manufacturers’ warranties. Thus the old saying, “Quality does not cost, it pays” applies not only to the initial equipment cost but also to the maintenance of the equipment.

### **Launching a Preventive Maintenance Program**

Districts should start by assembling all the relevant information available, including an accurate inventory of all buildings, equipment, and equipment histories. If records are incomplete, it is still possible to initiate a successful PM plan. It is recommended that districts initiate a PM program in manageable phases with realistic expectations, given the committed and available resources, including budget funding, labor, and technology.

1. Start small and select initial efforts prudently.
2. Garner support for PM growth based on measurable results and cost savings.
3. Focus on the inspection (the investment) followed by the correction (the return on investment).
4. Follow through on task and paperwork completion.

*Preventive maintenance includes supportive administrative functions, including:*

1. Accurate and timely data entry in the facilities work order system
2. PM checklists detailing specific inspection and correction tasks (kept current)
3. Service records for equipment inspection, service, and repair history from installation throughout life of equipment

*Performing preventive maintenance efficiently requires:*

1. Organized and routine schedules
2. Proper operation of equipment

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

3. Proper tools and materials in the right quantities, at the right site, and at the right time
4. Forecasting wear and tear by routinely inspecting (identifying small repairs before they become major) and correcting
5. Regular replacement of parts before they fail
6. Periodic overhauling of equipment to improve performance
7. And ideally, reliable design, engineering, fabrication, and commissioning or installation verification to minimize or eliminate repetitive failures

### Maintaining and Growing a Preventive Maintenance Program

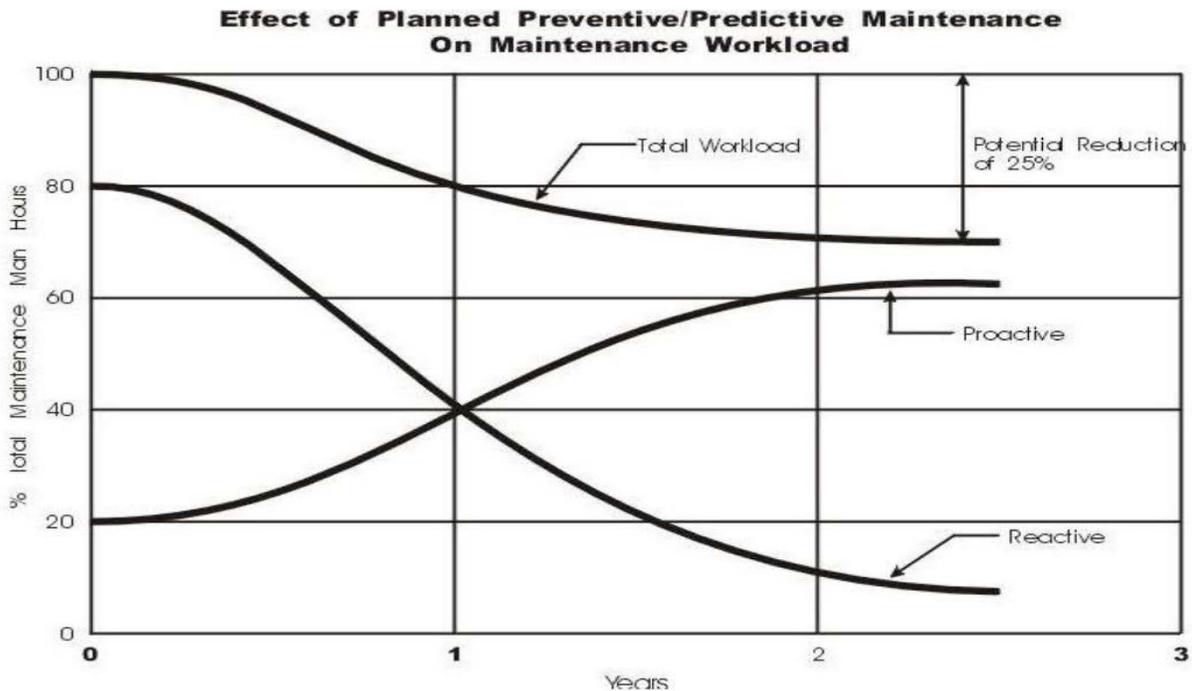
In the short run, PM programs add cost to the budget needed to fund the overall maintenance operation because savings from PM work accrue at a slower rate than the expended cost; however, there is a breakeven and then ROI period. It is therefore recommended to structure the PM program for initial success and then make minor course corrections to take advantage of opportunities that generate a real ROI. Measuring performance with a CMMS system is essential to supporting continued investment in and expansion of the PM program.

#### *Strike a Balance*

Balance maintenance and operational goals and efficiencies with the needs of the ultimate customer. Compromise is a virtue, and resources are finite; remember that it always comes down to dollars.

#### *The Investment in Preventive Maintenance Pays Off!*

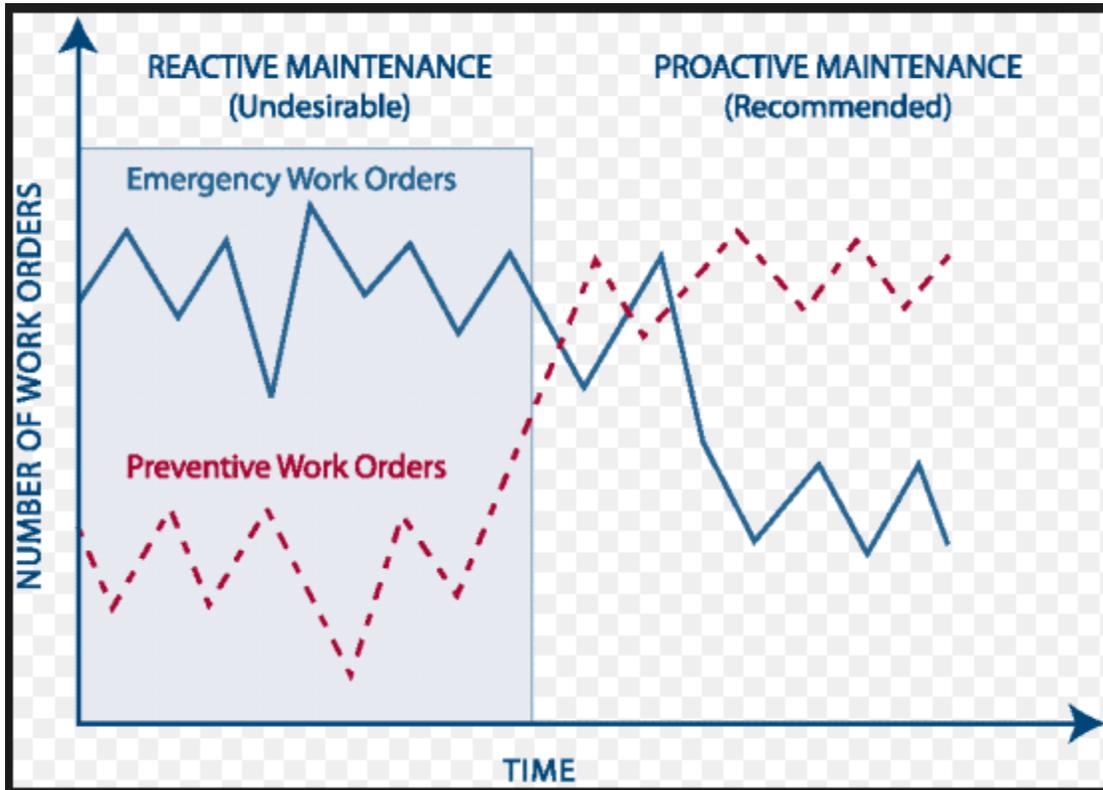
As the following graph illustrates, it typically takes two to three years from beginning a PM program to realize the savings. Not every school district will experience such dramatic curved lines representing percentage improvements, but it is a given that an increase in PM work *will* result in a downswing of reactive work and costs of that work.



Source: United States Department of Energy

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

As shown below, regardless of how long it takes to realize the returns of time, cost, and effort expended in a preventive maintenance program, emergency and reactive work (most expensive) declines as preventive work (most cost efficient) rises.



Source: United States Department of Education

### District Size May Affect PM Program Design and Execution

Lastly, district size may dictate the preferred approach in providing maintenance services to schools. In large districts there can often be difficulties in providing efficient and effective services across a large inventory of facilities. While many large districts dispatch from a central maintenance depot, other districts are using satellite depots to reduce unproductive labor hours in transit to and from jobs. The benefits of managing a smaller subset of district assets are as follows:

- Maintenance services could be provided and managed more effectively.
- More time on tool and shorter service response times, due to shorter travel distances.
- Staff continuity, better understanding of the facilities, and corporate knowledge.
- Enhanced customer relationships.

Many districts find that a hybrid approach works well. In this approach, some shops are housed in satellite depots and others, due to their unique needs or resources, reside in centralized depots. There are many variables that need to be considered regarding which model will work best; however, all decisions about the model should inform the design of a PM program.

## Conclusion

Facilities maintenance in public K-12 schools has been severely underfunded. The lack of resources, lack of effective planning, and lack of predictive and preventive maintenance have significantly increased the rate of decay in these facilities. For this reason, it is imperative that the stakeholders and decision makers have accurate information to make the right decisions and deploy the best strategies and tactics to maintain their assets.

One strategy is to move from the reactive, breakdown maintenance approach to a preventive and predictive model. In order to move towards a more predictive approach, it is necessary to understand the current condition of the facilities assets. This can be done several ways, either through a comprehensive facilities condition assessment or through a parametric approach. These approaches are explained in more detail in chapter 5.

Other strategies include the use of technology in managing facility assets. Computer Aided Facilities Management (CAFM) is used for inventory management and space planning; Computerized Maintenance Management Software (CMMS) supports asset and work order tracking. Facilities Condition Assessment (FCA) software defines the current deficiency needs and produces a life cycle analysis. All of these technologies provide various levels of support in managing a large portfolio of facilities, but when used together, they can provide managers a detailed understanding, allowing them to make informed decisions.

An additional strategy could include the organization aspects of the business services. Often in large districts, there can be difficulties in providing efficient and effective services across a large inventory of facilities and a large geographic area. While most large districts take a centralized approach to maintenance, some districts are moving towards a more decentralized approach in managing facilities.

*John Dufay*, Chapter 4 Team Leader; Executive Director, Support Operations, Albuquerque Public Schools

*John Dougherty*, Program Director, Jacobs Engineering

*Paul Gerner*, Former Associate Superintendent, Clark County School District

*Dr. Lester Herndon*, Assistant Superintendent, Seattle Public Schools

*Ronald Kramps*, Executive Director, Facilities, Charleston County School District

*Kristabel Lopez*, Business Leader, South Region, Jacobs Project Management

## References and Resources:

**Appendix 4-1:** Planning Guide for Maintaining School Facilities, published by the School Facilities Maintenance Task Force, the National Forum on Education Statistics and the Association of School Business Officials International (ASBO). Sponsored by the National Center for Education Statistics and the National Cooperative Education Statistics System, February 2003

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

**Appendix 4-2:** Determining the Economic Value of Preventive Maintenance. Jones Lang Lasalle, undated.

## **Chapter 5. Determining Correct Methods and Amounts for Allocating Resources to Maintain School Buildings and Equipment**

### **Background**

Cuts to education budgets and other economic setbacks have resulted in a downward spiral effect, impacting all aspects of school district business and operations. Maintenance has not been an exception, and in fact, has probably been more significantly impacted than other areas of public education, under the premise of “making cuts as far from the classroom as possible.” Over the past decades, educational agencies nationwide have not been investing sufficiently in maintaining their facilities. The lack of resources results in insufficient and ineffective planned, predictive and preventive maintenance of facilities. This funding failure increases the rate of decay, and significantly increases the total cost of facility ownership over the designed life expectancy of the facility.

It is imperative that school district stakeholders and decision makers have accurate information and make data-driven decisions about maintaining their assets in an environment of limited resources. Prudent district leaders see the current economy as a “new normal,” where pressure to provide improved levels of service and innovations for teaching and learning compete for limited resources of state and federal revenue.

Facilities managers are supported by numerous published studies that calculate the necessary funding levels to effectively accomplish planned, preventive and ongoing maintenance of school buildings and equipment. These studies offer a range of cost modeling, including cost per square foot, cost per student, projected costs based on useful life of building systems and components, as well as various facility modeling techniques.

This chapter explains the various methods of allocating both the resources to properly maintain school facilities and the dollar amounts.

### **Facilities Condition Assessment**

One of the most effective ways to determine the scope of resources needed to properly maintain schools is to assess a district’s facility assets through a comprehensive Facilities Condition Assessment (FCA). In the public education sector, an FCA is typically used to develop a Long-Range Facilities Master Plan (LRFMP). It is an essential tool for facility leaders to assess facilities needs, plan projects, record progress against the plan, and communicate with credible data. A subset of the LRFMP is often referred to as a Major Repair and Replacement (MRR) program.

Facilities leaders need to understand the needs of their district facilities. Although the Task Force recommends an FCA as a best practice, it also appreciates that some districts cannot or will not be able to perform an FCA. Accepting this reality, the Task Force has outlined a layered approach for collecting sufficient information and calculating reasonable and defensible budgets for maintaining the district’s inventory of facilities. The layered approach is described below:

**1) Percentage of District’s Capital Asset Current Replacement Value**

An initial approach would be to determine the district’s overall Capital Asset Current Replacement Value (CRV). This is done by multiplying the district’s total building square footage by the cost per square foot of new construction. Once the district’s CRV has been determined, it is multiplied by a factor to determine the rough order of magnitude of the budget needed. Districts should consider industry standards like the Association for Physical Plant Administrators (APPA) recommendation of 2 percent to 4 percent of CRV as an annual budget. Local factors, such as climate, age of facilities, type of construction, cost of labor, etc., also need to be considered.

Districts can refine this data by a “Level Zero Assessment” (Appendix 5-1). This simple model begins with the CRV and age of systems and then apportions repair/replacement across each system by utilizing a standard lifecycle.

<b>Advantages</b>	<b>Disadvantages</b>
Simple Approach of applying a yearly percentage of the building’s value	Some years fluctuate in funding requirements. Often there are surges every five years in needs to address.
Recognized approach and standards in data	Will depend on building-by-building factors.
Targets potential systems to address and estimates cost	Does not always account for considerations (e.g., historic structure) and will need to assess systems on a case-by-case basis
Effortless Results	May not address the fact that many schools are renovated in sections and have additions built over multiple years. Requires “splitting” components with differing years of installation.

**2) Parametric FCA Model**

A Parametric FCA is more detailed than the percentage of CRV but less detailed than a full FCA that documents discrete deficiencies and educational adequacy. This approach, further described in Appendix 5-2, uses an industry standard model like RS Means to calculate the approximate and proportionate cost of the major elements of the building by using the Unifomat industry standard developed by the American Society for Testing and Materials (ASTM). Each major building element is grouped uniformly and then evaluated systematically. Districts can rate the current condition of each category of system/component (substructure, shell, interiors, etc.) from 1 to 10, with 1 being an urgent, life/health/safety issue needing immediate attention, and 10 being a newly constructed facility with no issues to report. The CRV is then multiplied by the percentage of each individual system category, then by the ranking for that category. An example of this is as follows:

- Total building CRV = \$75,000,000
- RS Means cost model calculates the interior of a high school building (wood floor, carpet, acoustic 12x12, tee bar ceiling, etc.) to be 19.6 percent of the overall cost.

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

- Uniformat II Level would then be ranked from 1 to 10, say the wood floor ranked as a 7, carpet ranked as 6, ceiling tile as an 8, for an average rank of 7 for the entire Interiors category (Uniformat Level I)

$\$75,000,000 \times 19.6\% = \$14,700,000$  for Interiors (Uniformat Level 1)

$\$14,700,000 \times .7$  (ranking) =  $\$10,290,000$ . The delta between  $\$14,700,000$  minus  $\$10,290,000$  is  $\$4,410,000$  (total deficiency in that category)

This exercise would be repeated on all seven Uniformat Level I categories until all major elements have been evaluated. Once the total need is identified, a yearly deterioration and inflation rate should be applied to develop a multi-year analysis.

<b>Advantages</b>	<b>Disadvantages</b>
Provides simple reporting for boards and stakeholders	May not be detailed enough for some facility directors and architects.
Is a recognized data source	Will need to factor in elements such as soft costs and contingencies.
Addresses condition	Requires a judgment call that can require resources to analyze.
Provides centralized data that can be compared on a national basis	Addresses major metropolitan areas via City Cost Index, but may be limited to certain cities in a state.

### 3) Comprehensive FCA and MRR Program

A comprehensive audit or Facilities Condition Assessment (FCA) (Appendix 5-3) documents all building system/component deficiencies at the sites by discipline (architecture, structural, mechanical, plumbing, electrical, and civil). The audit should

- a) document the current condition of all building system components;
- b) prioritize the deficiencies based on life/health safety, preservation of assets, etc.;
- c) categorize the deficiencies based on funding source; and
- d) determine the expected remaining lifespan of the various systems and components.

The information gathered through the assessments is used to calculate the overall Facilities Condition Index (FCI) for the district and the FCI for particular facilities. The data are also used to generate reports and model improvement plans based on projected funding levels. Certain systems also support enhanced data visualization and integration with other lines of business systems.

<b>Advantages</b>	<b>Disadvantages</b>
Provides detailed information	Is time- and resource-intensive.
Is an insightful snapshot of conditions	Data must be consistently updated.
Is documented in thorough reports	Reports should be broken into summaries and detailed versions as needed for boards, facilities managers, general public, etc.
Provides professional results	Costs of assessment can vary, depending upon scope.

**4) Alternative FCA Modeling: Component Unit Cost with Condition**

Districts may employ a unit cost methodology to view more specific building components for remaining life, expected replacement and related costs. Districts can rate a generic component and apply an expected unit cost while taking life expectancy into consideration:

<b>SYSTEM</b>	<b>COMPONENT</b>	<b>UNIT OF MEASURE</b>	<b>UNIT COST</b>	<b>LIFE CYCLE IN YEARS</b>
Flooring	VCT	Sq. Ft.	\$2.00	20
Flooring	Ceramic Tile	Sq. Ft.	\$8.00	20

Districts can rate the current condition of each category of system/component on a scale of 1 to 10 that will apply against the life cycle. The amount of units (e.g., sq. ft.) could range from room-by-room to building-wide. See Appendix 5-4.

<b>Advantages</b>	<b>Disadvantages</b>
Allows detailed breakdown of data	Takes time to build and time to maintain or update.
Allows “true” costs based on exact unit of measure	Must consistently update unit costs on a regular basis.
Allows detail down to room level if needed	Most projects are completed on a region of a building or series of rooms. Too much data might be an impediment to decision making.
Allows component-by-component breakdown	Reports need to be summarized for the board and the public.
Allows for updating of condition	Staff must be prepared to update data on a regular basis, and there needs to be a central database to reduce administrative time.

**5) Site Modeling**

Site modeling could be used as the basis for a district to assess its overall facilities condition. The comprehensive assessments described in section 3 above could be done on a subset of the district’s inventory and extrapolated over the entire district facilities inventory. The assessments would be performed on a single school or a few schools with similar characteristics, based on several factors including age, type of construction, grade levels, location, etc.

Once costs have been extrapolated and projected deficiencies are understood, a yearly deterioration and inflation rate should be applied to determine a multi-year funding need.

<b>Advantages</b>	<b>Disadvantages</b>
Faster turnaround of results	Does not take into consideration each building’s amount of wear and tear.
Consistency in statistics	Assumes systems are upgraded or replaced with similar materials and technologies.

### **Developing Analysis of Resource Needs**

School districts do not widely or consistently calculate the total cost of maintaining a school district's facilities. Decades of inadequate funding have led many districts to look at their portfolios based on "what they might get" instead of "what they need." Accordingly, district budgets are typically built to fund day-to-day operations and maintenance and do not include long-range financial planning for capital renewal, major maintenance, and deferred maintenance.

The unfortunate reality is that capital assets depreciate over time regardless of a district's ability to fund planned or predictive maintenance. This report illustrates clearly that they depreciate at an accelerating rate if such maintenance is not performed. Accepting as fact that facilities have a limited productive or useful life, responsible district leaders need to understand and appreciate the life cycle of facility assets and increase planned and predictive maintenance programs to systematically protect their facility investments. Buildings do not wear out all at once; they fail gradually, by individual systems and components. A planned repair and replacement program that addresses systems and components is necessary to reverse deterioration and extend a facility's life.

Major Repair and Replacement (MRR) programs are used to plan, forecast, and fund the facility assets of the district based on information generated from one of the above systematic approaches. An MRR should take into consideration

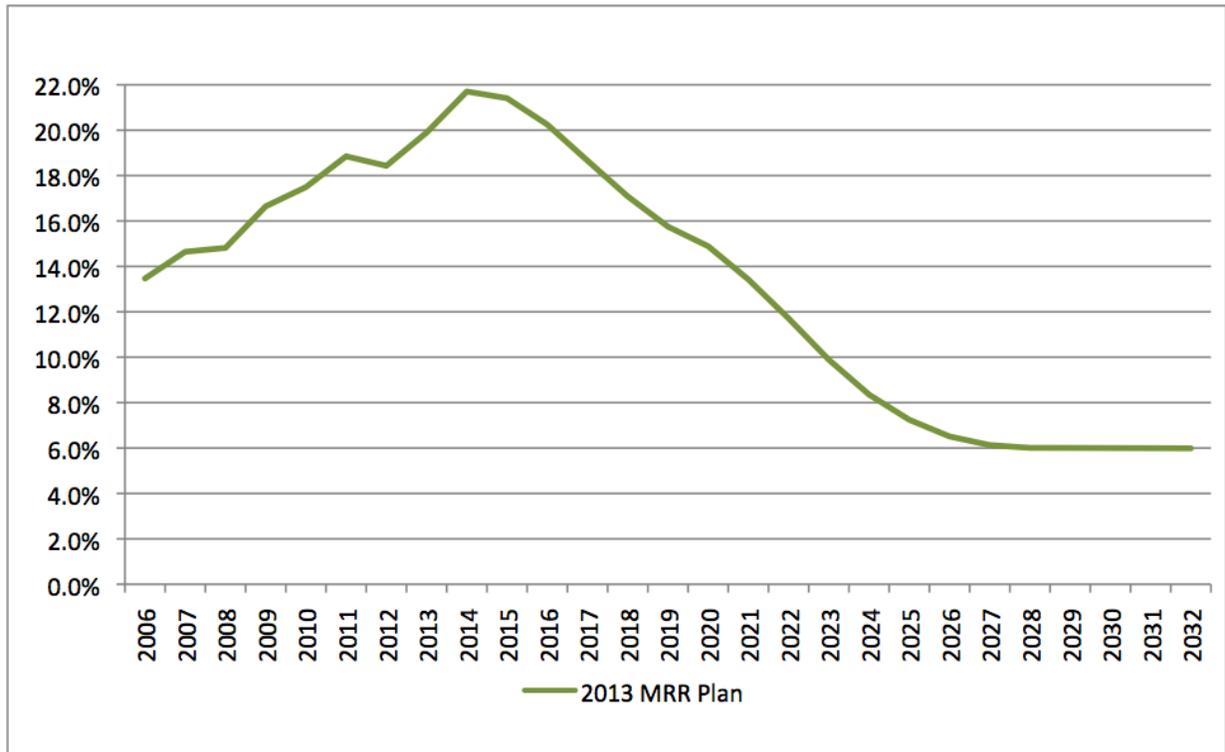
- a) facility deterioration over time;
- b) escalation of needed repair costs (inflation);
- c) annual changes to the district's total building square footage;
- d) the district's Current Replacement Value (CRV) and Facility Condition Index (FCI); and
- e) funding strategies to reduce the backlog of deficiencies.

In utilizing a funding model, the repair, replacement, and renovation needs of district facilities can be estimated over a multiple year program, and strategies to reduce the district's FCI can be developed and implemented.

The graph below shows an example of using facility modeling techniques to identify proper funding amounts. San Diego Unified School District's (SDUSD) most recent MRR program identified a funding strategy to reduce its districtwide FCI from 21 percent to 6 percent over the next 18 years.

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

### SDUSD 2014 MRR Plan FCI Projections

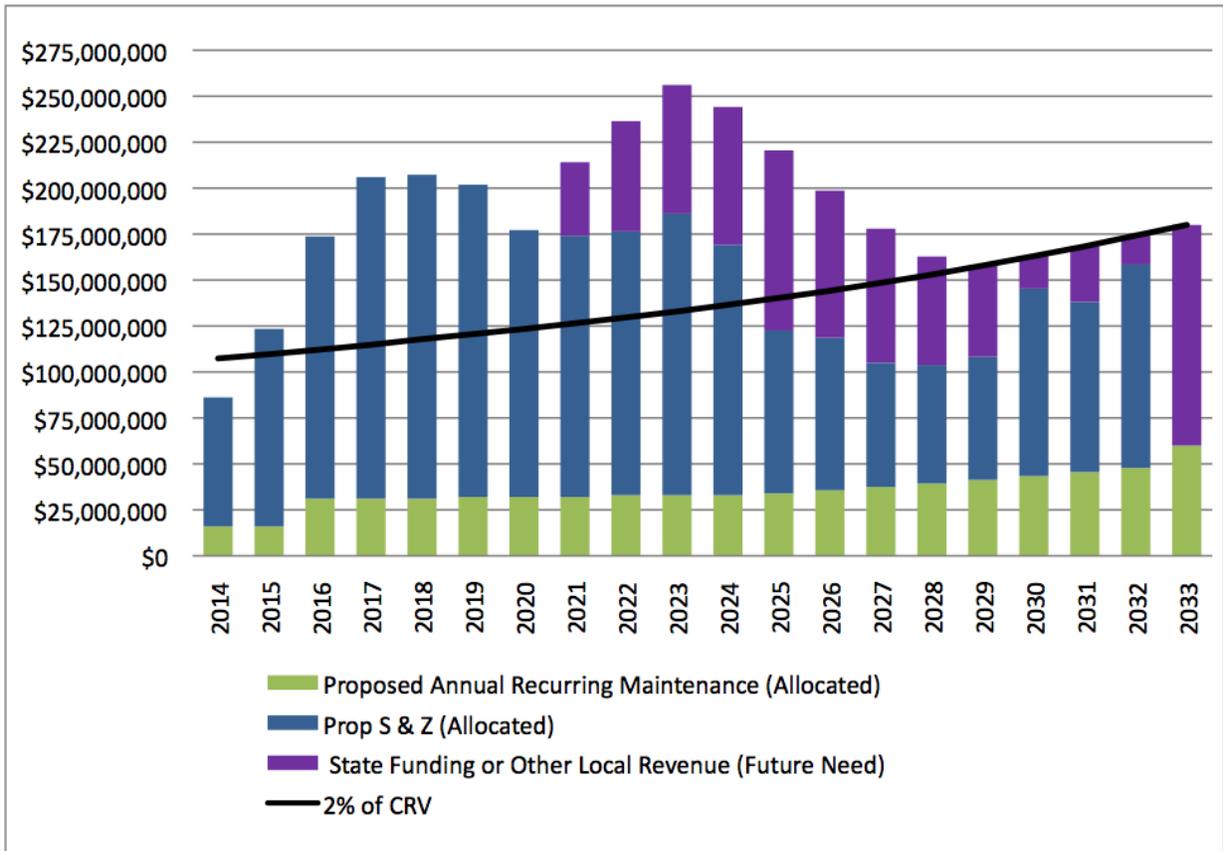


San Diego Unified School District's proposed annual recurring maintenance funding plan, reflected in the following graph, incorporates the district's current facilities backlog need, estimated at \$1.1 billion, the District's Current Replacement Value (CRV), estimated at \$1.5 billion, and a funding strategy to reduce its FCI over the next 18 years.

The district's plan used the Association of Physical Plant Administrators (APPA) recommended 2 percent to 4 percent of a district's aggregate CRV to be allocated annually for recurring funding for maintenance, minor repair and replacement, and major repair and replacement. APPA literature further states that, when a backlog of deferred maintenance has been allowed to accumulate, maintenance funding above the recommended level will be needed until the backlog has been eliminated. The 2 percent to 4 percent recommended range is due to various factors, including climate, age of facilities, and type of construction.

Based on the factors stated above and the typically mild climate in San Diego, SDUSD used 2 percent as the recommended funding level. The following graph reflects the estimated funding allocation over the next 18 years.

**SDUSD Proposed Annual Recurring Maintenance Funding Plan**



Though comprehensive assessments and modeling, such as the examples above, can be very effective, there are various other methods for allocating resources to properly maintain school facilities. These are further described below.

**Additional Methods and Amounts for Allocating Resources**

The Task Force recognizes that many districts use a “per-pupil” budgeting methodology for a variety of expenses. Per-pupil budgeting is not recommended as a strategy for allocating resources for building operations or maintenance because variables, such as the age of facilities and equipment, construction type, location, types of use, capacity and enrollment, all drive costs independent from the student enrollment in the facilities. To illustrate this point, consider the funding needed and provided to a new school with 1,400 students and an old school that was poorly maintained with 800 students. Under a per-pupil funding formula, the older school’s deteriorated conditions would require more but receive less funding than the newer school with fewer facilities issues.

## **Conclusion**

There are several factors to consider when determining the allocation of resources to maintain school buildings and equipment. The most accurate way to ascertain the overall need is by performing a comprehensive facilities condition assessment. However, in some cases it may be cost- or time-prohibitive to perform this level of the assessment; therefore, it may be necessary to use modeling techniques. Modeling approaches may offset the initial financial burden; however, the accuracy of the information could be compromised based on the level of effort and support provided. Additionally, the “per-pupil” budgeting methodology is not recommended as there are several factors that render the calculation unrelated to the condition of the facilities.

*Lee Dulgeroff*, Chapter 5 Team Leader; Chief Facilities Planning and Construction, San Diego Unified School District

*Bryan Ehm*, Senior Project Manager, Gafcon, Inc.

*Kenneth Huewitt*, Chief Financial Officer, Houston Independent School District

*Carl Nicoleau*, Assistant Superintendent, Miami-Dade County Public Schools

*Lee Prevost*, President, SchoolDude.com

*Fred Schmitt*, Schmitt Consulting

*Bill Wherritt*, Chief of Staff, Facilities, Los Angeles Unified School District

*Jenny Salkeld*, Chief Financial Officer, San Diego Unified school District

## **References and Resources**

**Appendix 5-1:** Level Zero Assessment Sample Renewal and Replacement Schedule

**Appendix 5-2:** Sample Parametric FCA Approach

**Appendix 5-3:** Facility Condition Assessment, Morse High School, San Diego Unified School District, June 11, 2014

**Appendix 5-4:** Sample Alternative FCA Modeling: Component Unit Cost with Condition

## Chapter 6. Creating a Model for Effective Community Relations

### Background

Schools are the heart of many urban communities, where the buildings serve purposes that go beyond educating enrolled students. Many schools today offer health clinics, job training, childcare, and a community venue for sports events, theater, and band. The role of the school as a community asset, funded by taxpayer dollars, means that any conversation about facilities needs to be inclusive and open so that all stakeholders feel heard, respected, and valued.

As any superintendent or Board of Education will attest, the most difficult conversations about facilities involve decisions to close, repurpose, or demolish schools that are past their expected lifespan, no longer educationally adequate, or underutilized because of declining enrollment.

Community relations can be irrevocably damaged if school districts are not open and transparent about the challenges and issues they face with their facilities, ranging from dilapidated buildings to mold problems to construction project delays and many more troubling conditions. Though the news is not always positive, districts can manage any crisis if they are responsive, proactive, accessible, and accountable. (Appendix 6-1: National School Public Relations Association, page 17).

The key is conducting regular inventories that strategically measure the adequacy of the district's real estate portfolio. These assessments need to be conducted publicly so that community stakeholders are not surprised by the findings or the recommendations, especially in relation to school closings.

Over the past five years, several large urban school districts have gone through significant adjustments, including Chicago, where nearly 50 schools were closed in 2013. What was a contentious discussion about which schools to close has since turned into an equally sensitive conversation about what to do next with empty buildings at risk of turning into neighborhood eyesores. (Appendix 6-2: CPS trying to unload dozens of schools, *Chicago Tribune*, Aug. 18, 2014.)

Building consensus in the community will only get more difficult, particularly in areas that are aging or gentrifying. Census data indicate that people with no school age children make up from 65 percent to 80 percent of the population in most communities in this country—a percentage that is growing. (Appendix 6-3: National School Public Relations Association, page 75).

In order to secure funding, everyone needs to understand that investing in new buildings, as well as the maintenance and upkeep of existing ones, is unquestionably in the public interest.

### **Building Relations with Trusted and Respected Community Leaders and Stakeholders**

Strategic discussions about school conditions, uses, closures, renovations, or new building projects should start early in the process with large and small group stakeholders. These should include alumni and business groups, neighborhood associations, elected leaders, parent groups, and school leaders. Districts should already have advisory groups in place to help facilitate the communication with all external partners. In the Houston Independent School District, for

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

example, those groups include the African-American Advisory Committee, the Asian Advisory Committee and the Hispanic Advisory Committee. The superintendent also has a Parent Advisory Committee and a Public Engagement Committee. School districts will find it easier and more effective to reach key constituents if such groups are already well established.

To better evaluate how community leaders and stakeholders can influence a conversation, districts should weigh these questions:

- Who is a trusted and respected member of the community?
- Who would have an interest in successful or unsuccessful conclusion to a project?
- Who is likely to gain the most or lose the most if a proposal is put forward?

In addition to determining the audience, school districts need to think carefully about the framework for the discussion so that difficult conversations remain productive, civil, and focused on improving student outcomes.

In Baltimore, leaders determined a list of common values and considerations in developing a 10-year building plan that included closing old schools as well opening new ones. (Appendix 6-4: 21st-Century Building for Our Kids: Community Conversations Summary Report)

That list included

- investing where building conditions are worst/most severe;
- investing where schools will have a maximum impact on a community’s stability, growth or development;
- maximizing how many students will be affected;
- prioritizing early investments in new/renovated schools to serve students of schools that will be closed or vacated;
- sequencing construction projects and movement of students to minimize academic disruption; and
- considering historical significance, demographic trends, student safety and the availability of school choices for students without excessive travel time.

Effective communication needs to take an “all hands on” approach at all levels of the district and on all platforms available, including print, digital, video and social media. Often the most important person is the principal, who is better able to win community allies than a central office administrator. If they are brought into the conversation early, principals can help soften the blow of a school closure or help sell the concept of a new school building.

Project savings will not influence community support in communities where schools are being closed or demolished. Accordingly, all communications about facility planning need to stay focused on improving student outcomes and equity. Capital Improvement Plans (CIPs) need to illustrate a rational basis for the recommendations, supported by data, which demonstrate the equitable distribution of funding based on the needs of the respective projects. A failure to consider and present a data-supported CIP may derail the community support and result in a failed referendum. One of the best tools for collecting the data and presenting the CIP Plan is to complete a comprehensive Facility Condition Assessment or FCA as discussed in chapter 3 of

this report. Also critical to success is a community engagement process that allows an authentic conversation between administrators and community stakeholders.

According to an initiative led by the 21<sup>st</sup> Century School Fund, increasing public participation at all levels serves several purposes: "First, it informs parents and children about the condition of structures in their community. Secondly, it provides valuable information to the community about the condition of public assets that are taxpayer supported. And thirdly, it holds public officials accountable for their management and maintenance of the public school facilities." (Appendix 6-5: 21st Century School Fund (2005), Recommended Policies for Public School Facilities: Public School Facilities Management Policies. Washington, D.C.)

### **Improvement Strategies in School Buildings Maintenance**

As described in chapter 4, facilities maintenance in public K-12 schools has been severely underfunded. The lack of resources, lack of effective planning, and lack of predictive and preventive maintenance have significantly increased the rate of decay in these facilities. For this reason it is imperative that the stakeholders and decision makers have accurate information to make the right decisions about maintaining their assets. There are many operational behaviors and circumstances, as stated above, that can hinder an effective asset management program. However, there are strategies (detailed in chapter 4) that can support managers in providing an effective operational approach, and demonstrating to stakeholders that operations are as effectively planned and accomplished as they can be within allocated resources.

### **Conducting Strategic Asset Management Planning**

In districts large and small, strategic asset management planning is essential to the successful operation of school facilities. The goal of such planning is to align a district's facilities with its operational needs to ensure that building assets are used in ways that maximize the value of the facility over its expected life span. In the context of this chapter, a key ingredient of strategic asset management planning is the immersion of relevant community members and interests in the planning process.

Before embarking on a strategic asset management plan, school districts should develop a set of guiding principles to align a district's facilities with its strategic vision. That plan should be developed with input from students, families, neighbors, other community members, selected officials, and school district staff so that it provides a framework for continuous improvement.

Priorities may include safety, sustainability, suitability for technology and educational innovation, community partnerships, and resource equity to ensure quality school options in every neighborhood.

The need for effective strategic asset management planning has never been greater. The community's needs and expectations of school district facilities are increasing each year, with demands for quality, energy efficiency, and innovative approaches to learning spaces. As more districts align their services with a 21<sup>st</sup> century educational model, school business leaders will be increasingly challenged to balance expectations with limited public resources.

State laws allowing charter schools to use surplus buildings adds another dimension to the conversation since many large urban school districts are encountering increased competition

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

from charter schools for student enrollment. A fundamental question for many districts will be whether to quickly dispose of surplus property or hold these assets with the knowledge that they may become available to other educational organizations.

No matter the outcome of that debate, the first step for any strategic asset management plan is to develop an accurate inventory of facilities. Building assets have a life cycle like any other resource and need to be documented and understood before any decisions can be made about ongoing maintenance, disposal, or replacement. Access to reliable information about district buildings is essential to

- determine whether current facilities are meeting educational needs;
- assess whether the facilities are being properly maintained and managed;
- evaluate whether a facility should be replaced;
- identify and plan for the demolition or sale of surplus or under-utilized facilities; and
- quantify the cost of building-related services provided by the district.

(See Appendix 6-6 Queensland Government, Department of Housing and Public Works, Strategic Asset Management Framework: Best practice guidelines for the management of Queens Government Buildings, page 7.)

The inventory should be compared to the district's guiding principles or strategic vision to develop a framework for obtaining desired outcomes and to comply with regulations on matters of classroom size, ADA requirements, and all building codes.

Any accurate inventory will raise issues of needs and funding challenges that underscore the importance of effective community involvement to address priorities. Across the country, school districts secure funding for capital improvements in a variety of ways, from voter-approved local bonds to state-approved monies. No matter the money source, school districts must find ways to engage, inform and involve their communities so that they can move forward in addressing building needs in a collaborative and transparent approach.

Fortunately, there is consensus today about the relationship between a quality school facility and student achievement. "Research indicates that the quality of facilities has an impact not only on educational outcomes but on the well-being of students and teachers. There is a growing awareness of the role that educational facilities play in shaping attitudes toward the environment and the contribution they make to urban renewal." (See Appendix 6-7 Manfred Hinum, PhD, Strategies for Managing Educational Facilities Infrastructure, Track 3 of the UEF/PEB/CAE International Symposium 1999, Baltimore Maryland, page 1.)

An accurate building inventory will also reveal under-utilized assets or facilities that are no longer worth maintaining or renovating. With effective community relationships, school districts will be better prepared to have tough conversations around closing, consolidating, or selling school facilities.

As school districts seek to move their educational models into the 21<sup>st</sup> century, they should also consider innovative space management programs. For example, how will 1-to-1 laptop programs change the need and/or configuration of classroom space? Blended-learning initiatives are increasingly relying on virtual classrooms that don't fit the traditional model. At the very least, uncertainty surrounding technology and teaching methods in the future should prompt school

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

districts to build and maintain spaces that will be flexible enough to accommodate whatever changes might come in the educational delivery method.

When it comes to conducting a strategic asset management plan, school districts will find a variety of software tools to help them develop an accurate building inventory and maintenance schedule. This summary doesn't provide any specific recommendations or reviews. However, any tool will only be effective if it's part of a dynamic and cross-functional approach to school facility management. Although daily operations are the responsibility of the chief operating officer, that leader must work closely with the finance, academic, and legal teams to ensure effective management over the long term.

The risks of failure are especially daunting for school districts because of taxpayer investment and public scrutiny. Risks include

- loss of community confidence;
- reduced asset life;
- unscheduled or unexpected major expenditures;
- breaches of statutory obligations resulting in censure or fines; and
- functional inefficiencies that drain resources from teaching and learning.

Conversely, school districts that take a proactive approach to strategic asset management planning will reap the benefits of this integrated and dynamic process, including a preventive maintenance schedule that will maximize the life cycle of facilities.

While every strategic asset management plan will be unique to its school district and community, the goal for such a plan should be universal: cost management that maximizes limited resources for education and student achievement.

### Conclusion

Developing a strategy for effective community relations should accompany any conversation about building new schools or repurposing or demolishing old ones.

The stakes are high. Across the country, urban school districts see greater demands for facilities that meet the needs of a 21<sup>st</sup> century educational model, with a premium on energy efficiency, integrated technology, and innovative approaches to learning spaces.

Without a framework for community conversations about how to move forward, many school districts will find it difficult to garner funding support.

Key considerations include

- identifying key stakeholders and organizing regular meetings to discuss the relationship between facilities and student outcomes;
- maintaining an accurate and dynamic inventory of school facilities;
- developing guiding principles or a list of common values to help guide discussions;
- recognizing that schools are no longer just educational facilities but often serve as community centers affecting the broader neighborhood; and

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

- taking an “all-hands-on” approach to disseminating information on all platforms, including print, digital, video, and social media.

The bottom line goal of any communications strategy should be to demonstrate the district’s effective management of limited resources to support education and student achievement. When it is commonly understood that the district is effectively managing its resources but is unable to keep up with the demands of aging facilities, a simple conclusion can be reached. The solution is that maintenance programs must perform better; it is that additional resources are necessary.

**Leo Bobadilla**, Chapter 6 Team Leader; Chief Operations Officer, Houston Independent School District, Houston, TX

**Lee Dulgeroff**, Executive Director, Facilities Planning, San Diego Unified School District

**Sylvia Wood**, General Manager, Business & Bond Communications, Houston Independent School District

**Priscilla Martinez**, Senior Business Analyst, Business Operations, Houston Independent School District

### References and Resources

**Appendix 6-1:** National School Public Relations Association. Election Success: Proven Strategies for Public Finance Campaigns.

**Appendix 6-2:** CPS trying to unload dozens of schools, *Chicago Tribune*, Aug. 18, 2014. <http://www.chicagotribune.com/news/local/breaking/ct-chicago-school-repurpose-20140818-story.html#page=1>

**Appendix 6-3:** National School Public Relations Association, page 75.

**Appendix 6-4:** 21st-Century Building for Our Kids: Community Conversations Summary Report <http://www.baltimorecityschools.org/cms/lib/MD01001351/Centricity/Domain/6847/21stCenturyBuildingsConversationsReport.pdf>

**Appendix 6-5:** 21st Century School Fund (2005) - Recommended Policies for Public School Facilities: Public School Facilities Management Policies, Washington, D.C.

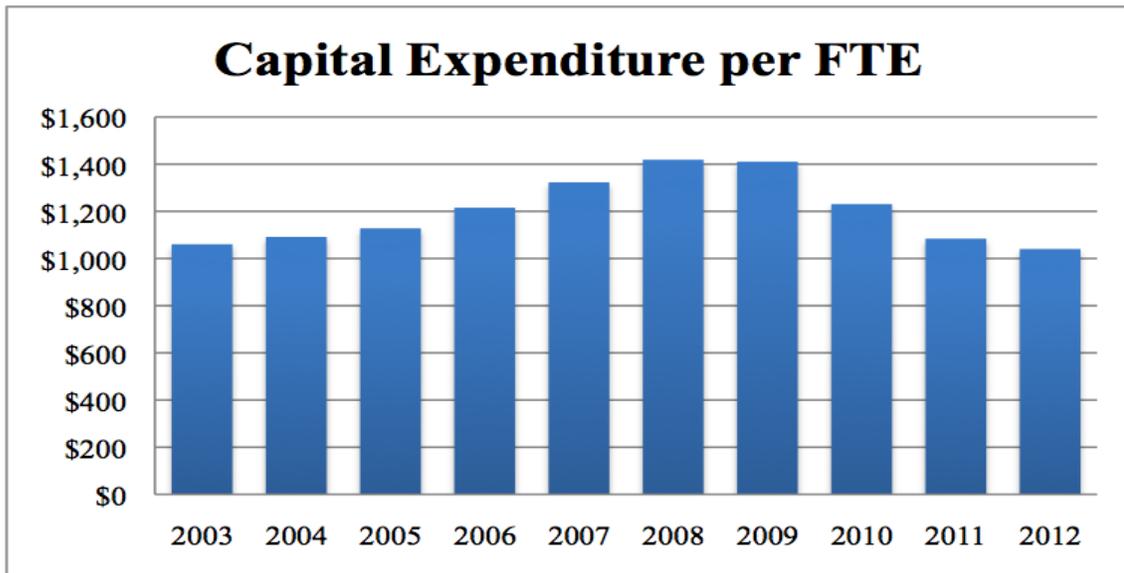
**Appendix 6-6:** Queensland Government, Department of Housing and Public Works, Strategic Asset Management Framework: Best practice guidelines for the management of Queens Government Buildings, page 7

**Appendix 6-7:** Manfred Hinum, PhD, Strategies for Managing Educational Facilities Infrastructure, Track 3 of the UEF/PEB/CAE International Symposium 1999, Baltimore Maryland, page 1

## Chapter 7. Mining Resources for Maintaining School Buildings and Equipment

### Background

Throughout the recent economic crisis, school districts across the United States experienced serious funding challenges. While total per pupil spending has remained essentially flat nationally between 2008 and 2012, funding for capital expenditures has plummeted over 26 percent since its all-time peak during the 2007-08 fiscal year.<sup>1</sup> (See chart below.) While actual conditions vary by state, these national trends reflect an understandable focus on protecting instructional and operational funding to the detriment of capital and planned maintenance investments in school facilities.



Source: United States Department of Commerce

The prolonged decline in capital revenue continues to stifle the capacity of districts to undertake school renovation and replacement projects. Rather than modernizing their buildings, school districts are struggling with growing deferred maintenance and critical facilities needs.

Until capital revenues reach sufficient levels, many school districts are forced to consider nontraditional avenues to fund unmet facilities needs and avoid further deterioration of their physical plants. Even when school districts have bond revenue sources, some nontraditional sources can and should be considered when an opportunity arises. Some financing arrangements such as Public-Private-Partnerships (P3), are not new; however, they introduce new obligations with potentially significant long-term ramifications. Districts should carefully weigh the benefits of short-term relief against the long-term financial obligations that they create.

### Alternative Funding Sources: Public-Public Collaboration

As the economy continues to improve, many cities and counties are beginning to see revenue increases. In such communities, district leaders and the local government officials may be able to set priorities to fund capital and planned maintenance at joint-use facilities, such as parks, playgrounds, and athletic venues. Because such facilities provide mutual benefits, the pooling of

<sup>1</sup> U.S. Department of Commerce, Public Education Finances, 2001-2012  
Council of the Great City Schools

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

resources may be justified. Ultimately, municipalities will benefit economically from such investments through increased property values that, in turn, result in a higher corresponding tax revenue stream when the new or renovated school facilities become more desirable to prospective residents and businesses.

Establishing and cultivating mutually beneficial relationships with local governments often leads to opportunities for financial collaborations. Partnerships with other government entities will depend on local dynamics and needs; therefore the opportunities will be unique to a particular community.

One example is the series of Education Compacts developed by Miami-Dade County Public Schools (M-DCPS) as a way to engage municipal leaders in their local schools. Although initially intended to support academic programs and activities (e.g., IB, STEM, after-school care, sports, etc.), they have also served as catalysts for long-term capital investments. The following are offered as outside-the-box solutions addressing facility renovation and construction needed by M-DCPS.

The Village of Key Biscayne is an affluent community with a demographic shifting to include more families with school-aged children. The island's only public school is a high performing K-8 center with enrollment exceeding capacity and older buildings in desperate need of renovation. Expansion was not feasible due to site constraints, other suitable sites on the island were simply not available, and the district lacked funding and debt capacity. Compounding the situation, the high school that serves the community was over ten miles away on the mainland, and the island lacked desirable athletic facilities.

Fortunately, the residents are strong supporters of public education, and their municipal leaders were willing to collaborate on a solution. Although at the time the district could not contribute financially to a solution, it did bring a critical asset to the table. The Maritime Academy for Science and Technology (MAST) is a countywide magnet school located on another island along the causeway about three miles from Key Biscayne. A collaboration involving this campus resulted in a number of highly desirable outcomes, among them K-8 capacity relief, funding to renovate the K-8 center, a closer high school option, and recreational space for Key Biscayne residents.

The district and the Village negotiated an Inter-Local Agreement (ILA), which allowed the Village to provide the \$22 million needed for construction of a 1,100-seat building addition and a multipurpose athletic field at the MAST campus and much needed renovations at the K-8 center. The district agreed to repay half the cost of the improvements at MAST and the full cost of the K-8 center renovations at a future date, when funding is anticipated to be available (see Appendix 7-1 for details).

Collaboration opportunities are not limited to affluent communities. M-DCPS entered into an ILA with the Homestead Community Redevelopment Agency (HCRA) to convert an elementary school in the City of Homestead to a K-8 center replacing many of the existing 50-year-old buildings with a state-of-the-art campus and launching a new STEM program.

Homestead is a community at the southern end of Miami-Dade County that was devastated by Hurricane Andrew in 1992 and is still recovering. The HCRA was established to promote economic development in an area of the city that is home to a large migrant farm worker population. District staff approached city leaders about investing in the West Homestead

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

Elementary project, which would serve as a center for community activities while generating construction jobs and enhancing property values.

The HCRA pledged \$775,000 to the \$7 million school construction project. The agreement called for the district to obtain financing for the project, and then to apply the HCRA contribution to service the debt until anticipated district capital revenue could repay the principal. When the district passed the \$1.2-billion General Obligation Bond (GOB) Program, the ILA funding was no longer needed to fund the project; however, the relationship and commitment resulted in supplemental funding in support of the project, resulting in an expanded scope of work for the project.

Yet another example involved a municipality in the southern part of the county. The Town of Cutler Bay was considering construction of a charter high school to provide an alternative for their residents within the town limits. The district approached municipal leaders to explore other options and discussions quickly focused on two middle schools located in the town and how these might be linked programmatically to provide a 6-12 educational continuum. Cutler Bay leaders agreed to invest in capital improvements at one of the middle schools for renovations and construction of high school science labs, as well as replication of a technology-intensive iPrep Academy, which the district had recently launched at other high schools. Their commitment of over \$3.4 million also included funding for student laptop computers phased in over four years as the school transitioned to a full high school. The district reconfigured the two middle schools to operate as a single 6-12 school on two campuses. Additionally, the second middle school was slated for a major replacement under the GOB with a new facility.

These are just a few examples where partnerships between public entities are benefiting the respective local communities and the district as a whole by expanding the portfolio of high quality academic offerings to more students.

### **Alternative Funding Sources: Public-Private Collaboration**

#### District-Managed Charter Schools

The proliferation of charter schools as educational choice options has affected new school construction in some new residential developments. In Florida, charter school operators can open and expand schools with very limited control by local school boards. Consequently, in Miami-Dade County alone, there are currently 128 charter schools competing with the district's 340 schools.

Rather than sit on the sidelines, M-DCPS developed a strategy to address this trend. The district now serves as the management company providing back office services and curriculum support for four charter schools, generating revenue at \$440/student.

#### Developer-Funded Projects

The most recent district-managed charter school evolved from discussions with a large developer, Codina Partners, and a municipal government, the City of Doral. Doral is home to a large concentration of charter schools, as well as high performing district public schools. As Codina was planning a new mixed-use development known as Downtown Doral, the district approached the developer to discuss opportunities for partnering on the school that would be built.

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

A prior development agreement with the City of Doral called for a municipal charter school to be included; however, district staff recognized an opportunity to present a district-managed charter as an alternative. The city was not eager to enter the charter school arena. The developer was receptive to the concept but insisted on researching other private management options as well as some high performing M-DCPS programs. After a thorough due diligence period, Codina chose the district as its charter management company.

M-DCPS then proposed that the district serve as the construction manager and build the 850-student station elementary school for the developer. As an experienced developer, Codina could have chosen to build the school, but the firm's management opted to accept the district's offer.

In order to consummate this venture, a complex set of multiparty agreements was created and executed between M-DCPS, the City of Doral, Codina Partners, and the newly established Downtown Doral Charter School (see Appendix 7-2). This unprecedented collaboration was made possible by the relationships established during the nearly two-year process.

Public-private models similar to those described above may be replicated in other communities if school districts take the initiative and seek out opportunities that push the envelope with regard to school choice and their relationships with charter schools.

### Guaranteed Energy Performance Contracting (GEPC)

GEPC offers districts a source of capital revenue derived directly from reducing inefficiencies in their operating budgets. The principle is simple: Implement energy conservation measures (ECM) and repay the investment from the resultant energy savings. However, the devil is in the details.

If applied judiciously, districts can upgrade mechanical and electrical systems as well as roofs, windows and other infrastructure and then reap recurring energy and maintenance savings. Typically an energy services company (ESCO) is retained through a competitive solicitation process. The ESCO then evaluates utilities data and facilities condition information provided by the district. It is important to understand that the accuracy and availability of relevant information is critical to a successful launch.

The first step requires performance of an energy audit to assess existing operational conditions, define baseline performance, and determine which ECMs may be suitable for each building being considered. If the audit reveals viable ECMs, an engineering validation report is then prepared with a detailed cost-benefit analysis. Simple payback calculations (Payback Period = Implementation Cost/Anticipated Annual Cost Avoidance) are useful for initial screening of candidate ECMs, but more thorough analysis is necessary to define long-term cost effectiveness. Additional factors must be quantified, including maintenance cost avoidance, utility cost escalation, component service life and replacement cost, debt service expense, utility rebates, and other incentives.

Although several campuses may be included in one contract cycle, the performance of each site must stand on its own. Anticipated savings from one school should not be applied to fund ECMs at another, as this will distort accountability and complicate contract enforcement.

Another key decision pertains to the financing approach. It may be appealing to have the ESCO provide financing if the district is unable or unwilling to issue debt. However, this will likely result in higher financing expense. Districts considering this option should bifurcate the

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

transaction and obtain proposals without financing as well as with financing in order to maximize flexibility and maintain transparency.

A measurement and verification protocol detailing all factors impacting cash flow through the term of the project is an essential contract element to inform decision making and enforce the savings guarantee. Assumptions must also be detailed and responsibilities of each party must be defined to prevent conflicts, particularly when conditions or building operating schedules change during the contract period.

A contract for GEPC services is a long-term engagement between the owner and the ESCO; consequently, the district must be certain that the “G” or guarantee is truly enforceable. Although a bond may serve this purpose, a Letter of Credit (LOC) reduces risk to the district and, depending on the ESCO, will not add significant cost. The initial value of the LOC equals the total anticipated cost avoidance guaranteed by the ESCO over the term of the contract. As cost avoidance targets are confirmed through the measurement and verification protocol, the LOC amount is reduced annually. If targets are exceeded, the LOC is reduced sooner, thus providing an additional performance incentive to the ESCO. If savings are not realized, however, the ESCO must compensate the district for any shortfall, and if it fails to do so, the district enforces the LOC.

If structured properly, GEPC is an excellent resource to address deferred maintenance and renovation needs of cash-strapped school districts, but caution must be exercised so that performance truly does meet expectations.

Facilities and other real estate assets may generate supplemental revenue to fund maintenance and critical district needs while serving the community. Centralized procedures and oversight are essential to protect these public assets and maximize their earning potential.

### Lease and Rental of Facilities

Under-utilized facilities and other real estate assets may generate supplemental revenue to fund maintenance and critical district needs while serving the community. Centralized procedures and oversight are essential to protect these public assets and maximize their earning potential.

School districts have unique real estate portfolios that can generate revenue from diverse sources while providing services to their communities. Many schools are embedded in residential areas and are often the largest properties in their neighborhoods, while some campuses are near commercial areas that developed after the school was built. Both scenarios offer opportunities to monetize a district’s assets while enhancing its core mission.

Community groups and religious organizations frequently approach schools seeking after-hours use of fields and buildings. Sometimes these agreements are informal and are entered into at the school level. This practice can result in potential liability and lost revenue opportunities for the district.

Rental and leasing of facilities by organized groups should be managed centrally to ensure the district’s interests are protected and public assets are not used for unauthorized commercial purposes. For short-term use or individual events, a rental agreement with defined hourly or daily rates may be appropriate. However, if an organization or league desires long-term use of a particular site, advertising a solicitation and executing a formal lease agreement should be considered to ensure the district receives the maximum revenue. In either case, insurance must

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

be provided and specific responsibilities regarding access, security, and cleaning must be addressed.

Districts should determine which facilities are suitable for such uses and establish appropriate fee schedules that consider site-specific factors and recover costs incurred. Schools with central air conditioning and heating plants, for example, are more costly to operate for after-hours functions and should be avoided whenever possible as smaller, self-contained buildings or sections of buildings are more cost effective. Specific provisions must be made for operation during holiday periods when school custodians and maintenance staff may not be available to open to buildings and respond to emergencies.

Unlike parking lots and fields, building rentals and leases usually require that school staff provide access and secure the facility. Consequently, fees must consider labor contracts with minimum call-out periods, as well as necessary preconditioning time for HVAC operation when setting rates for larger venues. Contingency funds should be set aside from rental proceeds to cover emergency service response by maintenance personnel, unless this level of service is excluded. Additional charges must be defined for use of school equipment, such as audio systems, projectors, stage lighting, etc., and any technical personnel required to set up and operate such equipment.

There are a number of resources available to help districts with joint use.

The 21<sup>st</sup> Century School Fund and the Center for Cities and Schools developed a free web-based template with school district data on maintenance, operations, administration, and capital outlay. The template is available to help school districts assess school district costs and develop a structure for fair fees for joint use.

<http://www.bestschoolfacilities.org/jointusecalc/>

The Safe Routes to School National Partnership has developed a web-based clearinghouse that is designed to aid communities and school districts in developing successful shared use agreements. It contains hundreds of resources already categorized, and new resources are added as they are developed.

<http://shareduse.saferoutespartnership.org/resources/joint-use>

ChangeLab Solutions has developed four model joint use agreements that districts can use to review their current legal documents and then adapt and use for themselves. These are sample agreements for opening indoor or outdoor school facilities during non-school hours, as well as a sample agreement between a school district and city recreation department for use of public school facilities.

<http://changelabsolutions.org/publications/model-JUAs-national>

Appendix 7-3 discusses in detail the potential benefits to districts in managing community uses of school properties and shows that the top 10 percent of districts who recovered costs for community use averaged more than \$50 per student in recovery of costs during fiscal year 2009-10.

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

### Parking Lots

Sites located in or adjacent to commercial areas may be suitable for leasing parking lots after school hours or on weekends and holidays. Prior to issuing a competitive solicitation, market research should be conducted to set reasonable revenue expectations and establish a minimum acceptable “floor” price for prospective bidders. Once a qualified bid is awarded, a schedule of after-hours school events should be provided annually to the operator, thus avoiding conflicts with planned school functions.

Other school sites may be located near venues that conduct seasonal events where short-term rental agreements may be more appropriate. In these instances, the district should develop a fee schedule specifying daily rental rates.

Parking lot leases can provide school districts with additional recurring revenue without requiring a capital investment. Some events using district parking lots may require use of restrooms or food service spaces; this may be factored into contracts. It is essential that contracts for such uses provide for insurance, security, and maintenance by the lessee.

### School Fields for Sports Leagues

Some agreements with not-for-profit children’s leagues may not generate significant revenue but provide a service to the community and may require that the organization maintain the field or provide some other in-kind service. Adult leagues may offer greater revenue-generating potential but may require additional resources for parking, security, etc.

In all cases, it is important that district policies regarding use of facilities by outside organizations be applied uniformly to protect the district’s interests and provide community access to public assets.

### Joint Use Agreements

Frequently, the most reliable lessee of a school playfield or athletic facility is another government entity, such as a local parks department. In areas where public parks are not available or adequate, schools can provide much-needed recreation areas for the general public after school hours. Joint use agreements (JUAs) formalize the relationship between a district and a municipal or county government. In larger communities, master JUAs can be established with various government entities to include multiple sites and provide operational flexibility once adopted.

Typically maintenance and utility costs are shared, and provisions for capital improvements are predefined. Additionally, revenue from concessions or rentals may be included to subsidize operating costs. In some instances the government partner operates after-school programs, summer camps, tutoring, and other activities that serve students, parents, and the community at large.

JUAs can also include venues such as community theaters, arenas, auditoriums, gymnasiums and other facilities used for cultural events. An incidental benefit of these collaborations relates to the positive community perception that local government agencies can in fact work together efficiently to share public resources.

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

### Vacant Land

Undeveloped land owned by school districts and not otherwise planned for an educational or ancillary facility can be a drain on limited maintenance resources, without the prospect of a future benefit. If land is located in residential or commercial areas, it must be mowed and maintained to avoid becoming a nuisance to neighbors. Idle land may also become a destination for illegal dumping or other undesirable activities.

Properties that will not be developed for schools in the near term may be candidates for interim use as recreation areas, community gardens or other beneficial uses. Through partnerships with other government entities, districts may temporarily shift the cost of upkeep while retaining ownership of the property. If there is no long-term need for the land, the district should consider selling or entering in a long-term lease with an interested government entity.

Not-for-profit community organizations may desire to operate community gardens while agreeing to maintain the site. Districts may solicit public input by advertising a Request for Interest (RFI) detailing any conditions or restrictions.

### Wireless Communication Facilities

With the proliferation of wireless communication technology, carriers often approach school districts regarding placement of communication towers or other transmission facilities on their property. From their perspective, this is a logical approach since it may provide access to numerous sites within residential areas while dealing with a single property owner.

If a wireless carrier or tower operator expresses interest in a district's facilities, and if state and local regulations do not prohibit such installations, districts may decide to explore it as a potential revenue source. Newer towers are commonly disguised as flag poles or trees. Antennae may also be attached to existing or planned lighting towers for athletic fields. Districts considering such installations should insist that the carrier undertake competent engineering analyses to determine structural integrity capacity for the additional weight and wind resistance factors. Most towers can also accommodate equipment from multiple companies, thereby increasing revenue and, if needed, the district may request mounting its own antennae to serve school-related communication needs.

Contracting with a carrier or tower operator may require a competitive solicitation unless a state contract or other similar agreement already exists. Yet, due to the highly specialized nature of these installations, research should be performed regarding technical considerations of installing communication towers on school sites. It is advisable to convene an ad hoc committee of experts to review the unique technical and financial considerations involved in these agreements and assist in drafting appropriate policy and procedures. Seeking public input is advisable to avoid potential conflicts with neighbors, parents or other community members, regardless of potential revenue opportunities.

### Sponsorship, Advertising, Naming Rights

Districts may consider the judicious application of opportunities to partner with community groups or private companies to rent or sell spaces on district property that might display names of people or companies that contribute to the district. Agreements might be considered to allow companies to provide districts with items such as stadium or gymnasium scoreboards, school marquees, billboards or other components that might display the name of the donor. Advertising

## Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

appropriate for a school environment might be considered. District vehicles might also display signage recognizing companies and donors for their contributions to public education. [Note: such signage would be inappropriate if it advertised in a way that solicited business for a company. Inappropriate: “Buy Jimmy’s Pizza.” Possibly appropriate: “Jimmy’s Pizza supports Sweetwater’s Compact for Success.”]

### Conclusion

School facilities face daunting challenges with regard to funding for maintenance and capital improvements, but there are also ample opportunities for revenue generation. As detailed in Chapter 6, districts should engage community partners from both public and private sectors to stimulate ideas and explore collaborations that offer mutual benefits and promote efficient use of public resources.

**Jaime G. Torrens**, Chapter 7 Team Leader; Chief Facilities Officer, Miami-Dade County Public Schools, Miami, FL

**Mary Filardo**, Executive Director, 21<sup>st</sup> Century School Fund, Washington, DC

**Bruce Husson**, Retired Superintendent, Sweetwater Union High School District, Chula Vista, CA, and Former Assistant Superintendent, Business Services, San Diego Unified School District, San Diego, CA

**Ana Rijo Conde**, Deputy Chief Facilities and Eco-Sustainability Officer, Miami-Dade County Public Schools, Miami, FL

**Lee Prevost**, President, School Dude.com, Cary, NC

### References and Resources

**Appendix 7-1:** Inter-Local Agreement between Miami-Dade County Public Schools and the Village of Key Biscayne, FL, October 25, 2013

**Appendix 7-2:** Multi-party Agreement for Downtown Doral Charter School, Miami-Dade County Public Schools, Miami, FL, July 16, 2012

**Appendix 7-3:** Recovering Costs for the Community Use of Our Schools. White Paper: A four-year view – examining the successful implementation of cost recovery programs in our schools; SchoolDude.com; 2013

## Reversing the Cycle of Deterioration in the Nation's Public School Buildings

Reversing the Cycle of Deterioration in the Nation's Public School Buildings

**Deferred Maintenance Task Force**

October 4, 2014

**Co-Chairs**

<p>Fred Schmitt Schmitt Consulting 1773 Pigeon Roost Road Banner Elk, NC 28604 828-260-0008 <a href="mailto:FredsSchmitt5@gmail.com">FredsSchmitt5@gmail.com</a></p>	<p>Bruce Husson Bruce A. Husson Consulting 1922 Sonett Street El Cajon, CA 92019 619-993-2206 <a href="mailto:bhussonconsult@cox.net">bhussonconsult@cox.net</a></p>
--	--

**Members**

<p>Leo Bobadilla Chief Operations Officer Houston Independent School District 4400 West 18<sup>th</sup> Street Houston, TX 77092 336-370-3482 <a href="mailto:lbobadil@houstonisd.org">lbobadil@houstonisd.org</a></p> <p>Priscilla Martinez Senior Business Analyst, Business Operations 713-556-7508 <a href="mailto:Pmarti19@houstonisd.org">Pmarti19@houstonisd.org</a></p> <p>Sylvia Wood General Manager, Business and Communications 713-556-7508 <a href="mailto:swood@houstonisd.org">swood@houstonisd.org</a></p>	<p>John Dufay Executive Director, Support Operations Albuquerque Public Schools 6400 Uptown Boulevard, Suite 110E Albuquerque, NM 87110 505-243-7712 <a href="mailto:dufay@aps.edu">dufay@aps.edu</a></p>
<p>John Dougherty Program Director Jacobs Engineering 10 10<sup>th</sup> Street, Suite 1400 Atlanta, GA 30309 404-305-2170 941-957-8887 cell <a href="mailto:John.Dougherty2@Jacobs.com">John.Dougherty2@Jacobs.com</a></p>	<p>Lee Dulgeroff Executive Director, Facilities Planning San Diego Unified School District 4860 Ruffner Street, Suite 3 San Diego, CA 92111 858-637-3516 858-829-1452 cell <a href="mailto:ldulgeroff@sandi.net">ldulgeroff@sandi.net</a></p> <p>Diane Garcia Confidential Administrative Assistant II <a href="mailto:dgarcial@sandi.net">dgarcial@sandi.net</a></p>
<p>Joe Edgens Executive Director of Facility Services (Retired) Metro Nashville Public Schools 2601 Bransford Avenue Nashville, TN 37204 615-259-8516 office 615-533-3958 cell <a href="mailto:joe.edgens@comcast.net">joe.edgens@comcast.net</a></p>	<p>Bryan Ehm Senior Project Manager Gafcon, Inc. SDUSD Facilities Planning and Construction 4860 Ruffner Street San Diego, CA 92111 619-823-0557 cell <a href="mailto:behm@gafcon.com">behm@gafcon.com</a> <a href="mailto:behm@sandi.net">behm@sandi.net</a></p>

Reversing the Cycle of Deterioration in the Nation's Public School Buildings

<p>Mary Filardo Executive Director 21<sup>st</sup> Century School Fund 1816 12<sup>th</sup> Street, NW  Washington, DC 20009 202-745-3745 ext. 11 202-745-1713 fax <a href="mailto:mfilardo@21csf.org">mfilardo@21csf.org</a></p>	<p>Yehudi (Gaf) Gaffen Principal Gafcon, Inc 701 B Street, Suite 1200  San Diego, CA 92101 619-231-6199 <a href="mailto:ygaffen@gafcon.com">ygaffen@gafcon.com</a></p>
<p>Paul Gerner Former Associate Superintendent Clark County School District 1559 West Quail Track Drive Phoenix, AZ 85085 702-218-9397 cell <a href="mailto:jpgerner@cox.net">jpgerner@cox.net</a></p>	<p>Dr. Lester Herndon Assistant Superintendent Seattle Public Schools MS 22-330 P.O. Box 34165 Seattle, WA 91824-3041 206-252-0644 <a href="mailto:ltherndon@seattleschools.org">ltherndon@seattleschools.org</a></p>
<p>Kenneth Huewitt Chief Financial Officer Houston Independent School District 4400 West 18<sup>th</sup> Street Houston, TX 77092 713-556-6600 <a href="mailto:khuewitt@houstonisd.org">khuewitt@houstonisd.org</a></p>	<p>Ronald Kramps Executive Director, Facilities Charleston County School District 3999 Bridge View Drive Charleston, SC 29405 843-566-8132 <a href="mailto:ronald_kramps@charleston.k12.sc.us">ronald_kramps@charleston.k12.sc.us</a></p>
<p>Kristabel Lopez Business Leader South Region Jacobs Project Management 1999 Bryan Street Dallas, TX 75201 305-979-5528 cell <a href="mailto:Kristabel.Lopez@jacobs.com">Kristabel.Lopez@jacobs.com</a></p>	<p>Jim McDaniel Vice President – Education Practice Jacobs 5995 Rogerdale Road Houston, TX 77072 832-351-7213 832-244-0217 cell <a href="mailto:Jim.McDaniel@Jacobs.com">Jim.McDaniel@Jacobs.com</a></p>
<p>Carl Nicoleau Assistant Superintendent Miami-Dade County Public Schools 12525 NW 28 Ave. Miami, FL 33167 305-995-4043 786-229-4117 cell <a href="mailto:cnicoleau@dadeschools.net">cnicoleau@dadeschools.net</a>  Cynthia Beraldi <a href="mailto:CRMcCoy@dadeschools.net">CRMcCoy@dadeschools.net</a></p>	<p>Lee Prevost President SchoolDude.com 11000 Regency Parkway, Suite 200 Cary, NC 27518 877-868-3833 <a href="mailto:lee@schooldude.com">lee@schooldude.com</a></p>
<p>Tracy Richter Chief Executive Officer DeJong-Richter 4945 Bradenton Avenue Dublin, OH 43017 614-798-8828 <a href="mailto:trichter@dejongrichter.com">trichter@dejongrichter.com</a></p>	<p>Jenny Salkeld Chief Financial Officer San Diego Unified School District Education Center 4100 Normal Street, Room 3251 San Diego, CA 92131 619-725-7667 <a href="mailto:jsalkeld@sandi.net">jsalkeld@sandi.net</a></p>

Reversing the Cycle of Deterioration in the Nation's Public School Buildings

	<p>Christina Lember  Confidential Administrative Assistant II  <a href="mailto:ilembert@sandi.net">ilembert@sandi.net</a></p>
<p>Jaime Torrens  Chief Facilities Officer  Miami-Dade County Public Schools  1450 N.E. Second Avenue, Room 923  Miami, FL 33132  305-995-1401  305-218-2705 cell  <a href="mailto:jtorrens@dadeschools.net">jtorrens@dadeschools.net</a></p> <p>Datsie Moreno-dominick  <a href="mailto:dmoreno2@dadeschools.net">dmoreno2@dadeschools.net</a></p>	<p>Valerie Wilson  School Business Administrator  Newark Public Schools  2 Cedar Street, Room 807  Newark, NJ 07102  973-733-8467  <a href="mailto:vwilson@nps.k12.nj.us">vwilson@nps.k12.nj.us</a></p>
<p>Bill Wherritt  Chief of Staff, Facilities  Los Angeles Unified School District  333 South Beaudry Avenue, 23<sup>rd</sup> Floor  Los Angeles, CA 90017  213-241-5355  <a href="mailto:bill.wherritt@lausd.net">bill.wherritt@lausd.net</a></p>	<p><b><u>Advisor</u></b>  Dr. Robert A. Carlson  Director of Management  Council of the Great City Schools  1301 Pennsylvania Avenue N.W., Suite 702  Washington, D.C. 20004  202-393-2427  <a href="mailto:rcarlson@cgcs.org">rcarlson@cgcs.org</a></p>

<b>Chapter 1. Determining the Relationships between School Building Conditions and Student Achievement, School Safety and Community Relations</b>	
<p>Carl Nicoleau – Chapter Leader Assistant Superintendent Miami-Dade County Public Schools 12525 NW 28 Ave. Miami, FL 33167 305-995-4043 786-229-4117 cell <a href="mailto:cnicoleau@dadeschools.net">cnicoleau@dadeschools.net</a></p>	<p>Tracy Richter Chief Executive Officer DeJong-Richter 4945 Bradenton Avenue Dublin, OH 43017 614-798-8828 <a href="mailto:trichter@dejongrichter.com">trichter@dejongrichter.com</a></p>
<p>Valerie Wilson School Business Administrator Newark Public Schools 2 Cedar Street, Room 807 Newark, NJ 07102 973-733-8467 <a href="mailto:vwilson@nps.k12.nj.us">vwilson@nps.k12.nj.us</a></p>	
<b>Chapter 2. Calculating School Building Life-Cycle Investments, Life-Cycle Costs, and the Costs of Deferring Maintenance</b>	
<p>John Dufay – Chapter Leader Executive Director, Support Operations Albuquerque Public Schools 6400 Uptown Boulevard, Suite 110E Albuquerque, NM 87110 505-243-7712 <a href="mailto:dufay@aps.edu">dufay@aps.edu</a></p>	<p>Paul Gerner Former Associate Superintendent Clark County School District 1559 West Quail Track Drive Phoenix, AZ 85085 702-218-9397 cell <a href="mailto:jpgerner@cox.net">jpgerner@cox.net</a></p>
<p>Mary Filardo Executive Director 21<sup>st</sup> Century School Fund 1816 12<sup>th</sup> Street, NW Washington, DC 20009 202-745-3745 ext. 11 202-745-1713 fax <a href="mailto:mfilardo@21csf.org">mfilardo@21csf.org</a></p>	<p>Lee Prevost President SchoolDude.com 11000 Regency Parkway, Suite 200 Cary, NC 27518 877-868-3833 <a href="mailto:lee@schooldude.com">lee@schooldude.com</a></p>
<b>Chapter 3. Facility Condition Assessment and Major Repair/Replacement Program Planning</b>	
<p>Lee Dulgeroff – Chapter Leader Executive Director, Facilities Planning San Diego Unified School District 4860 Ruffner Street, Suite 3 San Diego, CA 92111 858-637-3516 858-829-1452 cell <a href="mailto:ldulgeroff@sandi.net">ldulgeroff@sandi.net</a></p>	<p>Doug Eveland, Ph.D. Chief Technology Officer Gafcon, Inc. 701 B Street, Suite 1600 San Diego, CA 92101 619-231-6100 ext. 7419 760-415-0105 cell <a href="mailto:develand@gafcon.com">develand@gafcon.com</a></p>
<p>William (Bill) Lewis Chief Operating Officer</p>	<p>Sean Olcott Manager of BIM Services</p>

Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

<p>Charleston County School District          3999 Bridge View Drive          Charleston, SC 29405          843-566-1975          843-297-0924  <a href="mailto:william_lewis@charleston.k12.sc.us">william_lewis@charleston.k12.sc.us</a></p>	<p>Gafcon,, Inc.          600 Wilshire Blvd, Suite 950          Los Angeles, CA 90017          213-593-1027          310-819-6542 cell  <a href="mailto:solcott@gafcon.com">solcott@gafcon.com</a></p>
<p>Bryan Ehm          Senior Project Manager          Gafcon, Inc.          SDUSD Facilities Planning and Construction          4860 Ruffner Street          San Diego, CA 92111          619-823-0557 cell  <a href="mailto:behm@gafcon.com">behm@gafcon.com</a>  <a href="mailto:behm@sandi.net">behm@sandi.net</a></p>	
<p><b>Chapter 4. Identifying Best Practices Used          in Maintaining School Buildings and Equipment</b></p>	
<p>John Dufay – Chapter Leader          Executive Director, Support Operations          Albuquerque Public Schools          6400 Uptown Boulevard, Suite 110E          Albuquerque, NM 87110          505-243-7712  <a href="mailto:dufay@aps.edu">dufay@aps.edu</a></p>	<p>John Dougherty          Program Director          Jacobs Engineering          10 10<sup>th</sup> Street, Suite 1400          Atlanta, GA 30309          404-305-2170          941-957-8887 cell  <a href="mailto:John.Dougherty2@Jacobs.com">John.Dougherty2@Jacobs.com</a></p>
<p>Paul Gerner          10304 Huxley Cross Lane          Las Vegas, NV 89144          702-218-9397 cell  <a href="mailto:jpgerner@cox.net">jpgerner@cox.net</a></p>	<p>Dr. Lester Herndon          Assistant Superintendent          Seattle Public Schools          MS 22-330          P.O. Box 34165          Seattle, WA 91824-3041          206-252-0644  <a href="mailto:lherndon@seattleschools.org">lherndon@seattleschools.org</a></p>
<p>Ronald Kramps          Executive Director, Facilities          Charleston County School District          3999 Bridge View Drive          Charleston, SC 29405          843-566-8132  <a href="mailto:ronald_kramps@charleston.k12.sc.us">ronald_kramps@charleston.k12.sc.us</a></p>	<p>Kristabel Lopez          Business Leader South Region          Jacobs Project Management          1999 Bryan Street          Dallas, TX 75201          305-979-5528 cell  <a href="mailto:Kristabel.Lopez@jacobs.com">Kristabel.Lopez@jacobs.com</a></p>
<p><b>Chapter 5. Determining Correct Methods and Amounts of          Allocating Resources to Maintain School Buildings and Equipment</b></p>	
<p>Lee Dulgeroff – Chapter Leader          Executive Director, Facilities Planning          San Diego Unified School District          4860 Ruffner Street, Suite 3          San Diego, CA 92111          858-637-3516          858-829-1452 cell</p>	<p>Bryan Ehm          Senior Project Manager          Gafcon, Inc.          SDUSD Facilities Planning and Construction          4860 Ruffner Street          San Diego, CA 92111          619-823-0557 cell</p>

Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

<p><a href="mailto:ldulgeroff@sandi.net">ldulgeroff@sandi.net</a> Diane Garcia <a href="mailto:dgarcia1@sandi.net">dgarcia1@sandi.net</a></p>	<p><a href="mailto:behm@gafcon.com">behm@gafcon.com</a> <a href="mailto:behm@sandi.net">behm@sandi.net</a></p>
<p>Kenneth Huewitt Chief Financial Officer Houston Independent School District 4400 West 18<sup>th</sup> Street Houston, TX 77092 713-556-6600 <a href="mailto:khuewitt@houstonisd.org">khuewitt@houstonisd.org</a></p>	<p>Carl Nicoleau Assistant Superintendent Miami-Dade County Public Schools 12525 NW 28 Ave. Miami, FL 33167 305-995-4043 786-229-4117 cell <a href="mailto:cnicoleau@dadeschools.net">cnicoleau@dadeschools.net</a>  Cynthia Beraldi <a href="mailto:CRMcCoy@dadeschools.net">CRMcCoy@dadeschools.net</a></p>
<p>Lee Prevost President SchoolDude.com 11000 Regency Parkway, Suite 200 Cary, NC 27518 877-868-3833 <a href="mailto:lee@schooldude.com">lee@schooldude.com</a></p>	<p>Fred Schmitt Schmitt Consulting 1773 Pigeon Roost Road Banner Elk, NC 28604 828-260-0008 <a href="mailto:FredsSchmitt5@gmail.com">FredsSchmitt5@gmail.com</a></p>
<p>Bill Wherritt Chief of Staff, Facilities Los Angeles Unified School District 333 South Beaudry Avenue, 23<sup>rd</sup> Floor Los Angeles, CA 90017 213-241-5355 <a href="mailto:bill.wherritt@lausd.net">bill.wherritt@lausd.net</a></p>	<p>Jenny Salkeld Chief Financial Officer San Diego Unified School District Education Center 4100 Normal Street, Room 3251 San Diego, CA 92131 619-725-7667 <a href="mailto:jsalkeld@sandi.net">jsalkeld@sandi.net</a>  Christina Lembert <a href="mailto:ilembert@sandi.net">ilembert@sandi.net</a></p>
<p><b>Chapter 6. Creating a Model for Effective Community Relations</b></p>	
<p>Leo Bobadilla – Chapter Leader Chief Operations Officer Houston Independent School District 4400 West 18<sup>th</sup> Street Houston, TX 77092 336-370-3482 <a href="mailto:lbobadil@houstonisd.org">lbobadil@houstonisd.org</a>  Priscilla Martinez 713-556-7508 <a href="mailto:Pmarti19@houstonisd.org">Pmarti19@houstonisd.org</a>  Sylvia Wood <a href="mailto:swood@houstonisd.org">swood@houstonisd.org</a></p>	<p>Lee Dulgeroff Executive Director, Facilities Planning San Diego Unified School District 4860 Ruffner Street, Suite 3 San Diego, CA 92111 858-637-3516 858-829-1452 cell <a href="mailto:ldulgeroff@sandi.net">ldulgeroff@sandi.net</a>  Diane Garcia <a href="mailto:dgarcia1@sandi.net">dgarcia1@sandi.net</a></p>

Reversing the Cycle of Deterioration in the Nation’s Public School Buildings

<p>Bruce Husson                  Bruce A. Husson Consulting                  1922 Sonett Street                  El Cajon, CA 92019                  619-993-2206  <a href="mailto:bhussonconsult@cox.net">bhussonconsult@cox.net</a></p>	<p>Tracy Richter                  Chief Executive Officer                  DeJong-Richter                  4945 Bradenton Avenue                  Dublin, OH 43017                  614-798-8828  <a href="mailto:trichter@dejongrichter.com">trichter@dejongrichter.com</a></p>
<p><b>Chapter 7. Mining Resources for Maintaining School Buildings and Equipment</b></p>	
<p>Jaime Torrens – Chapter Leader                  Chief Facilities Officer                  Miami-Dade County Public Schools                  1450 N.E. Second Avenue, Room 923                  Miami, FL 33132                  305-995-1401                  305-218-2705 cell  <a href="mailto:jtorrens@dadeschools.net">jtorrens@dadeschools.net</a></p> <p>Datsie Moreno-dominick  <a href="mailto:dmoreno2@dadeschools.net">dmoreno2@dadeschools.net</a></p>	<p>Mary Filardo                  Executive Director                  21<sup>st</sup> Century School Fund                  1816 12<sup>th</sup> Street, NW                  Washington, DC 20009                  202-745-3745 ext. 11                  202-745-1713 fax  <a href="mailto:mfilardo@21csf.org">mfilardo@21csf.org</a></p>
<p>Bruce Husson                  Bruce A. Husson Consulting                  1922 Sonett Street                  El Cajon, CA 92019                  619-993-2206  <a href="mailto:bhussonconsult@cox.net">bhussonconsult@cox.net</a></p>	<p>Carl Nicoleau                  Assistant Superintendent                  Miami-Dade County Public Schools                  12525 NW 28 Ave.                  Miami, FL 33167                  305-995-4043                  786-229-4117 cell  <a href="mailto:cnicoleau@dadeschools.net">cnicoleau@dadeschools.net</a></p>
<p>Lee Prevost                  President                  SchoolDude.com                  11000 Regency Parkway, Suite 200                  Cary, NC 27518                  877-868-3833  <a href="mailto:lee@schooldude.com">lee@schooldude.com</a></p>	

**Council of the Great City Schools**

The Council of the Great City Schools is a coalition of 67 of the nation's largest urban public school systems. Its board of directors is composed of the superintendent of schools and one school board member from each member city. An Executive Committee of 24 individuals, equally divided in number between superintendents and school board members, provides regular oversight of the 501(c) (3) organization. The mission of the Council is to advocate for urban public education and assist its members in the improvement of leadership and instruction. The Council provides services to its members in the areas of legislation, research, communications, curriculum and instruction, and management. The group convenes two major conferences each year; conducts studies on urban school conditions and trends; and operates ongoing networks of senior school district managers with responsibilities in areas such as federal programs, operations, finance, personnel, communications, research, and technology. The Council was founded in 1956 and incorporated in 1961 and has its headquarters in Washington, DC.

Jumoke Hinton Hodge  
Chair of the Board  
And  
School Board Member  
Oakland Unified School District

Richard Carranza  
Chair-elect of the Board  
And  
Superintendent  
San Francisco Unified School District

Felton Williams  
Secretary/Treasurer  
And  
School Board Member  
Long Beach Unified School District

Valeria Silva  
Immediate Past Chair  
And  
Superintendent, St. Paul Public Schools

Michael Casserly  
Executive Director  
Council of the Great City Schools

<b>Albuquerque</b>	<b>East Baton Rouge</b>	<b>Oklahoma City</b>
<b>Anchorage</b>	<b>El Paso</b>	<b>Omaha</b>
<b>Atlanta</b>	<b>Fort Worth</b>	<b>Orange County</b>
<b>Austin</b>	<b>Fresno</b>	<b>Palm Beach</b>
<b>Baltimore</b>	<b>Guilford County</b>	<b>Philadelphia</b>
<b>Birmingham</b>	<b>Honolulu</b>	<b>Pittsburgh</b>
<b>Boston</b>	<b>Houston</b>	<b>Portland</b>
<b>Bridgeport</b>	<b>Indianapolis</b>	<b>Providence</b>
<b>Broward County</b>	<b>Jackson</b>	<b>Richmond</b>
<b>Buffalo</b>	<b>Jacksonville</b>	<b>Rochester</b>
<b>Charleston</b>	<b>Kansas City</b>	<b>Sacramento</b>
<b>Charlotte</b>	<b>Long Beach</b>	<b>San Diego</b>
<b>Chicago</b>	<b>Los Angeles</b>	<b>San Francisco</b>
<b>Cincinnati</b>	<b>Louisville</b>	<b>Santa Ana</b>
<b>Clark County</b>	<b>Miami-Dade</b>	<b>Seattle</b>
<b>Cleveland</b>	<b>Milwaukee</b>	<b>Shelby County</b>
<b>Columbus</b>	<b>Minneapolis</b>	<b>St. Louis</b>
<b>Dallas</b>	<b>Nashville</b>	<b>St. Paul</b>
<b>Dayton</b>	<b>Newark</b>	<b>Tampa</b>
<b>Denver</b>	<b>New Orleans</b>	<b>Toledo</b>
<b>Des Moines</b>	<b>New York City</b>	<b>Washington, DC</b>
<b>Detroit</b>	<b>Norfolk</b>	<b>Wichita</b>
	<b>Oakland</b>	



**Council of the Great City Schools**  
**1301 Pennsylvania Ave N.W.**  
**Suite 702**  
**Washington, D.C. 20004**