Public School Construction
Cost Reduction Guidelines

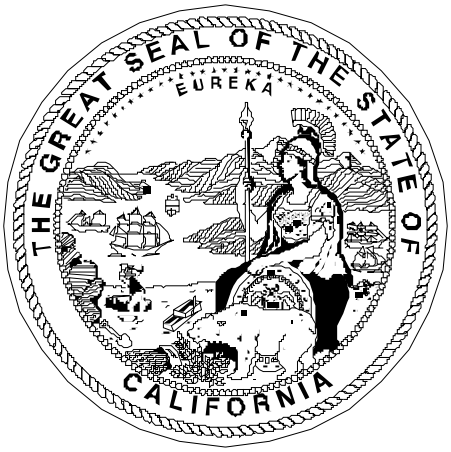








State Allocation Board



"The State Allocation Board is dedicated to providing quality educational environments for the children of California through a variety of facilities-related programs. In a state as dynamic and growing as ours, the challenge of providing new facilities and maintaining the existing classrooms is daunting. Innovation and cost consciousness are a requirement if we are to meet the challenge while maintaining consistency and quality for all our communities.

*These **Public School Construction Cost Reduction Guidelines** are a step toward controlling, and even reducing, costs while maintaining the quality of environment our leaders and parents demand and our children deserve. The consensus of the experts who helped assemble these Guidelines is clear: cost consciousness works! The Guidelines focus on improving the way in which we prepare for, plan for, build for, and live with our public schools. The suggestions emphasize efficiency, better processes, and innovative ideas that produce schools we can take pride in, while making the most of the resources available to us.*

On behalf of the State Allocation Board, I recommend these Guidelines with enthusiasm. Your success will benefit us all."

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Intent

California's State Allocation Board was charged with the responsibility to produce these Guidelines under statute SB50 passed by the Legislature in 1998. The purpose of the Guidelines is to set forth "measurable reductions in the cost of construction of public school facilities" in California. These Guidelines are in response to that mandate.

Most school districts are very capable of constructing a good educational environment, and do so within very stringent budgets. In fact it would be erroneous to presume that the districts were undertaking those projects without regard to the cost. Thus, the question might be asked: is there really a need for the guidelines? The answer is an emphatic "yes". Regardless of the good intentions and efforts of all concerned, there is always room for improvement. However, "room for improvement" by itself is not enough incentive. All stakeholders, be they legislators, agency staffs, architects, educators, builders, or developers must unite in the effort.

The Public School Construction Cost Reduction Guidelines is a comprehensive document setting forth the best practices and strategies for construction of new, or modernization of existing, facilities. The document was developed through a series of constituency workshops. It is not intended to be a treatise on how to build schools, rather, it is an identification of some of the key issues and processes that inflate the cost of construction, and suggestions of how to avoid them. The Guidelines address specific areas of concern which collectively influence the cost of school construction. Each concern taken individually may not produce a significant reduction, but acted upon collectively can result in measurable cost savings.

Methodology

The State Allocation Board, acting through the Office of Public School Construction, issued a Request For Qualifications for a consultant to be responsible for preparation of the Guidelines. Vanir Construction Management, Inc., with Harry C. Hallenbeck, FAIA as Project Director, was selected for the responsibility. Mr. Hallenbeck served as California State Architect from 1991 through 1995. The Office of Public School Construction established a Cost Reduction Workgroup to oversee and give guidance to the consultant.

The methodology, recommended and used by the consultant, involved the participation of a wide range of stakeholder/experts familiar with all aspects of public school construction. Eleven, one day workshops were conducted by the consultant covering the nine basic subjects included in these Guidelines. The subjects covered all aspects of the school construction process from "Working with Professional Consultants" to "Project Delivery Methods." Over one hundred persons, representing numerous constituencies, participated in the workshops. The constituency groups included: state agencies, school districts, architects, engineers, contractors, manufacturers, builders and developers, legal and other interested parties. Their input is the basis of the Guidelines.

Findings

The process of constructing new facilities, and modernizing existing, has evolved over time to a point where it is today. The process is driven by legislative mandates, governmental bureaucracy, funding availability, educational intent, and to a lesser degree market conditions. That is to say, the process has evolved somewhat as expected within the state's political environment; i.e. there are no surprises.

The enactment of SB50 is a significant change in the funding mechanism. The key element is the grant approach and the ability for the school districts to retain the "savings" as incentive for cost efficiency in design and construction. This is a significant change. The prior system can be characterized as a "bottom up" approach where a construction project was funded by adding up all of the elements of the project and arriving a total state loan amount based on allowances for each element. In contrast, the SB50 approach is "top down". The total state amount is a grant based on student eligibility. In the old system, the incentive was to build as much as allowed because the District got more money. In the new system the incentive is to be as cost-effective as possible because the District gets a fixed amount regardless of the project, and it can use its savings on another project.

With that as a background, the workshops focused on refinement of the system, as opposed to a complete overhaul. There are nine subject areas and approximately two hundred issues addressed in the Guidelines.

The major factors, effecting the costs of public schools in California are driven by several overriding issues:

- The desire for school by school control and the resultant customizing of each school to meet what is perceived as local educational necessities, has caused a "one of a kind," start-over-every-time, approach.
- Not withstanding the large statewide volume of school construction, most districts are faced with infrequent needs, and often limited resources and capabilities for managing construction.
- The state's mandates for the K-12 system are more complex than those for other state capital outlay systems, and are driving the results and the costs.
- The traditional project delivery methods, from initial planning through design and construction, are linear, step by step, prescriptive methods that fail to take advantage of current and evolving performance systems.

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Overview

There are over one thousand individual school districts in California. Collectively, they have built over 1500 new schools, and modernized nearly a thousand more, in the years from 1990 thru 1999. And the projection is that this growth pattern will continue into the foreseeable future. This amounts to more than one billion dollars a year of construction for K-12 schools alone. Regardless of the state's economy, public school construction has been, and continues to be, on a significant growth curve. And the costs have risen accordingly.

Most people believe that the cost of public school construction in California is "too high". This, of course, is a relative evaluation, and requires a "base" from which to make the comparison. In fact, no such basis exists, and the assertion is very difficult to quantify. None-the-less, the perception is generally accepted. The Legislature attempted to address this issue with the passage of SB50 in 1998. That statute produced a significant change in the state's funding system, allowing districts to retain "savings" from construction projects. This, in itself, is a major incentive to reduce costs.

Mandate

The mandate for these Guidelines is contained in Education Code, Section 17070.33 (a). It states:

"(a) The Board shall adopt guidelines for use by districts by June 30, 1999, to achieve measurable reductions in the cost of school facilities construction.

(b) The guidelines shall include, but not be limited to, all of the following:

- (1) Mechanisms designed to reduce the costs of professional fees.
- (2) Mechanisms designed to reduce the costs of site preparation.
- (3) Recommendations for the use of alternate cost-saving construction materials and methods.
- (4) Recommendations regarding the joint use of core facilities.
- (5) Mechanisms designed to reduce the costs by incorporating efficiencies in school site design.
- (6) Recommendations regarding the use of cost-effective, efficient reusable facility plans.

(c) If school district's matching funds include fees charged pursuant to Section 17620 or pursuant to Section 65995.5 or 65995.7 of the Government Code, or if a district receives funds pursuant to this chapter, the district shall consider the guidelines developed pursuant to this section as fully as is practicable.

(d) When the board adopts the guidelines, it shall not include any recommendations that would have a significant detrimental effect on the educational programs."

In response to that mandate, these Guidelines are intended to provide the District with ideas on how it can reduce construction costs without sacrificing the quality of the educational facility.

Issues

There are a multitude of "issues" impacting the costs of public school construction. Most have a relatively small cost impact individually, but collectively they amount to a tangible number.

The issues addressed in these Guidelines are those that can be controlled by the Districts without changes to regulation or statute; i.e. they are considered "in-the-box" of the current political system. Other issues that are beyond the District's control or that will require regulation and/or statute changes are considered "out-of-the-box" for the purposes of this document. The out-of-the-box suggestions are the subject of a separate document.

Those issues that a District has control over have been presented in nine subject areas:

Site and Use Related Issues

1. District Responsibilities
2. Joint Use Facilities
3. Site Issues

Consultants, Contractors and Agencies Issues

4. Professional Consultants
5. Contractors
6. Agencies

Construction Issues

7. Types of Construction
8. Prototype Designs
9. Project Delivery Methods

Definition

The costs associated with construction are generally identified as "Hard" costs and "Soft" costs. In combination, they comprise, what is properly called, the total "Project" cost. Hard costs are those resultant from the construction itself, i.e. the things you can touch and feel, the bricks and mortar. Soft costs are those that you can't touch or feel, yet are an integral part of the building process. They are usually preparatory to, or supportive of, the construction, such as professional fees and other related, but non-construction costs.

Matrix

The six "mechanisms" and "recommendations" mandated by the Education Code, along with related issues identified in the workshops, are presented in a matrix of nine subject areas. Each subject addresses a distinct, but inter-related area of concern. The following pages provide a matrix of the Guidelines.

Contents Matrix

SUBJECTS	SITE & RELATED USE ISSUES			CONSULTANTS,
	1. DISTRICTS	2. JOINT USE	3. SITE ISSUES	4. CONSULTANTS
PRECEPTS	1. Know what you don't know 2. Clear direction 3. Hire the best	1. Pursue the opportu-nities 2. Benefts to all partites 3. Costs must be less	1. Select site carefully 2. Be involved in local planning 3. Plan ahead	1. Define scope, time and fee 2. Select most expert consultants 3. Manage their services
GUIDELINES	1.1 Managing Your Future	2.0 Joint Use Defined	3.1 Site Selection	4.1 Time Issues
	1.2 District Leadership	2.1 Mutual Benefits	3.2 "Unknown" Problems	4.2 Consultant Selection
	1.3 Knowledge	2.2 Ownership Opportunites	3.3 Other Develop-ments	4.3 Procurement Concepts
	1.4 Resources	2.3 Design Impacts	3.4 Timing Issues	4.4 Incentive Agree-ments
		2.4 Funding	3.5 Market Opportuni-ties	4.5 Insurance Arrange-ments
		2.5 Operations	3.6 Alternate Design Approaches	4.6 Managing the Consultant
				4.7 Contract Docu-ments
				4.8 The "IOR"

Contents Matrix

CONTRACTORS & AGENCIES		CONSTRUCTION ISSUES		
5. CONTRACTORS	6. AGENCIES	7. CONSTRUCTION	8. PROTOTYPES	9. PROJ. DELIVERY
1. *Solicit the most qualified* 2. *Manage and communicate* 3. *Manage changes in a timely manner*	1. *Know what you don't know* 2. *Be fully involved in state and local* 3. *Work with the agencies*	1. *Keep design simple* 2. *Utilize standard elements* 3. *Maximize factory built components*	1. *Fully research best thinking* 2. *Ensure maximum flexibility* 3. *Keep basics simple*	1. *Qualifications, capability commitment are the key* 2. *Same responsibilities* 3. *No one best way*
5.1 Timing	*6.1 OPSC*	*7.1 Configuration Issues*	*8.0 Prototype Defined*	*9.0 Project Delivery Defined*
5.2 Pre-Qualification	*6.2 DSA*	*7.2 Life Expectancy*	*8.1 District Issues*	*9.1 Traditional Design, Bid, Build*
5.3 Change Orders	*6.3 CDE Requirements*	*7.3 Methods and Materials*	*8.2 Design Consultant Issues*	*9.2 Design/Build*
5.4 Dispute Resolution	*6.4 Local Planning Agencies*	*7.4 Time*	*8.3 Pre-Approval Issues*	*9.3 Developer, Lease-back, Turnkey*
5.5 Insurance Arrangements	*6.5 Local Permitting Agencies*	*7.5 Factory-Built Components*	*8.4 Design Issues*	*9.4 CM, Advisor*
		7.6 Field-Built Standardization	*8.5 Construction Issues*	*9.5 CM@Risk (GMP)*
				9.6 CM, Advisor (Multiple Prime/ Trade Contracting)
				9.7 Hybrid Methods

Overview

The multitude of Districts, and their varying degree of knowledge about construction, makes it difficult to address all Districts equally. However, from the largest Districts (measured in terms of nearly continuous construction needs) to the smallest Districts (identified by almost nonexistent construction needs) there is a common thread. The management of design and construction projects is not in the District's core competency. Even the largest Districts have difficulty in managing their projects due to a combination of 1) staff turn over, 2) process complexity, and 3) crushing schedules driven by sporadic funding cycles. The small Districts have no ability to manage the process due to the same difficulties facing the large Districts compounded by a need that may only occur every ten to fifteen years. This places all Districts in a very difficult position of needing to be "expert" in managing the design and construction process without the knowledge, experience, or resources.

Regardless of the size of the project (small ones are just as difficult to manage as large ones), whether modernization or new construction, the type of project delivery, or the funding source, the one constant element is the need for good direction and management from the District. Unfortunately, most Districts are not well prepared or staffed to undertake a major capital outlay program. Several phrases depict the situation: the design and construction industry has long said "a project is only as good as its owner" or, in the lingo of today's high-tech world, "garbage in, garbage out." The cost impact related to the District's project management cannot be understated; good management leads to a good project.

In considering the potential cost impacts from District Responsibilities, it is important to keep in mind:

1. The District responsibility is pervasive throughout the life of a project, from the initial inception to the post occupancy review.
2. The perception that hiring a bunch of consultants will protect the District, fails the test when those consultants are not properly selected or managed.
3. The ideas that the system has been simplified, or that new delivery methods (trade contracting or design build) will ease the District's responsibilities are not true.

The approach to reducing the costs related to District limitations, is rooted in three basic precepts:

1. Know what you don't know; recognize your limitations and ask for help where you need it.
2. The design and construction process is collaborative and complex; it needs clear and unwavering direction.
3. There are no quick fixes; if you have an immediate need, hire the very best expertise available.

1.1
Managing Your Future

o Be aware of the value of good planning (1.1.1)

Why: There is a potential increase in the cost of a project due to the lack of thorough and on-going long range facilities planning. Those Districts that fail to do good long range facilities planning, do so because they are 1) simply not attuned to its importance, or 2) do not have the resources to do it. Once a good facilities plan is established, it should be reevaluated whenever a new project is initiated or at intervals not exceeding five years.

How: The District should 1) be aware of the value of long range planning, 2) undertake and keep current a long range Facilities Master Plan, and 3) ensure that facilities are assessed on a regular basis.

o Develop the Facility Master Plan, from start to finish (1.1.2)

Why: There is a potential increase in the cost of a project due to the lack of a valid and complete planning effort. Often, those Districts that undertake a planning effort, do so incompletely. The District needs to include all aspects of a school's development (start to finish) from curriculum development, land acquisition, educational specifications, design, construction, to occupancy. A good Facilities Master Plan (FMP) should include:

Educational Goals
Enrollment Projections
Community Needs
Existing Facilities Condition Assessment
Model Space Program
District Priorities
Financial Plan, Short/Long Term (including sources)
Schedule and Staffing Needs
MTYRE, CSR and other Housing Needs
Legal Issues
District Standards (broad guidelines)

Each of these elements are essential. The District Board, its staff and teachers, and the community should be involved in the Facilities Master Plan (FMP) development, and in ensuring that the FMP is updated as needed and adhered to as new projects are undertaken. The planning document becomes 1) the commitment by the District and community as to the direction of its educational facilities, and 2) the direction to the design professional so that false starts are avoided. The document should be available at the outset of any new project. If it does not exist, then it should be accomplished prior to beginning the design process.

How: 1) Develop (or borrow from a qualified resource such as CDE School Facilities Planning Division) a planning process checklist, 2) identify the various participants (staff, teachers, community members, and consultants) that should participate in the planning process, and 3) utilize a planning facilitator to guide the process.

o Influence the Community Plan (1.1.3)

Why: There is a potential increase in the cost of a project due to the inability to influence the community plan. The District's long-range Facilities Master Plan depicts the intended growth of all District facilities. As such, it should guide the District's position in the local general plan development and updates. If the District doesn't know its own direction, it can not hope to influence the community planning efforts. This can lead to poor school site locations and/or higher land acquisition costs. This issue is addressed in the section on Working with the Agencies, but the key is: a good Facilities Master Plan can be a valuable tool to help influence community planning issues.

How: Develop a good Facilities Master Plan that 1) projects the next ten years of growth in the District, and 2) is based on strong community input.

o Develop and maintain your demographic analysis (1.1.4)

Why: There is a potential increase in the cost of a project due to a lack of a valid demographic analysis. Shifting student populations can cause increased costs through either over or under building. Student populations are recorded annually in the California Basic Educational Data System (CBEDS), and in the Special Day Class (SDC) reports. In addition, the normal public census and other specific local demographic studies (planning reports etc.) provide good information for a District demographic study. The current and historical CBEDS and SDC data are required for state funding eligibility analysis, along with specific data about new residential development. The CBEDS and SDC data are particularly important, but the data is sometimes gathered haphazardly and in conflict with each other. These are fundamental pieces of information that lead directly to the need for facilities, as well as teachers.

How: 1) Develop and maintain CBEDS and SDC data accurately in a District-wide database, 2) monitor local growth trends and issues, and 3) acquire and maintain a professionally prepared demographic study of the District every five years.

o Understand the cost impact of project timing and schedules (1.1.5)

Why: There is a potential increase in the cost of a project due to poor timing and/or bad scheduling. The potential impact on the cost of construction can be significant depending on the project's timing, due to the relative bid and construction activity, and/or when the project schedule is significantly delayed. See the section on Working with the Professional Consultant for additional guidance. Several issues are important:

Sequence of key events: Knowing and monitoring the major milestones in the project's schedule is essential. The FMP establishes the overall need and schedule for each project. The individual Project Master Plan should contain all the key dates for the orderly progress of the project.

Projects are DSA driven: Project schedules, under the SFP are "DSA driven" i.e. the trigger on funding is based on DSA approved plans. This impacts planning and scheduling.

Economic cycles: Another factor impacting the proper scheduling of school development is the economic cycles that all construction faces. Combining normal economic cycles with state funding cycles, and adding the District's own need to minimize the impact on the curriculum, makes recognizing and managing this even more critical.

How: 1) Stay abreast of what's going on, 2) consult with design and construction people and colleagues to better understand the issues, and 3) ensure that your design consultant keeps the project on schedule.

o Develop good Educational Specifications (1.1.6)

Why: There is an direct increase in the cost of design and other fees due to lack of definitive and complete educational specifications. The "Ed Spec" should be prepared ahead of the design process, and be used to guide all design decisions and solutions. It should be the basis of developing good and consistent construction standards for the District. Good Ed Specs are very broad, addressing all aspects of the proposed development, yet allowing design flexibility to tailor the design to the particular site. The District needs to "own" the Ed Specs, to be fully involved in their creation, and commit to achieving them. This is a critical element of the design process. Without good Ed Specs, there is a lack of direction and commitment that will allow the design process to drift unguided. The Ed Specs (even the best of them) require confirmation/updating with each new project to ensure the most current thinking and experience is included.

How: 1) Review the District's current educational specifications (or those of another District if yours do not exist) 2) review CDE's standards, and 3) update as needed.

1.2 District Leadership

o Assign one person to have full responsibility for the project (1.2.1)

Why: There is a potential increase in the cost of a project due to the lack of clear and responsible direction and/or decisions. There must be a single point of responsibility for each project. Who that is will vary from District to District, and project to project. The best practice is to assign someone to have ultimate responsibility even if that person is not at the top of the District's organizational chart. Refer to the section on Working with the Professional Consultants.

How: Assign one person to have ultimate authority (for the project) delegated by, and on behalf of, the Board.

o Keep the District Board informed (1.2.2)

Why: There is a potential increase in the cost of a project due (as stated previously) to the lack of clear and responsible direction and/or decisions. The one point of responsibility is essential, but the District Board must be kept informed of all major decisions and milestones in the process. There needs to be a good working process wherein, the Board is kept informed, and is made a part of the process. This is a fine line; day-to-day decisions must be delegated so that the project can move forward without delays or regenerative thinking, yet the Board must be kept in the loop. The best practice follows established strategic planning processes initiated by a strong statement and commitment by the Board to uphold that process.

How: The District Board must commit to its delegation of authority and to the communication strategy.

o Keep community informed (1.2.3)

Why: The local community should be kept informed, and help evolve those decisions that impact them. This is a critical element, political buy-in is very important, but there is a very fine line between success and failure. Day-to-day decisions cannot be "made by committee" or the project will be subject to excessive delays and regenerative thinking. Yet, community input is essential to achieving the optimum educational and community environment. The best practice follows established strategic planning processes initiated by a strong statement and commitment by the Board to uphold that process.

How: The District Board must commit to involving the local community, early in the process, in those elements of the design that effect the community.

o Manage Committees (oversight, board, etc.) (1.2.4)

Why: One of the potential difficulties in designing a school is resultant from too many and/or too poorly managed District established committees. Again, this is a fine line. The input of the Board, teachers, parents, oversight committees, and community are essential elements of producing the optimum design for a particular school. Yet at the same time, too much of a good thing can be a problem, especially if it results in a lack of clear decision or rethinking of every detail. The committees need to understand, and work within, established limitations on the financial aspects of the project.

How: 1) Follow established design and planning processes, 2) set roles, responsibilities, and limitations for each committee including identification of what areas they are not to be involved in, and 3) formalize the process and stick to it.

o Identify and support the "Driver." (1.2.5)

Why: There is a potential increase in the cost of a project due to the lack of someone to "drive" or ramrod the project. If the project is to be successful, someone needs to take (or be given) the role of "driver" to crack the whip and ensure that the project is kept on track. Actually, there should to be two drivers: 1) internal to the District, a key individual should be designated who is capable, in terms of knowledge, personality and time, and 2) external to the District, most often and logically the design consultant should take an assertive role. The District's representative (see Working with the Professional Consultants) must function as the internal driver. The internal driver's responsibility is to ensure that all District-controlled processes and answers are on schedule. The external driver's responsibility is to ensure that all sub-consultants are progressing on schedule. The District's design consultant should be selected with the "driver" capability as one of their qualifications.

How: 1) Select and assign the District representative in part on the ability to be the District's internal "driver." 2) Select the design consultant in part on their ability to be the District's external driver.

o Make decisions! (1.2.5)

Why: All decisions (during design and construction) must be made expeditiously. Delays in decisions cause two problems: 1) They can potentially stagnate the process based on the feeling that "nobody cares", and 2) they can cause the project to move in the wrong unguided direction. Both of these are costly to overcome.

How: The District, through its internal driver, must be responsive to the needs of the external driver.

o Commit adequate staff resources (1.2.7)

Why: Good planning, good management, and a good District representative are essential ingredients in a successful project. The problem is one of sufficient District resources to commit to the project. Most Districts assign the tasks as add-ons to their normal responsibilities. And most of the time this does not work well. The best approach is to have a key staff person assigned to this responsibility as a primary responsibility, not as an add-on or secondary responsibility. The number of projects, and/or consultants involved compounds the staff resource problem. The more consultants, the more management required, unless the internal driver is given the time and responsibility. The internal driver role can also be accomplished by a consultant specifically selected for that role. The smaller Districts typically cannot afford the staff to properly manage the project, in which case a consultant as internal driver can work well.

How: Commit the staff resources (or retain a consultant) that is singularly responsible for the project as a primary responsibility.

1.3 Know What you Don't Know

o Learn from others (1.3.1)

Why: There is potential for an increase in the cost of a project due to errors on the part of the District. Perhaps the most fundamental issue leading to excessive costs, for which the District has control, is the District's own lack of knowledge about the school construction and modernization process. This assertion is reasonable since most Districts do not have a continuum of projects, i.e. many are doing their first project in many years, and do not have experienced staff. There is however, a vast pool of information available from state agencies, other districts, and an unlimited number of consultants. One potential problem exists in the fact that Districts are in competition with each other for state funds, consultant services, and contractors, etc. The key is in identifying those that are willing to help, and making use of their expertise.

How: 1) Start by talking with your colleagues from other Districts, 2) meet with the state agencies to familiarize the District with their current processes and requirements, and 3) retain qualified consultants.

o Learn, Learn, Learn; commit to learning (1.3.2)

Why: There is a potential increase in the cost of a project due to the lack of sufficient resources for the District to invest in their own learning curve. The problem is threefold: 1) the lack of district funds to hire and maintain staff who could be trained in project management, 2) the lack of consistency in the District needs, due to the sporadic and complex nature of their development needs, and 3) the lack of a central resource to provide the necessary training.

How: 1) Commit to training a core of key staff in all aspects of the construction process, and 2) maintain their skill level even when current construction needs have ebbed.

o Process is multifaceted; Understand it! (1.3.3)

Why: The lack of District understanding about the construction process can be costly. The process continues to become evermore complex. While the intent of SB50 was to sim-

plify the process, and CDE, OPSC, and DSA, staffs have become more user-friendly, the statutes and regulations continue to overburden the process. At the same time, the local funding and local planning issues have taken on an increasing level of impact, adding to the process complexity that a District must understand and manage. The District must become more knowledgeable in order to avoid significant cost impacts.

How: 1) Expend the time and dollars to become fully aware of the process at both state and local levels, 2) stay in contact with the state agencies on a regular basis, and 3) participate in the associations that are specifically oriented to the school facilities construction process.

1.4 Resources

o Share the knowledge (1.4.1)

Why: It would be helpful if there was a centralized point where Districts could go to find out about resources that are available. Such things as: 1) a multi-district developed clearinghouse of all resources available to the District, indicating what services they can provide and where they are located, and/or 2) a multi-district developed Web based, nonexclusive, two-way, "chat" room that would provide links to various resources so that a District could both give and receive information. Regardless of how or where the central data is housed, the key is that it would be available to all Districts without special membership or fee, and that it would interactive, i.e. the District could input or output knowledge.

How: 1) Take the lead, create a vehicle by which Districts would be encouraged to share their knowledge and experiences, and 2) focus your efforts on the "big-ticket" items such as master planning, funding, permitting etc.

o Undertake and share post-occupancy reviews (1.4.2)

Why: All District projects should have a post occupancy review of the recently completed project. The review should describe the process, the design, and the construction, and all the pros and cons. This information should then be properly recorded in the District files for retrieval at the time of, and in preparation for, their next project. The same information could also be shared with, and be valuable to, other Districts as they start new projects. It should be part of a centralized resource system.

How: 1) Commit to doing a post-occupancy review of every project, 2) share your reviews with colleague districts, and 3) incorporate the best practices in the next project.

o Work with your County Office of Education (1.4.3)

Why: There is a potential for reducing the cost of a project through the better use of the County Office of Education (COE) as a central depository of resources. In some areas, the COEs are working well, but in other areas, they are not. It all depends on the District participation.

How: 1) Participate in, and insist on, a strong COE dialog on construction-related issues, and 2) share your knowledge and experiences.

Overview

The development of Joint Use facilities is increasing. There are several reasons: 1) to achieve better facilities, 2) to achieve a better use of public funds, and 3) to reduce the District's costs for facilities. In fact, the reasons for developing Joint Use facilities are so compelling, it is surprising that the technique has not been used more. There are, of course, impediments. Often, 1) the opportunities are just not available, 2) there is concern about compromising the District's political independence, 3) the benefits don't offset the risks, or 4) the costs are excessive. The key is to seek the opportunities, to weigh the pros and cons, and to mesh the right project into the District's facilities master plan.

Joint Use projects can be created for almost any function, but typically are aimed at the development of open space for physical education and recreation, libraries, auditoriums, or gymnasiums etc. On occasion, classrooms are the primary function.

There is a question about whether Joint Use projects actually save money. Obviously, a Joint Use project should be able to reduce the initial cost to the District since part of the cost is paid by the Joint Use partner. (For purposes of this document, the Joint Use must be less costly than the District-only alternative.) But the total cost of the project may not be less since it must serve both parties and there can be a tendency to over build the facility.

In considering potential cost savings from the development of Joint Uses facilities, it is important to keep in mind:

1. The benefit, to each of the participants in the Joint Use, needs to be identified and documented. Support and involvement from the community is a mutual benefit.
2. There should be a formal agreement documenting the Joint Use relationships and responsibilities.
3. The cost and time to design and construct the Joint Use project could be significantly more than a comparable school-only facility.

The approach to reducing costs through the development of Joint Use projects, is rooted in three basic precepts:

1. The District must actively pursue the opportunities.
2. The benefits must accrue to all parties to the Joint Use.
3. The costs to the District must be less than building the facility on its own.

2.0
Joint Use Defined

A facility of any type, core or otherwise, that has a shared use by, and benefit to, two or more entities through a contractual agreement; the development of which, including the cost of land and improvements, plus operation if it is part of the development agreement, results in a lower initial project cost to the District, as compared to the District having to provide a project that meets the District's needs individually.

That definition has several key words and phrases which require emphasis:

> "**any type"** means such things as open space for physical education and recreation, classrooms, libraries, auditoriums, gymnasiums, etc.
>
> "**shared use by, and benefit to,"** means the entities involved use, and intend to benefit from, the facility.
>
> "**contractual agreement"** means a formal and binding document expressing the terms of the Joint Use.
>
> "**plus operation**" means that operational costs can be considered part of the costs that are shared if so delineated in the agreement.
>
> "**lower initial project cost"** means that the joint use project (for this definition) cannot have an initial cost that is equal to or more than it would be without the Joint Use. This part of the definition is specifically intended to restrict the definition of Joint Use (for cost reduction purposes) to those projects for which the District's costs are less than they would be it were not a Joint Use.

The following examples are intended to help clarify the definition:

> **Example 1:** Assume a library is proposed as a Joint Use with the city. The library is going to be three times larger than the school actually needs in order to accommodate the additional city needs. If the District's cost for the Joint Use library is greater than its cost to build a smaller library exclusively for school use, then for the purposes of "cost reduction" this would not qualify as a Joint Use under this definition.
>
> **Example 2:** Assume again the same Joint Use library but in this example the library will be the same size (and cost) as if the District built it own their own. The contract with the city calls for the District to pay all design and construction costs and the city to pay all operational costs. Again, this would not qualify as a Joint Use under this definition since the District's initial cost was not reduced even though the school would be relieved of its normal operational costs.

The types of entities that may be involved is practically unlimited. The following relationships are the most common:

> **School to School**: This typically involves two adjacent schools within one District, or in overlapping Districts, and is motivated by land and cost savings.
>
> **District to District**: This typically involves two adjacent or overlapping Districts, and is motivated by land and cost savings.
>
> **District to Public Agency** (City, County, or Special District): This is probably the most commonly thought of relationship, and typically involves a District that is located within the public agency boundaries, although that is not a criteria. It is typically motivated by land and cost savings.

District to Higher Education Institution: This typically involves a shared educational program as its primary motivation, as opposed to land or cost savings.

District to Private Development: This typically involves a new subdivision development where the primary motivation is reduced costs and/or land consumption.

District to Non-Profit Organization: This typically involves recreational facilities, and is motivated by reduced costs.

2.1 Mutual Benefits

o Establish relative value (2.1.1)

Why: The most obvious benefit to the District is in reducing the initial cost of a project that the District would otherwise have to fund on its own. However, in a District/City Joint Use facility there is a secondary benefit of improving the District-to-City relationship. Community support is an integral value of any Joint Use. Whatever the situation, the Joint Use document should clearly establish the relative value of the Joint Use that is anticipated for each party involved. The "value" anticipated may be difficult to define. However, this is an important element of the agreement, and serves as the starting point (basis) for the agreement. The statement of benefit or value can be modified over time if and as the situation changes. The key is to identify the reason for the Joint Use project so that the responsibilities (and costs) can be fairly assigned.

How: Identify the benefit of the Joint Use to both parties at the outset, and record that information in the Joint Use agreement.

o Establish mutual risk in the agreement (2.1.2)

Why: There is potential to reduce the cost of a Joint Use project by clearly establishing the relative risk involved in the Joint Use facility. The agreement should include both the benefits and the risks to each party to the Joint Use. Risk is defined to mean: 1) tangible elements such as direct costs contributed to the building of the project, 2) maintenance cost associated with the operation of the facility, and 3) inherent dangers from any failure of the project to operate as anticipated including liability to users.

How: Identify the potential risk of the Joint Use to both parties at the outset, and record that information in the Joint Use agreement.

o Identify times of usage and responsibilities (2.1.3)

Why: There can be hidden costs in a Joint Use project due to potential conflicts as to who is allowed to use the facility and at what times. Because of this, the Joint Use document should include provisions for the actual use of the facility. The goal is to reduce conflicts. The process of identifying and working out mutually acceptable times and responsibilities for use, will help validate the reason for (or against) the Joint Use. Part of the responsibility issue is the question of who monitors and services the use. One approach would require the using entity to monitor and service their own use. In this approach, each party to the agreement is responsible for the facility during their own use. Another approach would assign the responsibility for monitoring and servicing the facility to one entity regardless of who is using it. Clearly two different approaches; the agreement needs to be very specific.

How: Work with the Joint Use partner as part of the initial concept discussions, to identify the usage and responsibilities of the Joint Use of both parties at the outset, and record that information in the Joint Use agreement.

o Establish how the Joint Use is governed (2.1.4)

Why: There is potential to reduce the costs of operating a Joint Use facility through clearly establishing the governance of the facility. There are a variety of solutions, ranging from essentially no governance, to a separate "board" to govern the Joint Use's ownership. Managing the completed Joint Use facility has been done in a variety of ways. Surprisingly, most do not have a formal governance methodology. Typically, the school is responsible for their use and the city (or partner) is responsible for their use. That approach is generally very informal and lacks in addressing the long-term needs of the partnership. Things to consider: 1) Some form of governance is necessary. It can be simple or complex, but it must be formalized; and 2) If the facility is sufficiently independent in its operation as to require its own staff, then you will need an individual to head up that staff (at the vice president or superintendent level).

How: Work with the Joint Use partner as part of the initial concept discussions, to identify how the Joint Use will be governed, and record that information in the Joint Use agreement.

o Use good public policy (2.1.5)

Why: There is potential for reducing the costs of a Joint Use project by formally establishing the relative benefits. The Joint Use document should contain language that each party (to the Joint Use) has formally found the Joint Use to be in the best interest of their constituency. The formal process of identifying and agreeing to the Joint Use, and the inclusion of the public policy statement, can go a long way in defusing opposition and in keeping the agreement together over time.

How: Discuss the concept of the Joint Use in formal Board session, and authorize it only after findings of public good, and due process.

o Formalize the Agreement on paper (no handshake) (2.1.6)

Why: A Joint Use facility can be financially successful only if it is of benefit to all parties, and those benefits need to be clearly identified in a written document. This seems obvious, but is not always done. The Joint Use agreement should be the formal contract between the parties that ultimately is approved by each party's governing authority. However, the document can be less formal initially and can serve as a tool to help develop the final relationship. There should be "criteria" that identifies the benefit to both parties.

How: Formalize the Joint Use agreement, with appropriate signatures of all parties.

2.2 Ownership Opportunities

o Look for the opportunities (2.2.1)

Why: In general, Joint Use facilities can offer significant benefits to the District if done properly. However, there are some limitations that should be recognized: 1) As a potential participant in any Joint Use facility, the District may be limited in its ability to contribute

its share. This is due to an inherent lack of funds, land, and/or other tangible resources. 2) The district may also be limited on staff time in which to actively approach and develop the potential Joint Use relationships. As a result, most opportunities seem to be driven by the District "wanting" and the partner "having." Nonetheless, the benefits can be significant, and the opportunities need to be pursued.

How: Be alert to the opportunities for Joint Use facilities within your local community, and assertively pursue (at least initially) each opportunity to determine its benefit to the District.

o Consider developer proposed Joint Use (2.2.2)

Why: There is a potential for reducing the cost of a Joint Use project by actively pursuing opportunities that can occur in new land development areas, and which are often initiated by the developer. Typically this is a land use issue, and the developer is seeking a benefit through more efficient land utilization. This may offer a good opportunity for the District, and should be pursued. For example, Joint Use of open space, play fields, and recreational facilities (that the developer might be required to provide as part of their development agreements) may be able to serve the District effectively.

How: Be alert to the opportunities for Joint Use facilities within new residential developments, and assertively pursue (at least initially) each opportunity to determine its benefit to the District.

o Get all stakeholders in discussion involved at outset (2.2.3)

Why: Unless the top-level stakeholders buy into the idea of the Joint Use facility, it will never achieve its objectives. The best approach is to start the discussions with the "CEO" of each entity, not lower level staffs. For example, in a District with City Joint Use, it is essential that the District Superintendent and the City Manager be committed to idea.

How: When the opportunity for a Joint Use project is first discussed, make sure that the initial discussions are held between the top staff levels of all parties.

o Pursue community initiated Joint Use facilities (2.2.4)

Why: There is potential for reducing the costs of a Joint Use project by actively pursuing opportunities that may be initiated by the community itself. Typically these opportunities are in the mutual benefit of shared recreational uses, such as sport fields, or libraries etc. These are excellent opportunities and often do not entail significant up front funding by the District. If the Joint Use proceeds, the actual parties to the Joint Use should be the District and City, with all agreements with the City.

How: Be alert to the opportunities for Joint Use facilities that may be promoted by local community interest groups, and assertively pursue (at least initially) each opportunity to determine its benefit to the District.

o Delegate School Board/City Council responsibilities (2.2.5)

Why: As stated previously, the Joint Use must be formally agreed to by the top level authority for each party; i.e., the District School Board (for the school involved) and the City Council (in the case of a City's participation) or other similar entity. However, for practical purposes of creating and operating the Joint Use facility, those same authorities must delegate the day-to-day activities to specific subordinates.

How: 1) The Board and Council should set the policy for the overall concept of the Joint Use, and delegate all other actions. 2) The Board and Council should avoid becoming involved in the detail of accomplishment, delegating that to specific staff. This could be district facility/M&O staff or other. 3) The Board and Council must ratify the initial Joint Use agreement and all amendments to that agreement.

o Avoid inter-jurisdictional conflicts (2.2.6)

Why: There is potential for reducing the costs of the Joint Use project due to potential disagreements between approving jurisdictions. For Example, if the Joint Use serves a "school" use, DSA will have code jurisdiction. However, if the Joint Use is not a required school function, or is located on city property, and/or the building is owned by the city, then local code authority may have (or also want) code approval jurisdiction. The question of inter-jurisdictional authority can lead to potential conflicts that will cause delay and/or increase the cost. These need to be resolved early in the process, and clarified in the Joint Use agreement.

How: 1) Identify the potential problem at the earliest point in the process, 2) work with the jurisdictions involved during the initial considerations of the Joint Use, 3) resolve the issue, and 4) record the resolution in the Joint Use agreement and in appropriate collateral documents.

2.3 Design Impacts

o Respond to local requirements (2.3.1)

Why: There can be increased costs of the Joint Use project due to the fact that there may be additional design requirements and/or other issues. Examples that may add cost or time to the design process include: 1) local design criteria that the school would not otherwise be required to meet, and 2) the requirement to use recycled materials etc.

How: Ensure that the District's design consultants meet with, and fully understand the requirements of, the local planning and permitting agencies.

o Consider special security issues (2.3.2)

Why: There can be increased costs of the Joint Use project due to additional security issues. Examples that may add cost or time to the project include:

Dual use: The dual use aspect can cause a conflict in security requirements. The city generally will want an "open to public" situation whereas the school probably will want a more "students only" approach.

Separate systems: There may be the need for two separate security systems. Even the type of door hardware may require special detailing in order to accommodate the two security needs.

Fencing: There may be differing security fencing requirements.

Dual entrances: The type of use may dictate two entrances (one from the school side, and one from the public side) to accommodate after school hours operation.

How 1) Identify and resolve each such issue as part of the basic Joint Use agreement, and 2) ensure that the design consultants know about, and provide proper design solutions for, each of the issues.

o Address design issues with both entities (2.3.3)

Why: There can be increased costs of design and other services due to the dual ownership and use issues. Often the design standards are different for each party. Examples include:

Building standards may be higher for schools: School buildings may have higher standards for security and durability than their city counterparts.

Recreational field standards may be higher for city: Recreational areas may have higher standards for city use than for school.

Parking standards may be higher for city: Parking standards (number of spaces and construction standards) may be higher for city use than school.

More use means better materials: The dual use of a Joint Use facility will mean more total usage and therefore, a greater need for durable materials to protect from damage.

How: 1) Identify and resolve each such issue as part of the basic Joint Use agreement, and 2) ensure that the design consultants know about, and provide proper design solutions for, each of the issues.

o Allow more time to accomplish the project (2.3.4)

Why: There is a direct increase in the cost of a Joint Use project due to fact that it will take longer to accomplish a well designed Joint Use facility than a normal single use school facility. Assuming a significant benefit (and cost savings) to the District, this additional time is well worth it. However, the District should be aware that the additional time might effect the funding under SB50.

How: 1) Be aware of the added time factor, and 2) adjust your project schedule accordingly.

2.4 Funding

o Ensure commitment and capability to fund project (2.4.1)

Why: There can be a significant increase in the cost of a Joint Use project in the case where the Joint Use partner fails to contribute as agreed. The District should protect itself (as one party to the Joint Use endeavor) by being able to accomplish the project on its own if the other party fails. The method to do this will vary depending on the nature of the Joint Use and the terms of the agreement. However, the District should consider protecting itself through various means:

How: 1) Consider the District's ability to operate, manage, and use the entire project if the Joint Use partner backs out or fails over time. 2) Consider establishing a special construction escrow account (with funds set aside by both parties) for the Joint Use construction wherein the project can be completed even if one of the parties backs out. 3) Consider bonding the agreement.

o Consider phasing Joint Use portion of the school project (2.4.2)

Why: There is an increase in the cost of a Joint Use project due to the fact that it will take longer to accomplish a well designed Joint Use facility than a normal single use school facility. As discussed previously, the District should be aware that the additional time might effect the funding under SB50.

How: Consider a separate time line for development of the Joint Use portion of a multi-building project.

o Avoid multiple approvals on change orders (2.4.3)

Why: There may be an increase in the cost of a Joint Use project due to the need to have multiple agency approvals on all change orders. This can potentially cause delays in the construction of the project and increases in cost. The best practice is to delegate authority to the governance of the Joint Use, and allow that entity to have single authority for change order approvals. This will require approval authority from both parties, and should be clarified in the Joint Use agreement.

How: Provide for singular authority for change order approvals in the Joint Use agreement.

o Optimize partner resources and in-kind contributions (2.4.4)

Why: There is potential of reducing the initial cost of the Joint Use project depending on the basis of financial contribution. All forms of contribution (money, land, services, etc.) are acceptable so long as the "value" of the contribution can be established and documented in the agreement. The District may be able to negotiate an agreement where (for instance) they contribute the operation and maintenance of the facility in lieu of any up front funds. Whatever the arrangement, the District should seek to optimize their partner's contribution.

How: Explore the various opportunities.

2.5 Operations

o Establish management responsibility clearly in agreement (2.5.1)

Why: There can be increased costs of the Joint Use facility due to the lack of clearly defined responsibilities for its management and operation. This reiterates the need to have everything spelled out in the Joint Use agreement. Responsibilities during the operation phase of the facility are extremely important. Whatever the arrangement, it should be carefully considered and well documented in the agreement. The two most common options are:

Use best-suited partner: In this option, the operation of the facility should be the responsibility of the partner "best suited" to the job. For instance if one partner is a developer who is contributing land (and will not be around during its operation), then the District is best suited to provide operational management.

Each partner has certain hours of responsibility: In this option, each partner, that actively uses the facility, has defined hours of responsibility for use and maintenance.

How: 1) Consider the actual in place usage, and how it should best be managed, and 2) record in the Joint Use agreement.

o Seek advice/expertise from colleagues (2.5.2)

Why: There can be increased costs of the Joint Use due to a lack of understanding of the various ramifications of the dual ownership responsibility. The Joint Use concept is gaining support, but is still relatively new, with only a limited number of good examples. Currently, CDE tracks Joint Use projects and may have data that can help. Also, the City County Schools (CCS) database may be a good reference.

How: Districts attempting their first Joint use, should seek advice from colleagues, CDE, and consultants that have the expertise.

Overview

When considering site related issues, there are two basic cost elements: 1) the acquisition costs, and 2) the improvement costs. The acquisition costs, while not a construction cost per se, can have direct impact on the improvement construction cost. The District may be able to acquire a property that meets good demographic and educational criteria, but negatively impacts, or even fails, good construction cost criteria. Thus, the two are interrelated. Unfortunately, Districts often acquire property that has potential design and construction difficulties. The Site Issues Guidelines address the following:

1. Select the Site Carefully.
2. Minimize "Unknown" Problems.
3. Coordinate with Other Developments.
4. Be Aware of Timing Issues.
5. Take Advantage of Market Opportunities.
6. Consider Alternate Design Approaches.

In considering the potential cost impacts relative to Site Issues, it is important to keep in mind:

1. The cost of site acquisition will impact the cost of improvements; i.e. size, shape, slope, availability of infrastructure, and environmental issues all impact the value of the site and subsequently the construction costs.
2. There is no perfect site; often it is best to select an alternate site in consideration of subsequent construction costs.
3. Mitigating site problems that are either unknown or unconsidered at the time of acquisition, can be very costly even to the point of prohibitive.
4. Thorough investigation and advance planning can help reduce the unknown and unconsidered problems.

The approach to reducing the costs relative to Site Issues, is rooted in the following precepts:

1. Select the site carefully, considering both the educational criteria and the design and construction impact.
2. Become fully involved in local land planning issues that will effect the demographics, the availability, and the value of District's current and future property; involve the community in the selection.
3. Plan ahead; undertake and update long range Facilities Master Plans.

3.1 Site Selection

o Monitor shifting demographics (3.1.1)

Why: Owning and maintaining existing but undeveloped school sites and/or existing but unused schools can be costly. The problem occurs when the demographics of the District shift such that: 1) a site acquired sometime in the past with the anticipation that a school would be built on it in the future, but the school is longer needed, or 2) an existing school campus is no longer needed. The District is then faced with the decision of 1) holding on to the vacant property (in case the demographics shifts back) and potentially leasing it temporarily to another user, 2) using the facility for other District, non-school needs, or 3) selling the property. The best choice is dependent on the particular situation within each District. The concern is that not anticipating the shift in demographics, and making informed decisions accordingly, can lead to expensive cost ramifications.

How: 1) Maintain current demographic data, 2) recognize trends, and 3) make informed decisions.

o Obtain CDE approval of site prior to acquisition (3.1.2)

Why: The District is required to have CDE approval of school sites. It can save the District substantial problems, and costs, if their approval is obtained as part of the due-diligence in considering the acquisition of the site.

How: 1) Consult with CDE at the outset of any site consideration, and 2) obtain their approval prior to acquisition.

o Use qualified consultants with local contacts (3.1.3)

Why: Projects can be more costly due to the lack of qualified expertise in investigating and planning of site development. There can be increased in the costs due to not knowing (or not challenging) what is required by a local agency to develop a site. Often those requirements are excessive and/or become known late in the design and/or construction process and necessitate excessive costs. It is essential to thoroughly investigate the site, preferable before it is purchased, but certainly precedent to its development. All too often, sites are acquired without proper evaluation. One of the essential benefits of using qualified consultants is their ability to interface/communicate with the approving agencies. The key is in using qualified consultants and not cutting corners.

How: Use qualified consultants to evaluate the site prior to purchase.

o Consider initial cost versus improvement costs (3.1.4)

Why: There can be a significant increase in the cost of the project due to the District buying a site that is overly costly to develop. This can occur when a site is purchased, or has been donated to the District, without proper investigation as to its potential development costs. While the cost to purchase property is not directly related to reducing construction cost, the potential cost impact to the District has a compounding effect on subsequent construction decisions and costs.

How: 1) Consider the potential development costs when acquiring a site, and 2) avoid acquiring those sites that will require excessive site development costs.

o Investigate site development options. (3.1.5)

Why: There can be added costs to the District due to the lack of careful investigation of the site's physical characteristics. Such things as size, shape, and slope are the obvious characteristics that must be considered. Others include the timing and nature of surrounding developments, environmental considerations or restraints, and local permitting processes. Each of these may make construction more difficult and expensive. There is a need for early and careful site investigation.

How: Thoroughly investigate the development pros and cons as part of the site selection criteria.

o Carefully consider developer provide "spin-off" sites. (3.1.6)

Why: Developer provided sites (acquired through their development agreement) can be a mixed blessing. The situation occurs when a developer provides the District a site that may be less desirable for residential use but may work well for the school use. The benefit: The site should be available to the District at an attractive price, assuming it is less desirable for the developer. The potential problem: The site may have environmental or development problems that are not readily apparent, and may end up costing the District.

How: Carefully consider all aspects of developer provided sites to ensure that development cost will not be excessive.

o Ensure you can actually buy the site. (3.1.7)

Why: There is a potential cost due to the inability to conclude the site purchase. The situation occurs when extensive site investigation and other pre-purchase costs are expended without adequate control of the property.

How: Ensure that the District has full rights to acquire the site from the seller prior to starting pre-purchase investigations.

o Review criteria changes from prior due-diligence. (3.1.8)

Why: There can be added costs due to starting a project prior to having all required approvals. The situation occurs when the District has purchased a site several years prior, and fails to reconsider the development criteria currently applicable at the time of development. The timing of a project is critical for a number of reasons, and often there is pressure to start a project prior to receiving all approvals. This can result in significant and costly changes when required by the approving authority.

How: 1) Do proper investigation at the time of acquisition, and 2) verify the validity and/or redo that investigation at the time of development.

o Consider 'add' costs in condemnation. (3.1.9)

Why: There are times when the "best" site is not for sale, and condemnation is necessary. Condemnation is a complicated subject well beyond the scope of these cost reduction Guidelines. However, the District should consider this option, and is best advised to seek experienced consultants when doing so. Additional costs such as relocation of existing persons or businesses need to be considered, and can add significantly to the total cost of the site.

How: 1) Use qualified consultants to advise on condemnations, and 2) consider potential add-on costs when evaluating the condemnation price.

o Clarify security issues. (3.1.10)

Why: There can be additional costs to the District for not recognizing the ever increasing security needs of the school campus. The concern is directed toward the lack of early, conceptual planning and design to anticipate the security issues inherent in a particular site. From a site selection standpoint, this may effect the decision on what site to purchase. From an overall cost point of view, any increased site improvement costs should be offset by lower purchase costs or other factors. In either case, knowing the potential costs will help reduce the overall costs.

How: Carefully consider all development aspects, including security issues, to ensure that development cost will not be excessive.

o Evaluate the environmental considerations carefully. (3.1.11)

Why: There can be significant additional costs to the District for mitigation, replanning, and/or relocating of facilities due to not fully investigating the environmental issues prior to purchase. Environmental considerations include such things as: 1) seismicity of the area, 2) proximity to freeways, and airports (including small rural airports), 3) exposure to air borne contaminates (such as fallout from nearby agricultural spraying), and 4) on-site hazardous waste. CDE has published criteria for site selection, and the Department of Toxic Substance Control (DTSC) has published procedures for investigation and mitigation of potentially hazardous sites. Unfortunately, the issues effecting a site continue to evolve, and it is difficult to keep up with the most current requirements.

How: 1) Keep current with or learn of the most current environmental criteria, 2) utilize a qualified consultant to investigate the site, and 3) avoid sites with high mitigation costs.

o Do environmental investigation prior to buying. (3.1.12)

Why: The environmental evaluation of the site can be done at any time precedent to purchase or development. It is best to do prior to buying the site. This involves spending money up front, but will greatly reduce the risk of spending unanticipated and inflated dollars later for undiscovered problems.

How: Follow DTSC recommendations and requirements.

o Get seller's approval for geological investigation. (3.1.13)

Why: The District can protect against significant costs of development if it properly investigates the site prior to purchase. This will require the seller's permission to allow (typically) minor destructive testing such as geological soil sampling, and/or boring. Unfortunately, some sellers are unwilling to allow destructive testing. The District should not buy a site that has not been thoroughly investigated, and should not do any destructive testing without the seller's permission.

How: 1) Get seller's voluntary approval for all testing required, 2) use all legal avenues to acquire access, or 3) don't purchase the site.

o Complete CEQA process completely. (3.1.14)

Why: The California Environmental Quality Act (CEQA) documentation is extensive. All too often, the approach is to "get by with the minimum." This usually means an incomplete document, and is subject to subsequent challenge and significant additional costs and time delays. Additionally, the District should carefully review the original CEQA documents ("base document") that may have been prepared by the previous site owners. This is part of the District's due-diligence, and can safeguard against unanticipated costs subsequent to purchase.

How: Don't skimp on the CEQA process.

o Consider acquiring an alternate site. (3.1.15)

Why: There is a potential to reduce costs by acquiring an alternate site when the "preferred" site is excessively expensive to develop. Often, the District focuses on only one site which, after full due-diligence, proves to be very costly to mitigate negative site conditions. While cost is not the only consideration, the District should consider alternate sites if they can be acquired and improved at less costs an still meet the educational criteria.

How: 1) Do full and proper investigation of the "best" site, including analysis of environmental mitigation and development cost, and 2) consider the second best site if it meets the educational criteria and can be acquired and improved at less cost.

o Understand the Conditional Use Permit requirements. (3.1.16)

Why: Obtaining a Conditional Use Permit (CUP) can increase the cost of the project by extending approval time and imposing special conditions on the project. Legally, public school Districts are not obligated to comply with local CUP requirements. However, the Districts should initiate discussion with the local planning agencies to determine their requirements and comply if the requirements do not impose excessive costs.

How: 1) Obtain written requirements from the local planning agencies, 2) determine the impact on the project, and 3) comply or take Board action formalizing noncompliance.

o Utilize an "acquisition specialist" (3.1.17)

Why: Site purchases are "big business" and not a normal expertise of most Districts. Committing to the costs of a consultant in this area could result in significant savings. There are a number of issues that need to be considered beyond obvious ones of location and price, such as: 1) "how" the purchase is made, i.e., the options available to the District are often unknown, and 2) how relocation costs can be managed need to be considered. A specialist in school site acquisition is money well spent.

How: Use qualified consultants to acquire the site.

o Consider sharing physical education areas (3.1.18)

Why: There can be cost reductions by not using the traditional approach of developing separate physical education facilities for each school. A shared use approach can work well if the two schools are close enough to accommodate the sharing of facilities. Typically this works best where two elementary schools are co-located such that they can sharing the same physical education facilities, or where a middle school and a high school can share, etc.

How: Consider sharing physical education areas and facilities between two adjacent schools within the District.

3.2 "Unknown" Problems

o Conduct exploratory soils boring and investigation (3.2.1)

Why: There can be added costs due to the lack of complete geological investigation. This is the old "a penny saved is a dollar lost" problem. All too often, a District will buy a new site or develop an existing site, based on preliminary studies without having completely investigated the soil conditions. Generally this is a matter of not wanting to spend the money on the necessary geological investigation. Once construction starts, and unanticipated conditions are encountered, the costs skyrocket.

How: Do thorough geological investigation prior to design.

o Consider selling bad sites (3.2.2)

Why: There can be additional costs resultant from holding on to site that will be overly costly to develop. This occurs when site has been purchased (or donated to the District) without proper investigation. If the District has some how acquired such a site, it is well advised to seek alternative-use buyers and sell the site if possible. While the cost to hold property, for potential future use, is not directly related to reducing construction cost (and therefore not within the purview of these cost reduction Guidelines) the potential cost to mitigate the environmental problems, or overcome the construction difficulties, has a compounding effect on subsequent construction decisions and costs.

How: 1) Investigate all currently unused District sites, and 2) consider selling those that will be excessively costly to develop.

3.3 Other Developments

o Collaborate with the developer community (3.3.1)

Why: There can be increased costs to the District due to the lack of involvement in developer-initiated planning and/or development actions. There is value in being a positive "partner" in the development process. All to often, land use and/or planning changes occur that do not reflect the District's best interest. The developer's plans can (and should) be of benefit to the District. This is best accomplished if the District works with the developer, during the advance planning stages, to shape those plans.

How: 1) Be aware of, and monitor, all developer and community advance planning, and 2) participate/collaborate in the process.

o Utilize developer provided infrastructure (3.3.2)

Why: There can be substantial savings by piggybacking on developer-provided infrastructure.

When the developer is constructing streets and infrastructure improvements for their development, they are in the best position to build the District's improvements at the same time. The piggybacking of District improvements has several advantages: 1) the cost of improvements will be greatly reduced (as compared with the District having to design and construct them as a separate contract), 2) the cost of consultant fees will be less, since the design responsibility is part of a larger project, and 3) the processing and approval time is significantly reduced.

How: Negotiate with the subdivision developer to have them provide District infrastructure improvements.

o Establish school 'footprint' to reduce utility extension (3.3.3)

Why: There can be additional costs to the District when utility extensions must be sized and run to various or extreme locations on the school site due to unknown needs and/or building location. This is a matter of good planning; if the basic site layout of the school is established, the utility extensions can be sized and run to the minimum requirements.

How: As part of the site investigation, prepare conceptual site plans indicating basic footprint of buildings so that they can help guide the design of the utility extensions.

3.4 Timing issues

o Optimize timing of site preparation (3.4.1)

Why: The cost of site improvements escalates significantly if the working conditions are poor. Starting site work at the beginning of the rainy season is a costly decision. Unfortunately, the District cannot always control the timing of a project. Availability of funding, coordination with the teaching cycle, and permit approvals are just some of the factors that may lead to an untimely start of site work.

How: Be aware of the timing issues and work toward optimizing the start of construction.

o Work within the bidding climate (3.4.2)

Why: There can be added costs to the District due to bidding site work during adverse bidding climates. Adverse bid climates occur 1) during a high economic cycle when all good contractors are already busy, and 2) when numerous projects are being bid on any particular day (regardless of economic cycle). Managing the bidding process is an essential ingredient to keeping the costs down.

How: 1) Anticipate the bid climate, 2) adjust bid date to avoid numerous competing projects, and market your bid opportunity.

3.5 Market Opportunities

o Consider the pros and cons of land banking (3.5.1)

Why: There can be significant savings to the District by purchasing property well in advance (approximately ten years) of need. Many Districts do this, but many do not. The action requires careful long-range planning and demographic studies. It also requires the District to have the expertise and financial capability to be in the land-banking business. The key is being able to acquire land at an attractive price, and hold on to it until it is needed for school use. The interim use of the property can be passive (continuation of the non-school use or vacancy at the time of purchase) or active (marketing to others for intensified, income producing, use). There are risks: 1) this puts the District into the real estate business, and requires an specific expertise, 2) it is based on the speculation that the demographics projections are correct and that the property will be needed for school use eventually, and 3) there may be an "Unused School Site Penalty" imposed by the state if the site is not used as a school site for a period of five years.

How: 1) Consider the pros and cons of land banking, and 2) make an informed decision.

o Consider buying property on speculation (3.5.2)

Why: There may be opportunities to acquire assets and/or gain income through land speculation. This approach is different from the previous, in that the securing of a site is primarily motivated by capital considerations and not school site needs, including those sites that may be (marginally) needed in the future but are not specifically in the long-range plan. There are several concerns: 1) This approach is probably not available to small or financially strapped Districts, 2) there are obvious increased risks and responsibilities, and 3) it should only be considered where land values are escalating.

How: Consider buying on speculation with extreme caution and proper advice.

3.6 Alternate Design Approaches

o Spend the money to plan effectively (3.6.1)

Why: Cost avoidance can come from effective advanced planning. Excess costs resulting from many of the site related issues discussed in this section, can be avoided if the District plans ahead and anticipates the issues. The funds expended up front will be help avoid costly mistakes later on; don't skimp on this effort.

How: 1) Select a consultant that specializes in facilities master planning, and 2) authorize a comprehensive Facilities Master Plan (FMP), and 3) update the FMP periodically.

o Use same consultant for on-site and off-site issues (3.6.2)

Why: There is the potential for increased costs to the District when different design firms are used for the design of the off-site improvements from those used for the design of the on-site improvements. The problem occurs in two areas: 1) when there is an overlap in the scope of work between the two design consultants, and 2) when there is a lack of coordination between their design solutions. Both increase the cost to the District. Similar cost impacts are likely with other site-related consultants.

How: Select one qualified consultant for both on-site and off-site services.

o Look to private developments for non-Field Act buildings (3.6.3)

Why: Costs may be reduced by utilization of existing commercial facilities. It was recognized that these buildings typically will not meet several public school standards (the Education Code and the Field Act) and will need to be upgraded to CDE and DSA standards. Nonetheless, this can often be an economical way of addressing site/location issues.

How: 1) Consider available commercial facilities, and 2) investigate all aspects, especially as to their acceptability for reuse as school facilities.

o Careful site-specific design (3.6.4)

Why: All too often, site design is not given proper consideration. Careful site design, specific to the site being considered is essential. Educational specifications tend to focus on the building needs, and less on the site needs. As a result, the site is often purchased and/or developed improperly at added costs.

How: 1) Use existing school facilities expertise available at County Offices and/or state resources, 2) learn from past experiences from other sites, 3) consider using a peer review process in evolving the site design, and 4) select the design consultant for their qualifications in site design as well as their building design.

o Consider basic relationships of each element during site design (3.6.5)

Why: There can be significant cost savings (and generally better land utilization) through careful consideration of the basic relationships of each element of the site design. This seems like an obvious “must” in the design process, but it is not always followed. Two examples help illustrate the problem: 1) The foot print of the building is often derived from another school that the District likes even if it does not fit well on the new site, and 2) buying additional site area even if that would be less expensive than paying the significant site construction costs that may be inherent in the smaller site area.

How: 1) Select the design consultant for their qualifications in site design as well as their building design, and 2) design the site to minimize costs.

4. Professional Consultants

Overview

Professional consultants comprise a significant portion of the soft cost on a construction project. Architects, attorneys, bond counsel, and financial advisors are the most commonly thought of consultants. However over time, numerous consultants have become involved in the school construction process. For the purposes of these Guidelines, they are grouped into four generic categories and identified as:

1. **Planning and design consultants:** demographic consultants, master planners, architects, (including their sub-consultants), engineers (design related but independent of the architect), project and program managers, construction managers, geotechnical engineers, site surveyors, environmental consultants, energy consultants,

2. **Legal consultants:** real estate attorneys, litigation attorneys, lobbyists,

3. **Finance consultants:** financial consultants, bond consultants, construction attorneys, developer fee consultants, entitlements consultants, appraisers, and

4. **Construction consultants:** construction testing engineers, forensics consultants, construction inspectors, including Inspectors of Record, (IOR), relocation specialists, regulatory agencies.

In considering consultant services, there are several things to keep in mind:

1. The state mandates that govern the school construction process are extensive, with numerous stakeholders, decision makers and approving authorities, which increases the number of consultants needed.

2. There is a tendency to down-play the importance of the consultant, which may result in the District attempting to do without, or seeking the services of less experienced consultants than are actually required for the work.

3. The consultant services (especially the planning and design services) are most critical relative to controlling subsequent construction costs, long term life cycle costs, and quality of the educational facility and environment. Short cuts at this stage may result in higher costs later in the life of the project.

The approach to reducing costs of professional consultants, without reducing the quality of the completed project, is rooted in three basic precepts:

1. Establishing a clear definition of the scope of services required thus avoiding duplication or overlap of services, including the time restraint for providing the services, and the fee anticipated for the services.

2. Using the fewest, but most expert consultants possible through careful selection.

3. Managing their services through constant, prompt and thorough interaction.

4.1 Time Issues

o Be ahead of the game; plan ahead (4.1.1)

Why: There is a lack of long-range planning and a clear direction of facilities needed. This results in a lack of direction and/or a rethinking of each new project, which translates to added services and fees.

How: Consider the long range need for facilities, and plan accordingly.

o Avoid false starts; commit to site and project size as early as possible (4.1.2)

Why: There is a lack of commitment to which site and what size project is to be undertaken. This causes multiple studies and rethinking at the start of each new project, which translates to added services and fees.

How: Focus the District's decision process and commit to the site and project size as early as possible.

o Minimize the start-and-stop effect caused by the state funding process (4.1.3)

Why: There is an increase in the cost of design fees due to the start-and-stop nature of the state funding process. The start-stop also causes unnecessary rethinking and delays.

How: Smooth out the planning and design process; use local funds (or interim funding if necessary) even if the costs saved is somewhat offset by the cost of the money.

o Avoid accelerating the design schedule just to secure funding (4.1.4)

Why: There is an increase in the cost of design fees, overtime and/or redesign, due to the need to meet deadlines imposed by SB50 funding requirements. This problem is exaggerated if the District is not fully committed to the design or the construction.

How: 1) Anticipate the funding cycles, 2) start the design process as early as possible, and 3) reuse existing designs if appropriate.

4.2 Consultant Selection

o Seek highly qualified professionals (4.2.1)

Why: There is a potential cost impact due to the use of inexperienced professionals even if they are "friends," or "readily available." These costs may not be apparent at first, and in fact may be masked on the surface by lower fees or other enticements.

How: Select the most qualified consultants through a formal selection process.

o Advertise for and interview at least three, qualified firms (4.2.2)

Why: Poor selection of consultants can cause cost problems throughout the project.

How: 1) Publicly advertise for the services, 2) review written statements of qualifications to arrive at a select (short) list of candidates, and 3) interview each to determine their qualifications for, and compatibility with, the project.

o Include the complete scope of services, time, fee, and contract language (4.2.3)

Why: There is a direct increase in the cost of professional services due to the lack of a well prepared request for qualifications. Both time to complete the services and fees for the services are difficult to establish without a clearly defined scope of work. If the scope can be defined, and strict time and fee requirements are established, the cost of services can be reduced.

How: The RFQ should include 1) the complete scope of services required, 2) the complete contract language that will be used, 3) a reasonable and definitive time frame for completing the services, and 4) the anticipated, or budgeted, fee for the work.

o Avoid overlaps or duplication of services (4.2.4)

Why: There can be an increase in the cost of professional services due to the overlap and/or duplication of services. Potential duplication in such areas as estimating and scheduling (between AE and CM) inspection during construction (between AE, CM, and IOR), shop drawing review and processing (between AE, CM, and Contractor) and even in reporting to the District Board (between AE and CM). Each of these overlaps causes an increase in the total fees for consultants.

How: 1) Use as few consultants as possible, and 2) coordinate their contracts carefully to avoid duplicating services.

o Utilize prototype, proven quality documents (4.2.5)

Why: There can be an increase in the cost of professional services due to overly complex, litigious, nonstandard District-Consultant contracts. Specialized contracts, written for an individual District, but which are nonstandard to the industry (or the consultant's profession) are generally too complex and litigation prone. Industry standard documents are more than adequate to protect the District and the Consultant, and are time-proven by other Districts.

How: Utilize good documents used by those Districts with proven track records in developing facilities.

4.3 Procurement Concepts

o Buy services of one consultant for multiple, long-term projects (4.3.1)

Why: The cost of consultant services is higher when multiple, phased, or long-term projects are divided up amongst several consultants. In contrast, buying multiple, phased, or long-term projects from one consultant saves the District costs for several reasons: 1) economies of scale allow the consultant to recognize reduced overhead in such areas as leveling out of the work force, reduced promotional costs etc., 2) buying multiple projects saves the District (and its procurement advisors) time and dollars, and 3) if the subsequent projects can reuse the initial project design, then the actual cost to produce the work product can be reduced.

How: Procure consultant services for multiple, phased, or long-term projects from one consultant.

o Consider consultant services procured through County Office of Education (4.3.2)

Why: There is a potential for reducing the cost of consultant services by utilizing consultants procured through the County Office of Education's processes. This opportunity is not widely used, but could save costs in several ways: 1) it reduces the District's costs by eliminating the "reinventing the wheel" syndrome, 2) it standardizes the procurement and contract process, and 3) it reduces the consultant's cost (since their promotional efforts would be directed towards one COE instead of several Districts). The approach is applicable to all types of services, but may be especially helpful for: 1) small, on-call services, 2) immediate, short term projects, and 3) large special expertise services for which the District may not fully understand how to select the consultant.

How: Procure consultant services through the District's County Office of Education.

o Consider using state-wide bid and procurement process (4.3.3)

Why: There is a potential for reducing the cost of consultant services by utilizing consultants procured through a statewide procurement similar to the California Multiple Award System (CMAS).

How: 1) Review the CMAS process to see if the type of consultants needed are available, and if so, 2) consider procuring consultant services through the CMAS system.

4.4
"Incentives" Agreements

o Consider bonuses for early and satisfactory completion of services (4.4.1)

Why: There is a potential for reducing the costs of the project if the design professional's services can be completed early. The benefit exists in several areas: 1) better place in line for plan review and funding, 2) better construction bid climates, and 3) earlier completion resulting in less interim financial costs. The positive effect of this guideline should not be confused with the negative effect of falsely accelerating the design phase. In this guideline, the consultant's compensation is negotiated and paid based upon mutually agreed conditions.

How: Utilize bonus clauses for early and satisfactory completion of services. The clause must be clear in defining "early" and "satisfactory."

o Consider making additional projects contingent on performance (4.4.2)

Why: There is a potential for reducing the costs of the project if the performance of the design professional's services can be improved. The reduction in cost would be in the area of fewer construction changes and cost overruns due to better documents. This is difficult to affect because "performance" is hard to define, and many cost factors are beyond the design consultant's control. Nonetheless, the concept is aimed directly at the issue of cost reduction, and should be considered.

How: Provide an incentive clause making additional projects (for which the consultant might be eligible) contingent on performance based on an agreed criteria. For example, the performance clause could provide that the next phase (or school) would be awarded to the consultant if the performance on the current project exceeds normal expectations. Normal expectations could be tied to 1) objective criteria such as time of completion, number of DSA changes, or cost of the project, or 2) subjective criteria such as acceptance by the community, educational design awards, or opinion polls. The key is to define the basis of determining the performance.

o Consider bonuses for completed project when less than the budget (4.4.3)

Why: There is potential for reducing the costs of the project if the design professional's services contribute to better bids and lower construction costs. This is similar to the performance based bonus, but with a narrower and more easily determined benefit tied directly to the construction cost of the project. Design consultants argue that this is difficult to affect because many cost factors are beyond their control (such as bid climate etc.). This type of incentive needs to be exercised with caution to ensure that there is no conflict of interest that might compromise the quality of design. Nonetheless, the concept is aimed directly at the issue of cost reduction, and should be considered.

How: Provide a bonus/penalty clause dependant upon the relationship of the construction bids to the agreed budget. For example, the clause could provide a specified bonus if the low bid is 10% less than the budget, and require the design professional to revise the

plans and specs, at their own expense, if the low bid is 10% more than the budget. The key is to define the basis of determining the cause of the bid variation. The clause should only be invoked if the bid variation is directly resultant from the consultant's services.

o Require a discount rate for prompt payment of fees (4.4.4)

Why: Prompt payment of consultant services is subject to statute. However, there is potential for reducing the cost of consultant services by negotiating a discount rate on their fees based on a better-than-required payment schedule. Cash flow is important to most consultants and they are generally willing to negotiate a small discount of their fee (and perhaps to provide even better services) for payment within 30 days of invoice.

How: Negotiate discount rate as part of the consultant's contract.

o Utilize a fee basis that encourages reduced costs such as a fixed fee (4.4.5)

Why: There is potential for reducing the costs of the design consultant's services by using a fee basis appropriate to the services provided. There are several methods of compensation typically used for design professionals:

Percentage of construction cost: This method has been used in school design for years, and was the basis of the old Office of Local Assistance (OLA) fee allowances. For cost reduction considerations, it is a reverse incentive because the design professional gets less fee if the project costs less, and more fee if it costs more. The percentage method is unfair to both District and consultant in that an abnormal bid climate can adversely hurt either one; unusually low bids hurt the designer and unusually high bids hurt the District. Very few private sector designs are compensated on this basis.

Hourly (or time and materials): This method is commonly used where the design project is very small or the scope of work is unknown. For cost reduction considerations, it is somewhat of a disincentive because the consultant does not have any incentive to get the job done expeditiously since faster means less fee income. However, the hourly method is fair to both District and consultant for those projects where the scope is unknown until some or all of the design work is accomplished such as master planning, site selection alternative studies, etc. This method is commonly used in the private sector for small or unknown scope projects.

Fixed fee: This method is becoming more common for schools. For cost reduction considerations, it is somewhat of an incentive because both the District and consultant benefit from a job well-done. The District benefits because it can control (negotiate and establish) a fee for the work up-front and know that the fee will not change unless the scope of work changes. The designer benefits because (assuming they budget their time and fee correctly) they can make more profit if they accomplish their work more expeditiously. There is a risk to the consultant in that changes to the scope may not be properly compensated, and poor performance means less profit. This method is most common in the private sector.

Percentage to fixed: This method is a combination of the "percentage" and the "fixed" methods wherein the design work starts out on the percentage basis until the design solution is defined at which time the fee is shifted to the "fixed basis." This works well where the scope of the project is reasonably well known, and the budget is set but will be adjusted depending on the design solution. Typically, the designer works on the percentage basis until the design solution and budget is finalized and then shifts to a fixed

fee equivalent to the percentage. The point of shift can be as early as the end of schematic design or as late as the end of construction documents. This is fair to both District and consultant, but is neutral (arguably even somewhat negative) as far as cost reduction is concerned. This method exposes the District to some risk in that the amount of the consultant's fee is based on the initial percentage and subject to the design solution. This method is commonly used in the private sector.

Hourly to Fixed: This method is similar to the "percentage to fixed" method wherein the design work starts out on one basis, in this case hourly, until the work has progressed sufficiently and then is shifted to the fixed basis. The difference between this and the percentage to fixed, is that this method is used where the scope and budget are not well defined initially. The point of shift is usually at the end of schematic design. This is fair to both District and consultant, but is neutral (arguably even somewhat negative) as far as cost reduction is concerned. This method exposes the District to some risk in that the amount of the designer's fee is not agreed until a substantial amount of design work has been done. This puts the designer in a somewhat stronger position in the negotiation. This method is commonly used in the private sector.

How: Define the project scope and budget as well as possible, and use a fixed fee.

4.5 Insurance Arrangements

o Consider "Wrap-up" or "Project" insurance covering all participants (4.5.1)

Why: There is potential for reducing the costs of the design professional's services by utilizing a type of insurance policy that covers all project participants. Typically each consultant, individually, provides professional liability (errors and omissions) insurance covering the performance of their services. This system has several disadvantages: 1) the combined total of all premiums, that are generally recaptured through consultant fees, may be excessive, 2) if litigation is necessary, numerous insurance companies tend to exacerbate the issue, and 3) the coverage varies such that the District has difficultly knowing what coverage they really have. "Wrap-up" or "Project" insurance covering all project participants is becoming more competitive and may help reduce overall costs by improving coverage and reducing litigation costs.

How: 1) Consult a qualified construction insurance broker to see if project insurance is appropriate for the project. 2) If so, establish as part of the consultant solicitation and 3) negotiate appropriate reductions in each consultant's fee.

4.6 Managing the Consultant

o Assign a District representative for day-to-day management (4.6.1)

Why: There is potential for increased costs of the design consultant's services due to a lack of clear and consistent direction from the District. Typically, the District-Consultant contract calls for an "owner's representative" to be designated by the District. Often this is looked on as a perfunctory requirement. To the contrary, the District's representative is

an essential element in the communication between the District (in the broader context) and the consultant. It is essential that the representative be an active participant with experience in, and authority to act on, design and construction issues.

How: Assign a qualified staff member (permanent or contract) to function as the District's representative throughout the duration of the project. This assignment should be the individual's primary responsibility. Depending on the intensity of the project schedule, this may be a full-time responsibility.

o Meet with the consultant on a regular basis (at least twice a month) (4.6.2)

Why: There can be an increase in the cost of the design consultant's services due to a lack of active, almost constant communication with the consultant. A great deal of work, time and money can be wasted if the communication is left to regular but infrequent progress reports. Design is a collaborative effort; the District establishes what it wants, and the consultant interprets that into a design solution. Inherent in the process is the need to ensure that the design is consistent with the District's wants. Frequent meetings will help keep the project on track.

How: Meet with the consultant, to discuss the progress of the design, on a regular basis. The frequency may vary depending on the intensity of the project schedule and the phase of the design. Twice monthly is the minimum on a normal project.

o Ensure prompt and clear direction and response to the consultant's issues (4.6.3)

Why: There can be an increase in the cost of the design consultant's services due to a lack of prompt and clear direction and response to the consultant's issues. This manifests itself in indecision which can lead to misguided design solutions and redesign delays and costs.

How: Ensure prompt and clear direction. Be responsive to the consultant's questions and issues.

4.7 Contract Documents

o Utilize Peer Review for quality control (4.7.1)

Why: There is potential for increased costs of construction due to the lack of quality control of the design consultant's plans and specifications including the District's general conditions. The quality of the documents is directly related to getting good bids, good quality of construction, and minimizing change orders. This is a significant cost reduction requirement. For these Guidelines, "Peer Review" is defined as a quality control check by an independent, fully qualified (peer) entity. A good peer review: 1) will bring a tenfold return in cost containment, i.e. one dollar spent on review will bring ten dollars in savings, 2) can be in any and all forms; such things as schedule and estimate review, constructibility reviews, and value engineering are all helpful in reducing costs, and 3) can be done by staff if qualified, but most typically are done by an independent consultants or perhaps the Inspector of Record (IOR) could be hired during the design phase for the purpose of doing the review. The objectives are to avoid change orders by

eliminating errors in the plans and specifications prior to bid, and to ensure the most cost-effective design by refining it during the design phase.

How: Utilize a formal and independent peer review or other form of quality control process.

o Clean up Mechanical and Electrical portions of the documents (4.7.2)

Why: There can be increased costs of construction due to errors in mechanical and electrical portions of the plans and specifications. These two (Divisions 15 and 16 respectively) of the documents are potentially "big ticket" items; i.e. they can lead to high costs in terms of 1) overall cost-effectiveness of the systems, 2) initial bids, and 3) change orders. They need to be carefully written and reviewed. The mechanical and electrical portions are not reviewed by DSA, thus, the normal state approval process does not exist. This fact makes an independent quality control check even more essential.

How: Utilize a formal and independent peer review or other form of quality control process.

o Use good General Conditions (4.7.3)

Why: There can be increased costs of construction due to lack of standardized General Conditions. The bidding and contracting process will be simpler (and less costly) if the General Conditions that the District uses are good, industry accepted documents. Standardized (state-wide) documents have been suggested and tried in various forms, without much success. The American Institute of Architects, in conjunction with the Association of General Contractors, publish standard documents which are widely used but not universally. Often the District's legal counsel advises otherwise. The result is a proliferation of General Conditions from one District to another and even from one project to another within the same District. This situation means different bidding and contractual requirements which adds costs through increased General Condition allowances by the bidder, with increased potential for change orders and litigation. Another issue is the procedures manual. Procedures manuals are generally created after the bid and award, and often impose obligations on the contractor that may lead to dispute or other costs. A better way is to have the procedures manual published as part of the General Conditions so that all bidders know exactly what will be required of them.

How: 1) Utilize industry standard General Conditions, 2) avoid customizing to suit the District's particular desires, and 3) include all requirements to be imposed on the contractor including procedures manual requirements. 4) If industry standards cannot be used, clearly identify that fact in the customized documents.

4.8 The "IOR"

o Select your Inspector of Record (IOR) carefully; check references (4.8.1)

Why: There is an indirect increase in the cost of the project due to the inexperience of, and/or lack of cooperation by, the Inspector of Record (IOR). The IOR is a major factor in the successful completion of a project. Conversely they can be a major impediment. There is a long history of, and debate about, the roles and responsibilities of an IOR. The bottom line seems to be that if a project has a "good" IOR, the construction should

go smoothly, but if it has a "bad" IOR, it may very well have problems. This can effect the routine progress of a project. There is a potential problem in the coordination of IOR, the DSA, and the design consultant. Between the three of them, there are three points of responsibility with overlapping authority. This often leads to duplication and/or omission of the action that can cause increased costs and time delays in the project. Additionally, one of the frequent problems in final approval of a project, by DSA, is the lack of proper documentation. Often, the IOR has changed part way through construction, or has moved elsewhere before completion, and the paperwork is unfinished. The District must ensure that a good IOR is selected for the project.

How: Ensure that the IOR has a good track record of 1) cooperation with all involved, and 2) has a good working relationship with DSA, and the design consultant.

o Ensure that IOR keeps their paperwork current (4.8.2)

Why: There is an indirect increase in the cost of the project due to the delay in providing, or total lack of, proper reports by the IOR as mentioned above. Unfortunately, this is all too common, and the District should stay on top of the situation and manage it assertively.

How: 1) Be alert to the situation, 2) establish compliance language in the IOR agreement, 3) meet with the IOR regularly, and 4) ensure that records are kept current and provided weekly.

o Consider using a firm, versus an individual, for continuity and backup (4.8.3)

Why: There is an indirect increase in the cost of the project due to the difficulty in managing, and/or replacing an ineffective, individual IOR. The IOR industry, is generally comprised of individual persons who contract with the District for inspection services on a project. They are required, by code, to be responsible for observation and inspection of all aspects of the project. This is a full-time, on the job, responsibility. The difficulty comes when an individual IOR is not fulfilling his/her responsibility, and there is no supervisory level of management to which the District can seek resolution. In contrast, there are a few firms that provide staff IOR's, and can provide backup and/or replacement staff when needed. The firm IOR approach seems to have less transitional problems. However, individual IOR's are generally less expensive than firm provided staff IOR's.

How: Consider the cost effectiveness of using a firm provided IOR.

5. Contractors

Overview

Of the two broad categories of costs associated with construction, "Hard" costs and "Soft" costs, the contractors deal primarily with the Hard costs. The word "primarily" is used because many contractors are expanding their role beyond the traditional bid and build approach and moving into newer and more influential roles. Two of the most common are as contractor and manager, in a Construction Manager/General Contractor (CM/GC) basis, or as contractor and designer, in a Design/Build (D/B) basis. A third approach is the situation where a construction manager serves as an advisor to the District and coordinates multiple prime or trade contractors. The construction manager is not technically a "contractor" but in essence functions as a contractor without the risk inherent in being one. (see Section 9, Project Delivery).

State law licenses numerous "contractors" identified by their construction specialty. Contractors vary in size and financial capability from the smallest one person entity to the largest multi-person, multi-location organization. Generally, the school arena attracts the small to medium size contractor. For the purposes of these Guidelines, we have grouped them into four generic categories and identified them as:

1. **Prime Contractors:** Those who function as the entity with whom the District is contracted (usually called the general contractor) and who in turn are responsible for numerous subcontractors. This is the traditional owner-contractor relationship.

2. **Sub-Contractors:** May be framing contractors, drywall contractors, electrical contractors, roofing contractors, etc. Subcontractors normally do not contract directly with the District.

3. **Trade Contractors:** Can be either prime contractors or subcontractors in the traditional owner-contractor relationship, but are working under a direct contractual relationship to the District without a GC.

4. **Design/Build Contractors:** Typically prime contractors who have taken on the responsibility for the design of the project on behalf of the owner. The Design/Build entity may be a contractor or an architect.

In considering contractors and their subcontractors, there are several things to keep in mind:

1. The school construction process is very competitive, with a wide-range of quality in contractors and subcontractors.

2. The cost saving value of good contractors is not intrinsic in the "low bid" versus "lowest qualified bid" approach. The "low bid" only approach often results in poorer quality and more cost than intended.

3. The form of project delivery (see Section 9) is less important than the quality of the entity with whom the District is contracting. The contractor is the District's partner in a major undertaking; carefully selection is essential.

The approach to reducing costs of construction without reducing the quality of the completed project, is rooted in three basic precepts:

1. Utilizing a thorough pre-qualification system that will solicit the most qualified contractors for the project.

2. Managing the construction phase through constant interaction and open communication.

3. Managing the Change Orders and Dispute Resolutions assertively and in a timely manner.

5.1 Timing

o Minimize the impact of peak construction cycles (5.1.1)

Why: Peak construction cycles cause significant inefficiencies and increases in costs when a very high number of projects are going to bid in the same time period, thus impacting the availability of good contractors and bids. Several factors cause the increase in costs: 1) "good" contractors/subcontractors often refuse work during peaks, 2) there are significant product and material delays, and 3) long lead items may be difficult to manage.

How: This is difficult to control, but the District should attempt to smooth out the funding process, using local funds (or interim funding if necessary) even if the costs saved is somewhat offset by the cost of the money.

o Consider the impact on the project due to the annual cost index (5.1.2)

Why: There is an indirect increase in the cost of construction due to the tendency for Districts to be overly concerned with the annual cost index adjustment to the state's grant amount. It has been argued that the state's approach of an annual increase does not always recognize the true cost of construction during periods of rapid escalation. Some Districts may even delay their bid date, from midyear until after the January 1 adjustment date, in hopes of an increased grant amount. This is a risky approach because while the grant may increase, it is unlikely to fully reflect what may be a short term, but significant increase in bidding climate due to a peak construction cycle. The better approach is to manage the schedule of your project; working with your design professional and the construction community to establish the optimum bid date.

How: 1) Anticipate the funding cycles, 2) start the design process as early as possible, 3) reuse existing designs if appropriate, 4) discuss the timing with construction industry representatives, and 5) accelerate or delay the schedule to hit the optimum bid period.

o Manage the bid date (5.1.3)

Why: There is a direct increase in the cost of construction due to the a lack of managing the project's bid date. Too often, numerous projects, in the same contractor area, are being bid on the same day, thus competing for the good bidders. This makes it difficult to recieve good bids which leads to higher costs. Bid dates should be selected to avoid dates when other District projects and/or non-school projects are bidding.

How: 1) Anticipate the bid climate, 2) adjust the bid date to avoid numerous competing projects, and 3) market your bid opportunity.

o Utilize "piggyback" bids where appropriate (5.1.4)

Why: Using "piggyback" bids, available from the statewide procurement system, can reduce costs. This approach has been used with mixed reviews. It seems appropriate for common, non-contractor critical elements (such as air conditioning units, furniture, etc.), but more problematic on items effecting the contractor's work and schedule. There are two specific concerns: 1) it is District staff intensive and requires a high level of experience to do properly, 2) there is a potential subcontractor issue relating to warrantee of the item purchased, especially if it requires significant coordination in its installation. However, there are positive aspects as well such as: 1) potentially lower costs due to the state's buying power, 2) known reliability of the item due to the state's oversight, and 3) improved timing and availability. The timing issue is especially important during peak construction periods.

How: Consider purchasing long lead items, and other items and equipment that are impacted by the bidding climate, through the California Multiple Award system (CMAS).

5.2 Pre-Qualification

o Utilize formal pre-qualification procedures (5.2.1)

Why: There is potential for increases in the cost of construction due to the lack of pre-qualifying the potential contractors. Securing good, qualified contractors is essential to cost containment. A new statute, effective January 1, 2000, is intended to clarify and expand the District's authority to pre-qualify contractors prior to bidding a project. The law allows evaluation of a contractor's ability to do a project based on 1) financial capability to perform the work, as previously allowed, and 2) performance-related evaluation from previous projects. This later part is significant, and if properly managed, will provide an excellent tool to ascertain a contractor's qualifications. The District will need to have a commitment from the District Board to actually eliminate a contractor, from the bid list, who is deemed non-qualified, for a particular project, through the process. Two cautions: "friends" are hard to reject even with a good process in place, and appeals may be an added burden of the process.

How: 1) Become familiar with the statutes governing the pre-qualification process, 2) establish the process district-wide, and 3) get commitment from the District Board to implement the process.

o Consider taking only the top most qualified bidders (5.2.2)

Why: There is potential for reducing the cost of construction by modifying the normal "come one come all" approach to bidding projects. The pre-qualification system (described previously) is based on getting the most qualified contractors to bid the project. The distinction is that the pre-qualification process does not seek to identify any bidder as "not qualified" but rather to find the "most qualified" for any given project. This is similar to "qualifications based selection" of professional consultants. The question then is how many? The traditional thinking is the more bidders the better. However, there is also a school of thought that professes that "good" bidders will not compete with those

that they feel are not of the same caliber, or if there are too many competitors. In order to get the most qualified bidders with the least protests, consider allowing only the three to five most qualified bidders to bid the project. This approach will require a purely objective rating system as part of the pre-qualification analysis. There is a risk of diminishing the bid competition at the subcontractor level. But the fact is that the most qualified general contractors will use the same subcontractors that they would normally, and the District receives the "most qualified" bid. The result will be a better project, with fewer change orders and less overall costs.

How: 1) Utilize the pre-qualifications process describe previously, 2) reduce the number of "most qualified" to a minimum of three, but in no case more than five.

5.3 Change Orders

o Minimize District requested changes during construction (5.3.1)

Why: There is potential for increases in the cost of construction due to changes during construction. Some changes are inevitable, but all too often, change orders occur during construction that are the result of changes in ideas, educational preferences, or even personalities, that should have been resolved prior to construction. Any change during construction is costly, but the "owner" changes are usually the most expensive. This is due to the fact that the District changes tend to be fairly significant (i.e. add a room, change a wall finish, or delete an item that is no longer desired) and are usually not requested at a good time in the construction sequence. There are two areas where changes become more expensive than they should be: 1) any District change that is late in the construction sequence, and 2) any delay in approving a change no matter what the cause or when it occurs. Additionally, the use of deductive alternates and/or change orders is not cost effective. There are times when they may be appropriate, but in general, they do not return full value to the District. So, the best practice is to minimize District changes.

How: Manage the District decision process during design through: 1) thorough and timely review and approval of the design issues, 2) limiting the rethinking after design decisions have been made, and 3) utilizing peer review/value engineering to help form commitment to those decisions.

o Make change order decisions timely (5.3.2)

Why: There is a direct increase in the cost of construction due to delays in decisions during construction. This is especially true of change order decisions, because the cost of change is effected by the time of making the change. Time in this case means both "when" the change occurs in the construction sequence, and "how long" it takes to reach agreement and authorize the change. Delay in considering and/or executing the change is crucial. The cost (of the delay) can be more than the item itself; the District needs to act immediately.

How: The District Board should delegate authority to act on change orders. The District should consider setting up some sort of pre-approval system as a part of the General Conditions. In this way, a change order could be reviewed and approved (without going to

the Board) which would help expedite the process and reduce costs. A panel with authority to act might be appropriate.

o Establish all markup factors in the Contract Documents (5.3.3)

Why: There can be increases in the cost of construction due to changes during construction. Often the approval of a change is held up over a disagreement over the contractor's markup (overhead, general conditions, and profit) on the change. This should all be established in the Contract Documents so that the amounts to not enter into the approval process.

How: Establish the contractor's overhead and markup factors in the contract documents at the time of bid.

o Insist on contractor review and approval of subcontract changes (5.3.4)

Why: Pass-through change orders are defined as those that are requested by a subcontractor and are forward to the District (or their consultants) without the responsible review and approval by contractor. Most General Conditions require the contractors review, but typically the general contractor has no incentive to keep the cost low, and all too often their review does not occur. This results in changes that are more expensive than they should be.

How: Insist that the general contractor negotiate the cost with the subcontractor. This will not be easy, and may require some form of penalty for noncompliance.

5.4 Dispute Resolution

o Consider using a dispute resolution board (5.4.1)

Why: There is potential for a direct decrease in the cost of construction by the use of a Dispute Resolution Board (DRB). Dispute is defined as a requested change order for which an agreement on cost cannot be reached, but the work of which must proceed. Disputes are one of the more tangible additional costs. Often the District finds itself in the position of trying to adjudge disputed issues during construction that can amount to significant additional dollars. Typically, this is a situation for which they are not well equipped and are not without bias. As discussed previously, timing of the decision is critical. Typically such a resolution should be made within two to three weeks. If the District is uncertain or unable to make a decision, the costs can increase significantly.

How: Consider establishing a DRB that would be knowledgeable about construction issues, and be able to act quickly to avoid delays. The DRB should be established in the Contract Documents, and should consist of a small group of individuals (three is best) identified in advance and able to serve throughout the duration of the project. Likewise, the County Office of Education could establish a DRB on a regional basis so that the smaller districts would have a consistent and reliable group to call upon.

o Utilize "partnering" where appropriate (5.4.2)

Why: There is potential for reducing the cost of construction by the use of partnering on the project. This approach to dispute resolution is intended to ward off the dispute before it occurs. Partnering has been the "buzz word" for establishing a good working relationship between owner, architect, and contractor, for some time. Unfortunately, the process has not achieved universal success. The key is that partnering only works if all participants want it to work. This is especially true of the District. If the top level representatives of the District aren't committed to the process, it won't work. The process itself requires an understanding of the relationship between the parties to the contract. Thus, there is a need to educate those "partners" who are less familiar with construction issues. Partnering, by its very nature, is voluntary even though it may be called for in the Contract Documents. Thus, the partners commitment is essential. Equally important, is the fact that each partner must have authority to act on behalf of their constituency. Without the authority of the partners, handshake agreements are of little value and the partnering will fail. Partnering is generally best used on larger, more complex projects.

How: 1) Establish a partnering system where appropriate. 2) Make sure the District Board is committed to the concept, and authorizes its representative to act on its behalf. 3) Ensure that all parties to the partnering process are top level in their organizations, and authorized to act on their behalf. Consider using a facilitator specialized in construction partnering techniques.

o Establish and provide good communication leadership (5.4.3)

Why: There is potential for reducing the cost of construction through the proper use of good communications. Communication is an essential element in the contractual relationship. Without good communication, even the best of documents and contracts can have problems. And most assuredly, without good communication, poor documents and contracts will definitely not survive. This requires a strong, positive commitment by all parties to the project. This one statement says a lot about the whole design and construction process; without a commitment by everyone to the success of the project, and the mutual benefit of the participants, the undertaking will be much more difficult and costly than it need be.

How: 1) Establish a "we" not a "we-they" attitude from the outset. 2) stay involved in the project throughout its construction. 3) meet with the contractor on a regular and frequent (at least weekly) basis. 4) respond immediately to requests, and 5) keep the District's commitments.

5.5 Use Optimum Insurance Arrangements

o Consider "Wrap-up" or "Project" insurance covering all participants (5.5.1)

Why: There is potential for reducing the costs of very large construction projects by utilizing a type of insurance policy that covers all project participants. Typically each contractor and subcontractor individually purchase liability and other forms of insurance covering the performance of their work. This system has several disadvantages: 1) the combined

total of all premiums may be excessive, 2) if litigation is necessary, numerous insurance companies tend to exacerbate the issue, and 3) the coverage varies such that the District has difficultly knowing what coverage they really have. “Wrap-up” or “Project” insurance covering all project participants is becoming more competitive and may help reduce overall costs by improving coverage and reducing litigation costs.

How: 1) Consult a qualified construction insurance broker to see if project insurance is appropriate for the project. 2) If so, establish as part of the bid documents and construction contract.

Overview

There are numerous state and local agencies that a District must deal with in the planning, design, and construction of a school. On the surface, California's public school construction is regulated by the state; i.e. everything from what a school should be, to how it is funded, and how it is built, is controlled at the state level. This view leads to the misconception that the District need only concern themselves with the state requirements. In the broader view, and looking at it realistically, school construction is controlled by both state and local requirements. Local input often leads to reworking, and sometimes abandonment of completed planning, design, and/or construction work.

"DSA", "OPSC", "CDE" are the most commonly mentioned acronyms representing the state agencies. However, they are only a large tip in a giant iceberg of regulation. Local agencies can effect the cost of a project from initial site selection and utilization, to final approval of a fire hydrant. For the purposes of these Guidelines, we have grouped the agencies into two generic categories and identified them as:

1. **State Agencies:** such as the State Allocation Board (SAB), the Office of Public School Construction (OPSC), the California Department of Education (CDE), the Division of the State Architect (DSA), the Division of Toxic Substance Control (DTSC), and the State Resources Agency (for California Environmental Quality Act (CEQA) requirements), and

2. **Local Agencies:** such as the City and/or County Planning Departments, the City and/or County Fire Departments, the City and/or County Utility Companies and Departments, and the City and/or County Health Departments.

In considering the potential cost impacts from each agency, it is important to keep in mind:

1. The agency "cost" is in two forms: 1) direct fees and/or charges for services rendered, and 2) indirect costs resultant from decisions and/or requirements.

2. The perception that school Districts are independent of local control is not correct for many aspects of the planning, design, or construction of facilities.

3. All agencies, state and local, are control oriented and their requirements may add to or delay approvals of a project which can be very time consuming and costly.

The approach to reducing the costs related to state and local agencies, is rooted in three basic precepts:

1. Know what you don't know. Recognize your limitations and ask for help where you need it.

2. Become fully involved in both local and state agency issues.

3. *Work* with *the agency staffs, not against them.*

6.1

OPSC

o Familiarize yourself with OPSC staff and processes (6.1.1)

Why: There is a direct increase in the cost of design and other fees, and potentially construction, due to the processing time and complexity of the state (grant) program. With the influx of new applications under SB50, and the start and stop nature of the funding, the OPSC staff is faced with: 1) a dramatic increase in workload, and 2) a difficult staffing balance that must be responsive to the peaks without over-staffing the valleys. Hopefully, this will resolve itself as the influx of applications recedes and the staff resources balance out. The problem of delays in processing causes delays in the start of construction which results in increased cost. Additionally, in the case of modernization, the delay can mean missing the summer construction period and a potentially whole year delay in making needed improvements. With this in mind, the District is best served by familiarizing themselves with OPSC staff, their responsibilities and processes.

How: Stay abreast of what's going on: 1) become involved in those associations that deal with the funding issues, 2) attend the OPSC workshops, 3) visit the OPSC web site on a weekly basis, and 4) meet with OPSC's project manager on a regular basis.

o Provide complete documentation; don't try to get away with the minimum (6.1.2)

Why: There can be increased costs of design and other fees due to the need to redo funding applications when they are incomplete and/or non-substantive errors occur in the initial application. OPSC staff may reject applications that contain errors or are incomplete. This puts the District at risk of losing their "place-in-line" for funding and potentially jeopardizing their state grant. The District is best served by ensuring that the documentation is more than sufficient.

How: 1) Learn the rules for yourself, 2) understand the purpose and process, and 3) make sure your consultants provide complete documentation.

o Meet directly with OPSC staff managing your project (6.1.3)

Why: There can be increased costs of design and other fees due to the lack of knowledge about the funding process in general, and the District's project status specifically. While the process may still be too complex, it is understandable and manageable if the District stays close to the process and works with their OPSC project manager. There is a hesitancy to actively communicate with the staff even though, for the most part, they are very responsive.

How: The key is to work with the OPSC staff. 1) Meet with them at the outset, and get their input, 2) keep them appraised of the progress on a regular basis (even if the project has not progressed much) 3) ask questions as often as needed, and 4) contact the supervisory personnel when needed.

6.2 DSA

o Familiarize yourself with DSA staff and processes (6.2.1)

Why: There can be increased costs of design and other fees, as well in construction, due to the length of time it takes to have a design approved by DSA. This is similar to the problem of delay in processing by OPSC. The delays in review and approval cause delays in the start of construction which results in increased cost. Additionally, in the case of modernization, the delay can mean missing the construction period and a potentially whole years delay in making needed improvements. As with OPSC, the District is best served by familiarizing themselves with DSA staff, their responsibilities and processes.

How: Stay abreast of what's going on: 1) become involved in those associations that deal with the plan approval issues, 2) attend the DSA workshops, 3) visit the DSA web site on a monthly basis, and 4) meet with DSA's upper management on an annual basis.

o Utilize design consultants familiar with DSA (6.2.2)

Why: There can be increased costs of design and other fees, as well in construction, due to the use of consultants that are unfamiliar with DSA, the code and DSA's interpretations. Working with the various agencies, especially DSA, requires experienced design consultants and sub-consultants. Knowing the code is the first step; knowing the interpretation of the code is even more important in achieving successful plan reviews. This takes familiarization with the DSA process. Utilization of competent consultants is essential.

How: Selection of consultants is addressed in the section on Professional Consultants; the key here is to ensure that the selection criteria includes DSA experience.

o Establish a schedule with DSA for submittal and review dates (6.2.3)

Why: There can be increased costs of design and other fees, as well in construction, due to the delays in review and approval of the plans and specs by DSA. Like OPSC, DSA is faced with 1) a dramatic increase in their current workload, and 2) a difficult staffing balance that must be responsive to the peaks without over-staffing the valleys. The problem of delays in plan approval causes delays in the start of construction which results in increased cost. One of the ways to avoid this problem is to work with DSA early in the design process (ahead of actual submittal) to establish an overall schedule for your project(s) and a target date for submittal. This helps DSA plan their staffing and helps the District establish a working relationship with them. Then, keep them informed as to the progress, and most importantly, keep your end of the bargain.

How: Meet with DSA senior staff to overview the project, and establish a schedule for submittal and review what is workable for the District, their consultant, and DSA.

o Submit only complete (100%) drawings to DSA (6.2.4)

Why: There can be increased costs of design and other fees, as well in construction, due to the common practice of submitting partially complete design documents to DSA for review and approval. The practice is intended to reduce the overall time for DSA processing by "getting in line" earlier than full completion of the documents would allow.

This allows the last 15% to 20% of the design work to be done while the "bin time" clock is running thus, apparently reducing the overall time frame. The fallacy is that (more often than not) the incomplete design documents are rejected for lack of completion, or require significant revision and back-check before they are approved. This can cause significant rework and/or delays by the District's architect, and compounds DSA's review period. The result is extra costs and often no improvement in the timing of the project. The District is best served by ensuring that the plans and specs are complete.

How: Learn the DSA processes, and make sure your consultants provide complete documentation.

o Ensure interface with DSA is by experienced, top level consultant staff (6.2.5)

Why: There is potential for increased costs of design and other fees, as well in construction, due to the problem related to finalizing design issues between the design consultant and DSA. All too often, the DSA review comments and the re-review (or back-check) of those comments, are handled by lower level staff of the design consultant. This results in a lack of good decisions which in turn can cause increases in time (double and triple back-checks) and unnecessary cost of the project. It is in the District's best interest to ensure that all interface with DSA is done by experienced, top level consultant staff. The consultant's representative should be responsible for the documentation of the design, and have authority to agree to all DSA requirements and changes as necessary.

How: Insist that the District's design consultant uses top level, responsible staff to meet with DSA at all points of interface, including the back-check.

o Stay in the loop; meet with DSA at all milestones (6.2.6)

Why: There can be increased costs of design and other fees, as well in construction, due to the inability to set and keep a reasonable schedule for DSA's review and approval of the plans and specs for a project. This concern is aimed equally at the design consultant and at the agency since the schedule is dependant on both entities. There is a tendency for "passing the buck" between the DSA and the design consultant about responsibility, timing, etc. Typically, the documents are submitted to DSA by the design consultant on behalf of the District. This is fine if there are no problems. However, when there are problems, the District is out of the loop and comments like "the plans are at DSA" or "they've been returned to the architect" fail to expedite the project. The design consultant must properly complete the design on time, and the DSA must review and comment on the design, and then the design consultant must make the required revisions in a timely manner. The best way to ensure this, is to set the schedule, then keep the pressure on to ensure that all key dates are met. This means staying involved and not delegating the "whip-cracking" to the design consultant.

How: 1) Set up the schedule, 2) stay on top of progress, and 3) attend all milestone meetings with DSA.

o Utilize preliminary process to ensure compliance with code (6.2.7)

Why: There can be increased costs of design and other fees, as well in construction, due to designs requiring significant correction and/or revision based on DSA review comments. This is especially true with design firms that are not familiar with DSA requirements, and with unique or complex projects. Meeting with DSA early in the design process to familiarize them with the project and to get their input as to the major elements of the design, is very helpful in avoiding surprises later. DSA will accommodate such meetings if the District asks. In fact they have a process called "concurrent plan review" that is available for certain types of projects. In that review, the project design is formally reviewed as it progresses, i.e., at each of the normal design milestones. Even if the project does not qualify for concurrent plan review, the preliminary review process is very worthwhile.

How: 1) Set up the preliminary review process (or the concurrent review) with the DSA area manager, 2) establish the schedule, and 3) attend the meeting(s).

o Utilize incremental reviews (6.2.8)

Why: DSA will accommodate "incremental reviews" for projects that can and need be reviewed, and built, in phases. The examples include separate site and building phases, or large multi building projects that are best phased. This can help smooth out the design and review process to help accomplish the critical projects in proper sequence.

How: 1) Set up the incremental review process with the DSA area manager, 2) establish the schedule, and 3) stick to it.

6.3 CDE Requirements

o Familiarize yourself with CDE staff and processes (6.3.1)

Why: There can be increased costs of the project due to the requirements and processes imposed by CDE. Basically, CDE is like OPSC and DSA in that they are a major player in the state's project approval process. Like the others, workload and other factors can cause delays which can result in increased cost. Additionally, in the case of modernization, the delay can mean missing the summer construction period and potentially a whole year delay in making needed improvements. Here again, the District is best served by familiarizing themselves with the staff, their responsibilities and processes.

How: Stay abreast of what's going on: 1) become involved in those associations that deal with the educational issues, 2) attend the CDE workshops, 3) visit the CDE web site on a monthly basis, and 4) meet with CDE's regional consultants regularly.

o Provide complete documentation; don't try to get away with the minimum (6.3.2)

Why: There is potential for increased costs of the project due to the need to have CDE approve the project prior to submission to OPSC for funding. This is particularly applicable to modernization projects (that do not change the basic configuration or capacity of a school) but still require CDE review. Again, like the other agencies, the submittal to CDE should be complete. Their documentation is different than required for OPSC, and the District should discuss the exact requirements prior to submittal.

How: Learn the rules for yourself, and make sure you, and your consultants provide complete documentation.

o Work with CDE at the initial stage of the project; use them as a resource (6.3.3)

Why: There can be increased costs of the project due to the uncertainty and often changing items required for site approval. This is especially true with Districts and/or consultants that are not familiar with CDE requirements. Meeting with CDE early in the planning process to familiarize them with the intended project and to get their input as to site, and other educational requirements, is essential to avoid surprises later. CDE will be more than helpful in accommodating the meeting and in helping the District sort out its options.

How: Set up the initial meetings at the earliest point in the planning process.

6.4 Local Planning Agencies

o Be familiar with, and involved in, your community planning issues (6.4.1)

Why: There is potential for increased costs of the project due to the lack of familiarity with, and involvement in, community planning issues. Planning decisions, and requirements, can have significant impact on the District just as they may have on any private development. Unfortunately, most Districts tend not to be actively involved in the politics and decisions of the local planning process. Long term planning, demographic trends and potential new development are fundamental to the District. Even when an issue comes before the local planning agency that may seem to have only a remote impact on the District, there is potential for significant impact. Without much fanfare, a local planning action can add significant costs to, or even prevent, a future District project from proceeding. The community planning process is the forum in which the District can gain and provide insight into its future.

How: Become involved as an active participant in the process. This should be a continuing commitment on behalf of the District.

o Work with the planning staff to resolve issues early in the planning process (6.4.2)

Why: There can be increased costs of the project due to the lack of knowledge about what will be required by the local planning agency. All to often, the District assumes that their project complies with the local plan, when in fact some recent or obscure requirement is unknown to them. These little surprises can have a major cost impact on the project.

How: Meet with the local planning agency at the outset of a project, and determine all the requirements with which the project must comply.

o Utilize capable planning consultants with good relationships with agency (6.4.3)

Why: There is potential for reducing the costs of a project by the use of consultants that have

good working relationships to the local planning agencies. Working with the various agencies, requires experience. Knowing the processes and the politics is important in achieving favorable planning decisions. Utilization of competent consultants is essential.

How: Selection of consultants is addressed in the section on Professional Consultants; the key here is to ensure that the planning consultant has good working relationships with the local jurisdictions involved.

o Minimize development "hold-ups" on state funded schools (6.4.4)

Why: There can be increased costs of the project due to excessive requirements imposed on the District by the local jurisdictions. Examples included such things as added infrastructure (utility extensions and street improvements), increased code requirements and the like, to which the non-districts would not be subjected. The concern being that since these are state-funded, non-tax producing projects, the local agencies may impose higher requirements than those required of a comparable private development. This is a "deep pocket" issue, and may or may not occur. The best practice is for the District to minimize the potential by being knowledgeable about the requirements and using consultants when appropriate.

How: 1) Stay alert to the possibility, 2) be involved in the process, and 3) use experienced consultants if necessary.

6.5 Local Permitting Agencies

o Ensure that design consultant complies with local requirements (6.5.1)

Why: There can be increased costs of the project due to the lack of knowledge about what will be required by the local authority. For the most part, public school projects are approved by state-level agencies, and are exempt from such things as local building permits etc. however, there are a number of areas where jurisdictional authority overlaps and local authority does apply. In these areas, it is essential to work with, and apply to, the local jurisdiction so that all costs can be properly anticipated. Cost reduction in this case means avoiding unnecessary or excessive costs. All too often, the local requirements become known after the project is under construction, which can significantly compound the costs.

How: 1) Become familiar with all local requirements, 2) ensure that the design consultant(s) meet with the local agencies and includes their requirements in the design, and 3) apply for, and receive approval, where necessary.

o Consider paying fees to local fire marshal for their review of the plans (6.5.2)

Why: Fire and life safety compliance is primarily the responsibility of DSA, but the local fire

marshal is responsible for the completed project in terms of the on-going operation and emergency response. This dual authority frequently results in added requirements and costs during construction. In addition to the previous Guideline, the District should work closely with the local fire marshal to ensure they have reviewed the plans and their requirements are satisfied. In this way, the excessive costs (due to changes during construction) could be avoided.

How: Consider paying a fee to the local fire marshal for written acceptance (or permit) prior to bid in addition to the normal DSA review.

7. Types of Construction

Overview

The types of construction for public schools are practically unlimited. From one-story to multistory, wood frame to concrete, most every type of construction has been utilized. Over time, the most common type of construction for public schools (perhaps as many as 9 out of 10) is field-built, single-story, wood frame, with stucco finish. That type of construction is one of, if not the, least expensive. However, the economy of the type is not generally realized due to the complexity of configuration and ornamentation that seems symptomatic of a desire for uniqueness. This produces a schizophrenic industry; a thousand Districts each trying to achieve their "unique" educational environment, struggling with a very common and mundane form of construction. The result is often over contortion, over decoration or both, and the costs are higher than they should be.

The Types of Construction Guidelines address the following:

1. **Configuration:** the impact on cost due to the building's shape and its components.
2. **Life Expectancy:** the establishing of reasonable life expectancies for the various elements of the building and the cost impact of those decisions.
3. **Methods and Materials:** the impact on cost due to the selection of materials and methods of construction.
4. **Time:** the impact on cost due to potential delays to construction.
5. **Factory-built Components:** the potential for cost savings due to greater use of factory-built components.
6. **Standardization:** the potential for cost savings due to the greater use of standardized elements throughout the project.

In considering the potential cost impacts relative to the types of construction, it is important to keep in mind:

1. The type of construction is dictated early in the design process by such things as building use and size, its locale and environment, and the image that the District and community desire.
2. The desired materials and finishes of construction can be provided in a variety of ways which can effect the cost without reducing the quality.
3. The methods of construction are generally left to the contractor, but can be influenced, and even dictated by the design, including the amount of factory-built components.

The approach to reducing the costs of construction, is rooted in the following precepts:

1. Keep the design as simple as possible; good architecture and good educational environments do not need overstatements of configuration, materials or finishes.
2. Utilize standard elements, that work well, are readily available, and tested over time.
3. Maximize the use of factory-built components, wherever they best suit the design.

7.1
Configuration Issues

o Campus configurations defined (7.1.1)

Most school building layouts can be categorized into one of several basic configurations. While there is no formal nomenclature, several names have evolved that describe the basic footprint of the classroom building portion of the campus. For the purposes of these Guidelines, the basic configurations can be described as follows:

Finger Plan: This configuration is perhaps the most widely used. It is characterized as a linear, rectangular arrangement of classrooms with exterior corridors. The classrooms are typically back-to-back, with windows and doors opening to the exterior corridor on the two long sides of the building. The number of classrooms in any one building typically varies from 4 to 12.

Pod/Cluster Plan: This configuration is probably the next most commonly used. It is characterized as a compact rectangular or circular arrangement of classrooms with exterior corridors. The classrooms are arranged back-to-side in a pinwheel fashion, with windows and doors opening to the exterior corridor on all sides of the building. The number of classrooms in any one building is typically limited to four to six.

Double-loaded Corridor Plan: This configuration is less used, being mostly used in inclement weather areas. It is characterized as a linear, rectangular arrangement of classrooms (similar to the Finger Plan) but with interior corridors. The classroom doors open into the corridor, with windows opening to the exterior walls on the two long sides of the building. The number of classrooms in any one building typically varies from 4 to 12.

Warehouse Plan: This configuration is perhaps the least widely used, although it was once very popular. It is characterized as a large rectangular or circular arrangement of classrooms (similar to the Pod/Cluster Plan) but with interior corridors. The classroom doors open into the corridor, with windows opening to the exterior walls on the all sides of the building. This configuration may have several interior corridors (which distinguishes it from the Double-loaded Corridor Plan) or it may have a large common area that functions as circulation and/or instructional space (which distinguishes it from the Pod/Cluster Plan). The number of classrooms in any one building typically varies from 8 to 20.

Multistory Plan: This configuration can have any of the other configurations as its basic footprint, and can consist of two, three, or four floor levels. It is most commonly used in situations where the available site area is limited.

The relative cost between the various configurations is not possible to accurately define. However, on a new site, without undue site limitations, it is generally agreed that the Warehouse Plan is the least expensive configuration, and the Double-loaded Corridor Plan is next least. In contrast, the Finger Plan is considered the most costly. If that is so, it is interesting to note that the lowest cost Warehouse and Double-loaded Corridor Plans are the least used, and the most expensive configuration, the Finger Plan is the most widely used.

The building's configuration is driven by several factors: 1) the educational style and needs, 2) the site restraints, and 3) the funding allowances approach of the old Lease-Purchase Program. The funding allowances approach had a bigger cost impact than anticipated. It "charged" the building configuration for areas such as interior corridors at a different rate than exterior corridors. As a

result, the designs followed the most advantageous funding configuration even though they may not have been the most economical construction solutions.

o Avoid customizing the design "to death" (7.1.2)

Why: Many Districts want to customize their school design to suit their particular educational needs. This makes good sense in every way except cost. Customizing and/or personalizing a design takes extra time and dollars to accomplish. School facility needs are essentially the same from school to school and district to district. The tendency to have custom elementary "A" for one school, and custom elementary "B" for another is not cost effective. This is a political issue and not solvable within the context of these Guidelines. However, in the context of overall state-wide school construction program, this customization increases every aspect of the cost including District staff costs, design services, code review, and construction. The proponents of custom design argue: 1) The District is responsible to ensure that their students get the best education possible; this means up-to-the-minute, state-of-the-art facilities. 2) Each site is different therefore requiring a custom design. 3) Each individual District (and sometimes individual school) has a different educational approach therefore requiring a custom design. 4) Each community should take pride in their schools, and want to have the school design be compatible with and enhance their neighborhood. The arguments are valid. However, the caution is that over doing the design customization, especially when it goes beyond the educational needs, will result in school building configurations that are excessively expensive.

How: 1) Recognize the cost impact of customization, 2) set District standards that minimize customization, and 3) ensure that the design professional stays within those standards.

o Seek standardized details (7.1.3)

Why: In contrast to customization, is standardization. Even if the campus plan configuration is customized, much of the building detail can be standardized to reduce costs. This is especially true of the structural details on a project. The basic building form and its structural elements comprise a significant portion of the cost. If these elements can be standardized, then design, review, and construction costs will be reduced. One of the difficulties in standardizing the structural elements, from school to school, is responsibility. Typically a structural engineer is responsible for the structural design on a particular building. If that same design is standardized for use on several buildings (designed by other structural engineers, then there is a question of responsibility.

How: The District has several options: 1) The District must have good design standards. Ideally those standards will reflect widely utilized (and therefore standardized) details. 2) The District should consider using the same design professionals on multiple projects.

o Use repetitive modules (7.1.4)

Why: Standard is less costly than custom. The comment can be applied at all scales of a project; from the overall building configuration to the smallest detail. This includes standardized, pre-approved building modules such as wall panels, whole wall systems, roof systems, or whole room elements. Permanent, pre-engineered, factory-built classrooms are the most obvious example. One classroom module can be repeated for as many classrooms as needed. Repetitive module have several advantages:

Pre-Check and District standards: The repetitive modules, assuming they are pre-approved by DSA, can be identified in the District standards. This allows faster approval and better purchasing opportunities.

Lower design fees: Design time and fees should be lower since the modules are pre-designed and approved.

Improved contractor efficiency/costs: The contractor's costs should be reduced since 1) a major element of the work is bid as a unit price, 2) there is increased site efficiency, and 3) the contractor's risk is reduced.

Make sure it works: The District must make sure they are using a proven module that really works, and not one that just came on the market and may not be well tested.

Extra effort in prototype: If the District is developing a design or modifying an existing design for use as a repetitive module, they must take the extra time necessary to properly design the prototype.

How: Ensure that the design professional organizes the design to maximize repetitive elements.

o Try to keep configurations simple (7.1.5)

Why: A simple configuration is more cost-effective than a complex one. This cannot be overstated. There are numerous decisions to be made about the project's configuration. From a cost perspective, choose the simpler choice. Examples include:

The fewer the materials, the less the cost: Adding lots of different exterior finishes, for example, may cause additional details and coordination between trades. Even if the various materials are the all same unit price, it will be more costly than just one material. In simple terms, it is more expensive to use two colors of paint than it is to use only one. And if the paint pattern is very complicated (like a checkerboard) then the cost skyrockets.

Straight versus curve: Straight building configurations are less expensive than curved ones. The building may not be quite as "interesting" but it will be less expensive without sacrificing its function.

How: 1) Set good design standards, and 2) manage the design process to keep configurations simple and ensure compliance with cost concerns.

o Consider the value of multistory versus site area (7.1.6)

Why: Multistory buildings are typically used on small sites (often in urban areas) and sites with difficult configurations (slope, etc.) In general, it is not cost effective to use multistory construction just to save land cost. The multistory construction cost is more expensive than one story, and generally there is not a significant reduction in land usage (and therefore cost) to offset the additional construction cost. Other costs involve accessibility and the need for increased vertical circulation elements such as elevators, stairs, ramps, etc. The best use will be in the case of very high land costs and/or urban location where additional land is not available. The following examples illustrate the point:

Building to site ratio: Typically, a one story building occupies approximately 10% of the site area. Thus, a 40,000 sq ft. building requires approximately 400,000 sq. ft. of site area. The difference between the building area and the total site area is consumed with uses (play fields, parking, etc.) that are not effected by the building's height.

Multistory footprint: Typically, approximately 80% of a single story building can be designed as a multistory facility. Multipurpose rooms, gymnasiums, and cafeterias are generally single story. Thus, a two story building will save approximately 40% of a single story footprint.

Conclusion: The site area saved (by using a two story design) is directly related to the reduction in the footprint of the building. Thus, if the building footprint is reduced by 40%, and that is 10% of the site, then 4% of the site is saved. Depending on the cost of the site, the two story option may not be cost effective.

How: 1) Develop alternative site plans using both single story and multiple story building arrangements, and 2) pursue the most cost effective plan.

7.2 Life Expectancy

o Establish the proper life expectancy (7.2.1)

Why: It is generally agreed, and the Field Act requires, that school buildings must have a life expectancy that is greater than for other types such as commercial buildings and/or private schools. Good public policy dictates that schools should be built to last, and that the cost of construction should not be the only criteria. However, in establishing the proper life expectancy for school facilities, there are several things that need to be considered:

Major structure: Most people believe that the major elements of a building (its primary structure) should be built to last 70 to 100 years. In reality, many school buildings built in the last 50 years need significant maintenance and or modernization in as little as 25 to 30 years, and the primary structure is outdated (from a code perspective) in even shorter time. Funding under the old Lease-Purchase Program and the current School Facilities Program recognize that fact, with funding available for modernization after 25 to 30 years. Generally, the structural systems for schools are not selected for their life expectancy. Most often, they are selected on the basis of cost and other factors other than longevity. The great majority are built of the least expensive and least durable form of construction that meets the code prescribed minimums. From a cost reduction standpoint, the most common systems (wood frame, masonry and/or concrete) are reasonable. A greater cost factor has to do with the configuration of whatever systems are selected.

Maximum flexibility for educational changes: While longevity is desired, the building must be flexible enough to allow changes in educational systems and styles to occur without completely rebuilding the school. This is not easy to achieve; a look at the most historical school structure (50 years or older) will show inadequacies in serving current educational needs. A look to the future, raises the question of what the educational system will be in 50 years from now. The impact of such things as academy schools, advanced technology, home instruction, web-site schools, etc., means that a building constructed today may be in good physical shape, but may not function to serve the long-term educational needs. Again, the configuration will dictate, and flexible spaces are the key.

How: The District should: 1) carefully establish its long-range facility needs as part of its Facility Master Plan, 2) include all possible teaching scenarios, and 3) ensure the building design allows the most flexibility to respond to potential changes in the future.

o Consider the durability of materials (7.2.2)

Why: Durability and life expectancy are interrelated. Durability is the ability of the material to withstand the everyday wear and tear to which it will be subjected. Generally, the overall impact on the cost of the school, if good durable materials are used, is believed to add as little as five percent to the cost of the project. However, the actual cost of individual materials will vary, and the District will need to consider each as it develops its District standards. One of the major considerations is vandalism. The value of longevity and ease of maintenance, cannot be overstated. However, sometimes using a lower initial cost, easily replaceable item, is a better choice. The choice of material for wall finishes should consider durability and cost. The following materials are ranked in order of least cost and least longevity: 1) wood siding, 2) metal siding, 3) stucco, 4) brick veneer over wood framing, 5) concrete block or brick, and 6) cast-in-place concrete.

How: 1) Work with the maintenance and operations staff to develop this portion of the District standards, and 2) work with the design professional to review the District standards and to establish the materials palette for the project that will provide the most cost effective results.

o Undertake value engineering (7.2.3)

Why: Assuming that long life expectancy and ease of maintenance and operation, are desirable performance criteria in good school design, it is essential that all designs involve objective value engineering. Value engineering is defined as an independent, professional analysis of 1) the initial cost, 2) long-term cost to maintain and operate, 3) the function, and 4) the aesthetics of the proposed design. Several elements need to be considered:

Operating cost: This is a significant portion of the total (lifelong) cost of the school. Unfortunately, the traditional capital outlay funding systems have focused on initial construction cost and have not adequately addressed the need to provide on-going funds for preserving the asset. This is contrary to good value engineering. Often, a higher initial cost will result in lower on-going costs, but when initial cost is the only consideration, the proper value choice may not be made.

Reasonable life expectancy: The following life expectancies are reasonable for the major building systems: 1) Primary structure or element; 70 to 100 years, 2) Major mechanical, electrical, and plumbing systems; 25 to 30 years, and roofing system; 15 to 20 years.

Technology systems: New technologies will continue to evolve. Building designs need to be flexible to allow future modifications that are difficult, if not impossible to anticipate.

How: 1) Identify within the design consultant's agreement, that value engineering will be conducted by an independent consultant, 2) select the value engineering consultant for their expertise in the type of project, 3) conduct the value engineering, and 4) incorporate all cost effective recommendations.

o Select HVAC system carefully (7.2.4)

Why: The heating, ventilating, and air conditioning (HVAC) system is always a major consideration from a life expectancy versus cost perspective. The HVAC system has several fundamental options (from wall mounted, self contained package units to four pipe central systems) each with their own operational characteristics, life expectancy, and cost considerations. When all factors are considered, the most expensive system is not always the best choice. The system should be selected for: 1) its energy savings capability, 2) its parts and replacement support from its manufacturer, and 3) its minimum maintenance.

How: 1) Identify within the design consultant's agreement, that life cycle analysis will be required as part of their services, 2) conduct the life cycle analysis early in the design phase, and 4) incorporate the most cost effective option.

7.3 Methods and Materials

o Recognize the types of construction (7.3.1)

Why: The building code establishes various types of construction that can be used for the various types of occupancy. The types of construction relate to their structural and fire resistant characteristics, and range from Type V, for wood frame, one to three story buildings, to Type I, for steel and concrete, high rise buildings. The majority of schools are one story, wood frame, "studs and stucco" construction. These are generally, Type V, nonrated (as to fire resistance) buildings. Some or all of the building may have increased fire ratings, and/or automatic fire sprinklers depending on the size, location, and any special uses of the facility. The type of construction currently used for schools is the least expensive form of construction, and potential cost reductions will relate to the method of construction, not the type.

How: 1) Work with the design professional to understand the options for the project, and 2) incorporate the most cost effective recommendation.

o Select materials carefully (7.3.2)

Why: There are two levels of materials that need to be considered during the design of the facility: 1) the basic building materials (the primary structure and finishes) such as stucco versus brick, and 2) the secondary finish items (the interior walls and ceilings, fixtures, etc.) such as drywall versus plaster. The choices made can effect the initial construction cost as well as the long term maintenance costs. In all of these areas, the District must be involved in the selection based on meeting District standards and maintenance and operations requirements. See the previous comments on value engineering. For example, even the mundane items like toilet accessories can impact costs. For toilet accessories, there are two approaches: 1) good quality, durable accessories that hopefully will be easy to maintain and long lasting, and 2) inexpensive, even vendor provided, accessories that are considered sacrificial and easily replaced when damaged.

How: 1) Be aware of the choices, 2) develop good District standards, 3) ensure that the standards are adhered to by the design professional, and 4) do value engineering.

o Consider regional standards (7.3.3)

Why: Regional standards, developed by the County Office of Education, can be of great help to Districts that do not have the expertise or experience in construction. The need for good District-wide standards is undisputable. Region-wide standards can have several cost benefits: 1) Each District would not have to develop their own standards; thus, saving staff and consultant time and dollars, 2) the design professional would be more familiar with the broader-use standards; thus, saving research and design time, 3) the items selected from regional standards would be more widely available; thus, saving "one-of-a-kind" costs, and 4) this approach could facilitate the District's ability to buy the item through a regional or state level purchase contract.

How: 1) Work with the County Office of Education and other Districts to prepare good regional standards, and 2) use them on all projects.

7.4 Time

o Understand the value of time (7.4.1)

Why: Saving time, in the accomplishment of a project, is directly related to saving money. The linkage between time and cost is not always understood by the Districts or their design professionals. There needs to be more emphasis on, and awareness of, the value of time. Other sections of these Guidelines express the concern about going too fast and the start and stop problem related to funding. Those concerns are not at odds with this concern. The issue is time; taking the right amount of time to do the project correctly, but not so much time that both time and dollars are wasted. This is a delicate balance, and the District needs to understand how to find that right balance. The cost impact to a project is in several forms: 1) the obvious cost of money in terms of interest paid (or lost), 2) the inefficiencies in a slow moving, indecisive design process that reflects in added fees over time, and 3) in increased construction overhead and general conditions costs when the project drags on during construction. To help reduce the time element, the District should identify and establish all key points of time (milestones) in the overall master schedule for the project. When properly established, this will ensure that reasonable time frames are allowed and that expectations are met without sacrificing the quality of the project or the cost. The project master schedule should include every aspect of the design and construction of the project, from site selection to building occupancy.

How: 1) Establish a reasonable project master schedule with key milestones clearly identified, 2) work closely with the designer and contractor to ensure compliance, and 3) utilize timesaving procurement and construction techniques described in these Guidelines.

o Use timesaving techniques (7.4.2)

Why: There are several timesaving procurement and construction techniques that will help reduce the cost of the project

Use repetitive elements: Using repetitive elements of the building (building components, classroom clusters, or complete buildings) will: 1) save design time, 2) save DSA review time, and 3) save construction time. Each element saves costs.

Use volume buying power: Buying multiple items (from building components, to classroom clusters, to complete buildings) allows the procurement to take advantage of volume buying. The effort necessary to buy one item is very little different from the effort to buy several of the same items. In fact, most vendors and service providers will give you discounts for volume purchases. Volume buying saves time and dollars.

Piggyback purchase: A significant amount of time can be saved by buying items through regional and/or state-wide purchase contracts.

Master contracts with suppliers: If the District's construction program involves many schools, over an extended time frame, consider entering into master contracts with commonly used suppliers of equipment; thus, increasing your buying power and reducing both time and costs.

Selection of materials: It is essential to properly schedule long lead items to avoid project delays.

How: 1) Be aware of the cost impact of delays, 2) use procurement and construction techniques that minimize costs.

o Work the seasons (7.4.3)

Why: School construction costs are influenced by the time of year in which the construction is being done. Winter months tend to be bid a little higher to compensate for unknown weather conditions. Summer months tend to be bid a little higher due to the high level of construction activity. Thus, spring and fall tend to be good bidding seasons. Several suggestions:

Use modular buildings: Factory-built modules can help offset the seasonal phenomenon, and provide good phasing opportunities. These can help in several ways: 1) by beginning manufacturing while site is progressing (or ahead of site) 2) by building in the factory during inclement weather, thus offsetting the seasonal impact, and 3) by being able to close in a project more rapidly as the winter sets in.

Start of site work: Start site work in the spring and have completed by fall. Avoid starting in the winter.

Manage the process: The key is to know the seasonal impact and manage your schedule to minimize it.

How: 1) Be aware of the cost impact of timing of a project, and 2) establish project schedules that minimize costs.

7.5 Consider Factory-Built Components

o Factory-built components defined (7.5.1)

Factory-built components can mean anything from "portables" to complete "buildings" and everything in between; this has lead to some confusion. For example, a "portable" may mean a complete classroom (consisting of several subcomponents) intended for short-term and relocatable

use. These are generally characterized as plywood sided, flat roofed, and self-contained boxes. In fact, the vast majority of relocatable classrooms are of that description. As a result, the factory-built components, in general, have been inaccurately labeled as "portables." The following definitions are used for the purposes of these Guidelines:

Trailer: This group consists of Department of Housing/Housing and Community Development (DOH/HCD), units that are not approved by DSA, and are specifically intended for temporary, short-term use. They are pre-engineered, and factory-built with a self-contained floor structure. They are delivered to the site on wheels as completed units (usually two or three components depending on size). The components are assembled on site with wheels left in place to serve as support.

Portable: This group includes both DSA approved and non-approved units specifically intended for temporary, short-term use. They are pre-engineered, and factory-built with a self-contained floor structure. They are delivered to the site on wheels, as completed units (usually two or three components depending on size). The components are assembled on site with wheels removed and are supported on a temporary foundation. DSA approval is "pre-checked" (PC).

Modular (transportable): This group includes DSA approved units specifically intended for long term, but relocatable use. They are pre-engineered, and factory-built with a self-contained floor structure. They are delivered to the site on wheels as completed units (usually two or three components depending on size). The components are assembled on site with wheels removed and are supported on a DSA approved temporary foundation. This group is a step better in quality than the Portable, and generally includes architectural and mechanical upgrades to reflect the longer use intended. DSA approval is "pre-checked" (PC).

Modular (permanent): This group consists of DSA approved units specifically intended for permanent long-term, use. They are relocatable, but only by special technicians. They are pre-engineered and factory-built without a self-contained floor structure. They are delivered to the site on wheels or shipped on trailer as completed units (usually two or three components depending on size). The components are assembled on site with wheels removed and are secured to a permanent "slab-on-grade" or similar foundation. This group is a step better in quality than the Modular (transportable) and generally includes architectural and mechanical upgrades to reflect the permanent use. This group can serve all space needs (from classrooms to gymnasiums) and is a full alternative to field built spaces. DSA approval is "pre-checked" (PC) for standard classrooms, or normal checking for nonstandard classrooms and other spaces.

Metal Buildings: This group consists of DSA approved buildings specifically intended for permanent long-term, use. They are relocatable, but only by special technicians. They are pre-engineered and factory-built without a self-contained floor structure. They are shipped to the site on trailer. The components are assembled on site and are secured to a permanent "slab-on-grade" or similar foundation. This group is a step better in quality than the Modular (transportable) and generally includes architectural and mechanical upgrades to reflect the permanent use. This group can serve all space needs (from classrooms to gymnasiums) and is a full alternative to field built spaces. DSA approval is generally normal checking for nonstandard classrooms and other spaces.

Panelized Component: This category includes a wide variety of DSA approved building components or units. They are pre-engineered and factory-built. They are shipped to the site on trailer and are assembled into, and as part of, the building. This group can be anything (from light fixtures to wall panels) that has DSA approval as a component. DSA approval is "pre-checked" (PC).

o Use a "systems" approach of factory-built components (7.5.2)

Why: In general, the "systems" approach should be able to reduce costs, especially if the system is pre-approved by DSA. The system can be a product or a component (such as a pre-engineered wall frame) or a complete building (such as a classroom module). There are several advantages:

Less costly: Systems can help achieve more cost-effective buildings because they are generally 1) mass produced, 2) less risk to the contractor since they are better known, and 3) more readily available.

Reduced labor costs: Factory labor is generally less than field labor. In addition, factory conditions usually provide a more efficient work environment, thus reducing the time and cost to accomplish the work.

Less time required: Systems can help reduce the time for design and approval because 1) they are generally known items and can be designed (and accepted by the District) with more certainty, and 2) they are pre-approved by DSA which reduces the code review time.

More cost-effective inspection: The required inspection work is more efficient and less expensive. Efficiency is increased since one inspector can inspect several projects concurrently within a controlled, easily accessible environment. Manufacturers report that a factory-built classroom unit costs approximately $200 to inspect (at $100 / "floor" for a 480 sq. ft. half-unit), which is considerably less than the field built alternative.

Reduced competition: One potential problem lays in the possibility that if the system is overly proprietary (i.e., has very little competition) or is only available from one manufacturer, then the cost may not be competitive with the non-system alternative.

How: 1) Be aware of the cost saving potential of factory-built components, and 2) ensure that the design professional maximizes their use.

o Recognize the pro's and con's of factory automation (7.5.3)

Why: Being "factory-built" does not prescribe that the component is built in an automated assembly line. Factory-built components can be one-of-a-kind, custom built units, or multiple, assembly line produced, repetitive units. However, for cost reduction purposes, the more automation involved the more cost-competitive the products, especially if they are the manufacturer's standard units. There are pros and cons:

Improved consistency: The more repetitive the product, the more consistent it will be. The shop built unit should be better than a similar field built unit due to the controlled factory environment.

Lower cost: The ability to buy elements on a high volume basis (for multiple projects as opposed to a single project) should lower the cost.

Design acceptance: Using a high number of standard repeat units requires acceptance of the product by the design professional and the school District. The designer and District must be flexible in their acceptance of the manufacturer's standards in order to take advantage of the inherent costs savings. The desire to tailor the design to the school's needs tends to go against standardization and/or mass production.

Perception of lower quality: Relocatable classrooms (portables) have a reputation of being temporary and nondurable. This perception is sometimes applied to all pre-

manufactured modules even though there are numerous examples of well designed, permanent products of equal, or better, quality to their field-built counterparts.

Perception of less control: Another perception is that the use of pre-manufactured elements reduces the District's control of the schedule. Even though the schedule should be improved, once a contract is committed to a manufacturer, there can be problems with the schedule if that manufacturer is over committed and cannot produce the units as scheduled.

How: 1) Be aware of the cost saving potential of factory automation, and 2) work with the design professional to optimize their use.

o Consider the differences in "purchase" versus "design and construct" (7.5.4)

Why: There may be advantages in buying a pre-manufactured system or product versus designing and constructing the same system or product individually for each project. The District should consider several issues relating to the "purchase" alternative.

Piggyback bids: Pre-manufactured systems allow the opportunity to buy from (piggyback on) existing regional or state-wide procurement contracts. This can save costs through volume procurement.

Coordination with contractor's work: Systems or products purchased separately from the normal construction contract, require careful coordination to ensure that the contractor's schedule, responsibility, and warrantee are not diminished.

Risk to District: Using a purchase method will increase the District's risk since the District is responsible for the proper delivery and function of the product.

How: 1) Be aware of the cost saving potential of buying a pre-manufactured system or product, 2) consider the alternatives, and 3) purchase those items that will help reduce the overall costs.

o Consider the importance of time savings in the overall schedule (7.5.5)

Why: The factory-built systems approach can save time in the overall schedule of the project, if properly coordinated. There are several things to keep in mind:

Potential savings in design time: The entire design process can be accomplished more quickly assuming that the system chosen is well established and a known product to both designer and District. This can save both the design decision time, and the detailing time.

Potential savings in DSA approval time: The system (by definition) would have DSA's pre-approval which should help expedite the plan review process. However, DSA des not always grant pre-approval, and both designer and District need to work with DSA to ensure pre-approval is available and the time savings will occur.

Overlap of site and factory schedules: The overall construction schedule can be reduced when major systems are used because much of the systems manufacturing can occur while other field work (which is normally precedent to the system) is going on. For example: the factory-built work on the classrooms can be done while the rough grading and slab work (that must precede the field-built classroom work) is being accomplished. This doubling up of individual tasks can reduce the overall project significantly.

Reduced weather impact: The project is subject to less weather impact. Prefabrication can continue during inclement weather days when field work must be shut down.

Reduced site disruption: Because much of the work is done off site, in the factory, the on site work is less impacted and/or disrupted.

How: 1) Be aware of the time saving potential of factory-built components, and 2) ensure that the design professional maximizes their use.

o Understand and resolve the "sole source" issue (7.5.6)

Why: There is a potential sole source problem in using a system (or product) that can only be supplied by one manufacturer. The Public Contract Code requires competitive bidding from multiple vendors. The basic sole source problem is amplified greatly when the system becomes a major element of the design. Traditionally, Districts have sole source issues evolving around such things as hardware or security items that the District wants for consistency in their operation. Where only one type product exists, or is applicable to the District, the sole selection has been allowed. But if the system desired is a factory-built classroom module, the issue is more difficult to resolve. Factory-built classroom modules are available from a number of manufacturers, but each is slightly different from the other. This causes two problems: 1) If the design professional selects and designs to fit only one manufacturer, a sole source situation occurs that is difficult if not impossible to justify, or 2) if the design professional designs to one manufacturer's module, but allows other bidders, and the preferred manufacturer is not the low bidder, a significant amount of redesign may be required to accommodate the module of the low bidder. Several solutions exist; each is reasonable, but not perfect:

Performance specifications and deferred approvals: One way to address the sole source issue, relating to factory-built modules, may be the use of "performance specifications" and the "deferred approval" process, where the function and utility of the module is described, but not the specific manufacturer. In this situation, the design professional develops the performance specifications as part of the bid package, but does not design or detail elements of, or closely relating to, the intended module. Once the bids are received and the contract awarded, the successful manufacturer provides all required design information required for DSA review. This is called a deferred approval. This avoids the sole source problem, but the design professional may still have some redesign required to integrate the design with the selected manufacturer's module. Also, there is a potential delay in the process if the module selected is not ultimately approved by DSA or if the deferred approval submittal and review takes longer than anticipated.

Pre-approved elements: The sole source problem applies to all pre-approved modules just as it does to non-pre-approved modules. However, the risk of delay is greatly reduced. In this situation, the design professional performance specifies a DSA pre-approved module that is very generic and there are several manufacturers making nearly identical elements. This will reduce the risk of redesign and delays, but also tends to limit the design flexibility.

Pre-bid the factory-built modules: This option can avoid the risks describe previously. In this situation, the design professional establishes the performance specifications and issues a separate bid package just for the factory-built modules. This separate bidding works best if it occurs early in the construction document phase of the design professional's work. Once the bids are received and the module manufacturer is selected, the design professional and the module manufacturer can complete their design work concurrently, and the complete, integrated design can be submitted to DSA for approval. This avoids delays, deferred approvals, and redesign issues. However, there is

another problem: the module selected by the separate bid process becomes a "given" to the contractors bidding the work (just as a sole source would be) and sometimes this can result in less competitive bidding by the general contractor.

How: 1) Be aware of the problems of sole source selection, 2) consider the pros and cons of deferred approvals, and 3) select the most cost effective alternative for each project.

o Decide if you want "Module 1B" (7.5.7)

Why: The key to the cost-effective use (or reuse) of a system or module (or complete building) is minimizing changes. If the District likes a particular module (lets call it "Module 1B") then use Module 1B, but don't make a lot of changes or the cost savings will disappear. The challenge is to decide if a District wants to use the identical module (or whole building) that another District has used. The decision can be programmatically driven or egotistically driven. In either case, the District should recognize that they will probably have to accept some design limitations in order to get the cost savings. This is not a problem if the District likes the module design, but it is a problem if it doesn't. One of the major reasons to use a system or module is not just cost savings (although that should occur), but is the reduced risk to the District. The system or module is known; it has been built previously and is time and use tested. The District knows exactly what it is getting. Additionally, construction quality is established and the new project has a (previously constructed) standard by which it can be judged.

How: 1) Address the issue of standardized modules at the outset of the project design, 2) work with the design professional and the community to resolve any design issues, and 3) utilize the modules wherever possible.

o Understand and work with the design limitations (7.5.8)

Why: One of the biggest objections to the use of pre-engineered systems or modules is the potential of limiting design expression. This potential is real but manageable. It is understandable that the District and its community want to have pride in their school, and to be able to identify with it as "our school." However, this concern tends to limit the utilization of the system approach. It seems clear, that in order for the systems approach to become more widely used, all stakeholders (Districts, designers, and manufacturers) will have to work together to customize the factory-built standards, to meet the needs of 1) the educational program so that spaces can be tailored to the individual District needs, and 2) the exterior skin and roof elements so that local community identity can be accomplished.

How: 1) Address the issue of standardized modules at the outset of the project design, 2) work with the design professional and the community to resolve any design issues, and 3) utilize the modules wherever possible.

7.6 Field-built Standardization

o Utilize a standards approach (7.6.1)

Why: The use of standard buildings and/or major elements of buildings, as opposed to customizing each element, will reduce costs. "Standard" applies to all elements, from light fixtures to whole buildings. A standard is an item that is intended to be used more than once. Many small items of a building are already standardized. Such things as light

fixtures, doors, plumbing fixtures, etc. are standardized. The key is that standardization of as many elements as possible, will help reduce costs. A "standard" should not be confused with "prototype." The two words are often used interchangeably. For the purposes of the Guidelines, the distinction is that a prototype is intended to be replicated only a few times, with each repeat individually constructed, while a standard is intended to be replicated multiple times, and is generally mass produced.

How: 1) Address the issue of standardization at the outset of the project design, 2) work with the design professional and the community to resolve any design issues, and 3) standardize all elements to the greatest degree possible.

o Standardize major building systems (7.6.2)

Why: The standardization of the major building elements in any one project will reduce costs for several reasons:

Consistent sizes for framing: The consistent use of commonly available, standard material sizes and dimensions saves material and labor costs.

Economy of scale: The use of fewer different types of materials gains the economies of scale and saves money.

Reduce trades: The use of fewer different types of materials also reduces the number of trades required, which means less coordination and more efficiency on site.

Simplify design: Construction costs (per square foot) will be less in a simple shaped plan than in a complex one.

Reduce the number of exterior elements: Different exterior elements can cause problems at their interface. Simplification and the use of the least number of materials will reduce the costs, and potential save in callback and/or dispute resolution.

How: 1) Address the issue of standardization at the outset of the project design, and 2) work with the design professional to standardize the design to the greatest degree possible.

o Understand the pro's and con's of standardization (7.6.3)

Why: The benefits of using standards were discussed previously and will definitely reduce costs. However, the District should understand the pro's and con's so that the proper decisions can be made.

Benefits: 1) Standards are usually readily available and competitively priced. This means they are a low risk. 2) Standards save both labor and time. 3) Standards help ease on-going maintenance, repair and replacement. 4) Long-term serviceability; service and parts for standard products are generally supported by their manufacturer.

Problems: 1) If the standard is a unique item or one that is not often used in the school construction industry, there may not be sufficient competition to keep the price down. 2) When reusing a standard, there is a potential to repeat a programmatically bad element even though the costs savings is achieved. 3) The use of standard building plans or modules may limit design innovation.

How: 1) Address the issue of standardization at the outset of the project design, and 2) work with the design professional to simplify and standardize the design to the greatest degree possible.

Overview

Prototype is defined by Webster's New World Dictionary as "1. the first thing or being of its kind; original 2. a model for another of its kind 3. a perfect example of a particular type." For the purposes of the Guidelines, we focus on the second and third definitions: "model for another" and "perfect example." In thinking about cost reduction techniques, a prototype school design must be: 1) one that is intended to be copied, and 2) one that's design and construction are refined sufficiently as to be worthy of copy. The definition includes the modeling of a whole school or any of its major components. The use of Prototypes is more applicable to new construction than to modernization. As a District considers the development of a new facility, whole or component, the District should consider basing its new facility on a previously developed prototype.

The use of prototypes is not common. Some Districts often base the design of their next school on a previous one, but in general, the previous school was not developed as a prototype (was not intended to be copied, and was not refined sufficiently) and even that occurrence is limited. The Prototypes Guidelines address the following:

1. **District issues:** the need for extra care, time and resources to properly design the prototype.
2. **Design Consultant issues:** the need to sort out some of the inter-professional complexities.
3. **Pre-Approval issues:** understanding the code and approval issues.
4. **Design Issues:** the added concerns about flexibility for future uses.
5. **Construction Issues:** consideration of a separate shell and interiors approach.

In considering the use of prototypes, there are several things to keep in mind:

1. The initial prototype design process is more extensive than normal due to the fact that the design is intended to be copied at various sites.
2. The educational specifications and the input of each intended school's community is essential.
3. The District may spend a little more on the prototype, but will make it up with substantial savings on the repeats.

The approach to reducing costs through the use of prototypes, without reducing the quality of the completed project, is rooted in the following precepts:

1. Expend the time and resources necessary to fully research the best educational components from colleague districts so that the prototype design represents the very best thinking and experience.
2. Design the prototype as a complement of basic educational components to ensure maximum flexibility for future uses and educational changes.
3. Keep the basic components as simple as possible, but include the ability to tailor the exterior visual character to the local community.

8.0 Prototype Defined

The words "prototype" and "standard" are often used interchangeably. For the purposes of the Guidelines, the distinction is that a prototype is built for use by a District with the intention of replicating it several times, with each repeat individually constructed. In contrast, a standard is intended to be replicated many times, and is generally mass produced.

For the purposes of the Guidelines, the following definition applies:

A prototype is a school, or major component of a school, that is designed and constructed with the intent that the design will be repeated several times.

That definition has several key words and phrases which require emphasis:

"school, or major component" means that the prototype can be a complete school campus, or a major portion, such as a multipurpose building, or a classroom module, etc. It is not therefore, a construction component such as a wall panel or door etc.

"designed and constructed" means that the prototype itself was actually built and is in use prior to the construction of its repeat. This infers, that the same design professional is retained for the repeat. The contractor may be the same or different.

"with the intent" means that the original building, (the prototype) was designed to be repeated. This impacts such things as the agreement with the design professional, and the time and involvement of the District and community in making design decisions. This differs from the simple reuse of an existing plan that happens to fit the District's needs.

8.1 District Issues

o Understand the impact on staff (8.1.1)

Why: Developing a prototype is staff intensive and somewhat more expensive to design than one individual school. However, one of the advantages in the prototype approach is that the repeat schools are less costly and quicker to design. For a small District, the development of a prototype can present several issues: 1) staff resources may be impacted, 2) experience and capability are essential, and 3) learning about prototypes can be aided by seeking help from Districts or the County Office of Education who have had experience.

How: 1) Understand the additional time and resources necessary to properly develop the prototype, 2) secure the necessary capabilities, and/or 3) learn from others.

o Conduct post occupancy evaluation (8.1.2)

Why: Prior to designing a prototype, or any new project, the District should conduct a post occupancy evaluation of its most recently completed and comparable project. If the District does not have a recently completed project, it should evaluate a nearby school from another District. Knowing what worked well, and what did not work well, in the design and construction is essential. This is especially true in preparation of the prototype. The evaluation must include: 1) user evaluation, is it functioning to their expectations, 2) physical evaluation, how does it look and are the systems working, 3) quality of

the design documents, try not to repeat errors, and 4) commentary on decisions made that effected the end result and cost.

How: Conduct a post occupancy evaluation of the District's (or a colleague District's) most recently completed and comparable project.

o Allow time to develop prototype (8.1.3)

Why: Developing a good prototype takes additional effort and time than required for a normal (non-prototype) project. Those Districts with construction oriented facilities staff, are better prepared to develop prototypes. Nonetheless, there must be a recognition of the additional time required to: 1) properly develop the educational specifications, 2) solicit community input, 3) refine the District standards, and 4) do the design. Unfortunately, the normal processes do not encourage the additional time.

Funding cycles: The cyclical effect of state funding makes it prudent to develop prototypes that are ready to go when funding becomes available, but does provide a funding mechanism to properly develop the first model.

SB50 impact: SB50's criteria of DSA approved drawings (in order to receive funding) causes a time impact on the normal design phase, and works against the extra time needed to properly develop a good prototype.

How: Commit the necessary resources to develop the prototype.

o Design prototype to facilitate educational changes (8.1.4)

Why: The prototype is intended to be replicated several times, potentially spanning as much as ten years, from prototype to last repeat. It is likely that the District's educational program at the time of the prototype may be quite different at the time of the last repeat. Thus, the design of the prototype is effected by, and must respond to, the educational system. Even in the short term, the program needs of one school, that is on a multitrack year round schedule is different than the traditional schedule etc. In essence, the prototype design must be "timeless" and flexible. This leads to thinking in terms of subsystem prototypes as opposed to complete buildings. The best practice is to develop a wide variety of prototype components so that the District can mix and match as much as possible.

Max flexibility/adaptive: The key is to allow the District maximum flexibility to respond to new and changing educational needs while maintaining the cost effectiveness of the prototype.

Numerous plans: It would be best if the District has several designs to choose from. This suggests that the District work with its County Office of Education and/or other Districts to develop a pool of prototypical components that all could utilize.

Simple, big spaces: The building layout should utilize large, simple and flexible spaces as opposed to smaller specific use areas.

Support for prototypes: The District will need tools to help them overcome objections to the idea of standard models reused from one school to another.

How: 1) Incorporate the latest educational specifications from all schools that will use the prototype, 2) incorporate each school's community in the design process, and 3) design the prototype as a series of subparts, or components, that can be configured to match each of the various specifications.

o Ensure site compatibility (8.1.5)

Why: Adapting prototype designs to various sites requires a design flexibility of its own. Site issues lean toward the development of prototypical components and subsystems that can be selected and assembled into complete buildings, thus allowing proper design response to site issues.

Site/Soil condition: Differences in geotechnical characteristics of each site may require structural refinement of the prototype. This is true also of environmental considerations and site configuration.

DSA approval: The potential of getting DSA's site adapt approval of prototype components and subsystems may be easier than for whole buildings or campuses. Avoid acquiring a site that will not adequately accept the prototype footprint.

Test site with footprint: When considering the purchase of a new site, the District should "test" the site against the footprint of the prototype they intend to use.

Neighborhood design standards: This issues concerns the need to tailor the design to meet neighborhood design standards. In this case, the prototype should be designed to allow exterior modifications without reducing the potential cost savings of a prototype.

How: Evaluate all potential sites based on the foot print and design requirements of the prototype.

8.2 Design Consultant Issues

o Understand the responsibilities and liabilities (8.2.1)

Why: There are potential design liability issues that must be resolved in using the prototype approach. If the consultant of record for the prototype was one consultant, and the consultant of record for the repeat will be another consultant, then there can be confusion as to who is ultimately responsible and professionally liable for the repeat. This is legal issue, and is compounded when the repeat is comprised of several prototypical components. The solution can take several different forms: 1) the consultant of record for the repeat assumes all responsibility for the prototypical components, 2) the consultant of record for the prototypical components works as a consultant to the consultant of record for the repeat, or 3) the consultant of record for the prototypical components (assuming there is only one) is retained to be the consultant of record for the repeat. The following elaborates:

Multiple consultants: There is a potential problem when two or more design professionals are responsible for the same project, one as the consultant of record for the project, and the others are responsible for design of the prototypical components. Issues involve responsibility (who does what) liability (if something is wrong) and compensation (how is the prototype consultant paid).

District ownership: There is a question as to who "owns" the prototype design, i.e., the District that originally developed the prototype, or the consultant that designed the prototype. Typically, the District thinks it owns the design and often writes the consultant agreement to reflect that idea. However, the intellectual property is still the consultant's and the District cannot use it (or sell the design for use by others) without relieving the consultant's liability.

Shift in consultant of record: When a prototype design is used to build a repeat school, there will be a shifting of responsibility from the original consultant (for the prototype) to the new consultant (for the repeat). This shift in responsibility requires careful resolution and documentation. Even with good documentation, if a liability issue arises, adjudicating the issue will be more complex. One solution is to have the new consultant (for the repeat) redraw the entire design documents. This is obviously a duplication of effort, and tends to defeat the economies of the prototype approach.

Use original consultant: It is most efficient to use the consultant of record for the prototype as the consultant of record on the repeat.

Establish intent to reuse: When the District is negotiating with their consultant (for either the original design that will be used as a prototype, or for the design of the repeat project) the District should establish the terms and conditions of the reuse in the consultant agreement.

How: 1) Establish the intent to design a prototype in the design consultant's agreement, 2) include the intent to reuse the consultant, on the repeat projects, based on satisfactory performance, and 3) negotiate compensation for the prototype and each repeat.

o Be aware of the over-stamping issue (8.2.2)

Why: DSA requires a single consultant of record to stamp the design documents. This has professional liability concerns when much of the project is 1) comprised of standard pre-engineered components designed by the manufacturer's professional, and/or 2) comprised of prototype components designed by other professionals. This is an administrative requirement, and its application may vary from time to time. The District should meet with DSA staff to get agreement about the consultant of record on each specific project.

How: If multiple design professionals are involved on a repeat project, work with the consultant of record and the DSA staff to resolve responsibilities and over-stamping issues prior to completing the design documents.

o Consider product versus service (8.2.3)

Why: There is some concern that buying a prototype building is like buying a product and that liability issues are different than a normal design liability. This is a legal issue beyond the scope of these Guidelines. However, the District should be aware of the issue and seek legal advise accordingly. There are related issues:

Missing "service" to District: There is concern that the very essence of architectural services is in helping the District choose the best educational solution between several options. This aspect of the consultant's service may be lost in the choice to repeat an existing (prototype) design. One of the reasons the development of the prototype takes longer than normal, is to address this very issue; the prototype design must anticipate and reflect the needs of the repeat use.

Copyright: The use of standard components, or prototype designs, needs to account for copyright issues. The original consultant may have copyright protection and may have rights to repeat fees etc. Again, the District should establish the terms and conditions of the reuse in the consultant agreement.

How: 1) Be aware of the legal ramifications, and 2) seek legal counsel.

o Use competitive selection based on prototype (8.2.4)

Why: Selection of a design consultant is based on competitive qualifications which typically include such things as prior experience etc. It has been suggested that the selection could be based less on the "firm" and more on the "prototype". The District would establish their program needs etc., and the consultant firms would submit their prototype designs which become the basis of selection. This can occur when one District wants to build a project, and knows there are prototypes (developed by other Districts) that will meet their program. In such a case, the experience of the firm is less important than the correctness of the prototype in matching the District's programmatic criteria. Proponents of this approach argue that selecting a consultant based on comparing prototypes is sufficient, and fulfills the requirements of qualification based selection. In such a case, "qualifications" of the consultant are fully represented by the completed prototype projects they would submit.

How: If the District is intending to build a major component of a school, such as a multipurpose building, or even a whole new school, it should consider selecting the design consultant based on the availability and qualifications of the prototype.

o Consider the fee issues (8.2.5)

Why: As discussed previously, the original consultant (for the prototype) may have copyright protection and may have rights to repeat use fees etc. The District needs to consider this as part of their decision to use a prototype. Typically, there will be a fee to the consultant of record for the repeat. If that consultant is different than the prototype consultant, and the prototype consultant requires a repeat use fee, the total fees paid by the District may exceed that of a new design. The consultant of record for the repeat may agree to a reduced fee assuming that there is little or no change to the prototype. However, the reduction in fee may be very small if there are numerous changes. Using the original consultant (of the prototype) as the consultant of record (for the repeat design) will result in the best services for the least fee cost.

How: When considering building a repeat project (based on a prototype from another District) clarify all fee issues relating to the consultant of record for the prototype.

8.3 Pre-Approval Issues

o Take advantage of pre-approval (8.3.1)

Why: One of the advantages in the prototype approach, is saving time in the DSA approval process. This requires two things: 1) that the prototype is actually approved by DSA, through its original plan review and construction, and 2) that DSA is willing to use its "comparison check" system wherein the repeat of a previously approved school building requires only minimal new plan checking. This is an administrative option, and its utilization may vary from time to time.

How: Meet with DSA staff to get agreement that the comparison check can be used on each specific project.

o Be careful of factory inspection out of state (8.3.2)

Why: There can be hidden inspection costs if factory-built components are part of the repeat construction. While there are cost-reducing efficiencies of in-plant inspection, there can be higher costs due to travel, out-of-state licensing etc., if the components are manufactured at a remote location. Also, there can be a lack of certified inspectors especially if the plant is out of state.

How: Be aware of this potential problem, and adjust your budget accordingly.

o Be careful of code changes (8.3.3)

Why: One of the inherent problems with the prototype approach, is that the prototype design must comply with the building code at the time of its repeat. The revisions to the design may be minor, or major, depending on how extensive the code changes are. In either case, this will impact the schedule and the cost of the repeat design process. On the other hand, code revisions by themselves should be significantly quicker and less expensive than a whole new design.

How: 1) Be aware of this potential problem, 2) adjust your agreement with the design consultant to include the necessary changes, and 3) adjust your schedule and budget accordingly.

8.4 Design Issues

o Flexibility to meet District educational needs (8.4.1)

Why: The key is to allow the District maximum flexibility to respond to new and changing educational needs while utilizing the cost effectiveness of the prototype. This is at the root issue of the "prototype" approach. Inherent in the design of a prototype, is the requirement that it will work for several different schools. This means that different educational specifications for several schools will have to be incorporated into the prototype design. The design will need to facilitate change to meet varying requirements of the various schools, as well as educational changes in the future.

How: 1) Establish the intent to design a prototype in the design consultant's agreement, and 2) work with the design consultant to ensure that the prototype design will be able to incorporate the needs of the repeat uses.

o Ensure life expectancy is considered (8.4.2)

Why: The prototype approach should not reduce the life expectancy of the building or its components. In fact, because the prototype is intended to be repeated several times, the care in, and the value engineering of, the material and equipment selection must be accomplished with the utmost care.

How: Undertake value engineering of the prototype to ensure the proper life expectancy.

o Ensure long term maintenance is considered (8.4.3)

Why: The prototype approach should not reduce the long term maintenance quality of the building or its components. In fact, because the prototype is intended to be repeated

several times, the care in, and the value engineering of, the long term maintenance concerns must be accomplished with the utmost care.

How: Undertake value engineering of the prototype to ensure that all long term maintenance issues are resolved.

o Accomplish a permanent, sense of place; a valued house (8.4.4)

Why: The intrinsic need for a valued sense of place in which to educate our children is of great concern to all stakeholders. The discussion of "prototypes" and/or "factory-built" components, conjures up the image of temporary, transient and portable. The discussion of "standards" or "reuse of plans" makes one think of plain, normal and bland. The connection between those images and the use of prototypes is unfounded. Nonetheless, the District should be alert to that problem, and identify the intended quality of the project from the outset.

How: Work with the design consultant to ensure that the prototype and its repeat uses will provide the proper sense of permanence and place.

8.5 Construction Issues

o Shell versus T.I.s (8.5.1)

Why: It has been suggested that the prototype approach may lead to a "shell and tenant improvement" approach similar to private commercial construction. In this situation, the basic approach to developing the school would be changed. The school would be thought of and constructed in two parts: 1) exterior shell and 2) interior spaces. The exterior shell would be the prototype consisting of the whole school or a series of components. The interior spaces would consist of standard pre-engineered or custom elements built within the shell. While this approach may sound unlikely for school construction, there are several benefits:

Design flexibility: The building shell could be comprised of several prototypical components (just as discussed previously) and have the plus of more mix and match; i.e. an exterior type "A" could be combined with an interior type "B".

Construction sequence options: The construction sequence can be more easily tailored to meet District needs. The exterior shell could be approved by DSA and started construction prior to finalizing the interior educational components.

Cost reduction: Because the tenant improvements could be prefabricated and/or perhaps purchased through a regional mass purchase system, the options available to the District are increased and the cost decreased.

Better 'mod' cost later: Future remodeling cost would be reduced due to the easier upgrading of prefabricated tenant improvements.

How: Consider the potential and value of using a "Shell and TI" approach.

Overview

Project Delivery is a phrase, used by the design and construction industry, to describe the processes necessary to design and build a project. In general, the public school system in California is restricted to only a few of the common methods of project delivery that are available to other public and private institutions. However, with the ever constant need to improve the way schools are constructed and modernized, there has been pressure to allow a wider choice of methods. Currently, "design-build" is being touted as one of the best (new) methods. However, there are several options available to the Districts, each of which should be considered at the outset of a project.

The discussion of project delivery overlaps many of the other sections of the Guidelines, and each of the other sections has application to this section. In particular, the Project Delivery Guidelines address the following:

1. **Traditional Design, Bid, Build:** improving on the most used method.
2. **Design/Build:** understanding and using the newest opportunity.
3. **Developer, Leaseback, Turnkey:** making use of other financial options.
4. **CM, Advisor:** using more management to control projects.
5. **CM@Risk (GMP):** understanding a not commonly used approach.
6. **CM, Advisor (Prime, Trade Contracting):** improving on the second most common method.
7. **Hybrid Methods:** consideration of other options.

In considering the use of various project delivery methods, there are several things to keep in mind:

1. The District should consider all methods, allowed by law, to achieve the most cost effective project delivery.
2. To some degree, and in comparison with, the traditional design-bid-build method, the other methods will effect the time and cost of accomplishing the project.
3. The choice of which method to use may come down to the District's own capability to manage the process, and the style in which the District is most comfortable.

The approach to reducing costs through the use of a specific project delivery method, without reducing the quality of the completed project, is rooted in the following precepts:

1. Regardless of the project delivery method used, the qualifications, capability, and commitment of the entities involved will dictate the success of the project.
2. The individual, professional, responsibility of each entity involved remains the same. The District, the design consultant, the general contractor, and each subcontractor is equally responsible for their portion of the work regardless of the type of project delivery.
3. There is no one best method, all should be considered.

9.0 Project Delivery Defined

The design and construction industry has adopted the phrase “project delivery” and defined it to include the various processes necessary to design and build a construction project. There are hundreds of different ways to accomplish a project. The American Institute of Architects, California Council published its Handbook On Project Delivery, in 1996. It has become one of the standard documents describing project delivery. That document identifies eight basic methods of project delivery that are considered the most common core methods. Numerous variations can be applied to each of those described in the document. The eight methods are:

1. Traditional, Design, Bid, Build
2. Negotiated Select Team
3. CM-Advisor
4. CM-Agent
5. CM-Constructor
6. Design-Build
7. Design-Build-Developer
8. Design-Build-Bridging

The commentary in these Guidelines uses much of the same nomenclature, over viewing some of the key points relative to school construction, but does not attempt to deal in depth with each method.

9.1 Traditional Design, Bid, Build

o Basic Approach (9.1.1)

This method conforms to the Public Contract Code, and is the most prevalent method currently used by the Districts. The District hires the design professional who designs the project. At the completion of design, the project is put out to public bid. The lowest responsible bidder is awarded the contract and builds the project. This method relays heavily on the “low bid” approach in determining who the District will be using for the construction of the project. That is a basic flaw in the approach; it can be managed (through pre-qualification) but most often it is not. This method is a very linear, step by step approach; it is difficult to accelerate and can fail critical time schedules. The primary entities are 1) the District, 2) the design professional, and 3) the contractor. Inherent in the process is a small degree of adversarial relationship between the three entities. Traditionally, this has not been a problem but, in recent years, it has become more of one.

o Pre-qualification (9.1.2)

Why: Using good, qualified contractors to build your project is essential. Determining which contractors will be good to work with, and are fully qualified, is not easy. Historically, the Public Contract Code has allowed the Districts to pre-qualify potential contractors based on their financial capability. Recently, new legislation has expanded the pre-qualification process to include past performance related screening. If the District wants to pre-qualify its bidders, the law requires the District to establish a formal pre-qualification process based on an standard questionnaire and rating system. The pre-qualification screening is intended to create an annual list of qualified contractors that would

be eligible for bidding on the District's projects. The screening can be tailored to the various types of projects (new construction, modernization, large, small etc.) that the District anticipates. The pre-qualification documents should include such things as: 1) financial stability of the contractor, 2) past performance record on similar projects, 3) change order record, 4) claims record of unresolved change orders, 5) worker's compensation rating for field safety, 6) user satisfaction and references, and 7) current work load, and prior three years history.

How: 1) The District should establish a formal pre-qualification system and 2) allow only qualified contractors to bid their projects.

o Bonding (9.1.3)

Why: The requirement for bonding of the general contractor has traditionally been considered an effective tool to qualify potential contractors. Its cost is approximately two percent of the cost of the contractor's costs. Bonding is essential to protect the District against the contractor's unforeseen financial failures during the project. However, bonding is relatively easy for contractors to acquire, and should not be relied upon as proof of qualifications. It has been suggested that the District should require individual bonding of all major subcontractors. This is not commonly done (except in trade contracting, see comments later in this Section) but it does have some merit. It would also add some cost, and discourage some potential subcontractors. One strategy would be to require the bidder to have their bonding capacity certified, but that the District could decide to not have it provided, thus saving the cost.

How: 1) Bond the general contractor, and 2) consider bonding each of the major subcontractors.

o Standard/tight Specs (9.1.1)

Why: General Conditions and Technical Specifications vary considerably from project to project and, as a result, significant variations in the quality and performance of the contractor are allowed and do occur. The best practice is for the District to develop and use standard documents wherever possible. Historically this has been difficult (if not impossible) to accomplish due to the fact that design professionals have not been able to agree on a standard. The American Institute of Architects in conjunction with the Association of General Contractors publishes standard specifications and general conditions that are probably the most widely accepted "standard". However, even these are modified significantly by many design professionals, and generally not accepted by the District's legal counsel. This is unfortunate, because standardizing the general conditions and technical specifications would help reduce defaults, claims, and costs.

How: Utilize standards documents wherever possible.

o Time/schedule (9.1.5)

Why: This issue has been addressed in several other Sections. The issue is that the haste to finish plans for DSA's approval, as precedent to OPSC funding, causes problems in the whole project delivery system. This is especially critical in the traditional design, bid, build approach because: 1) Proper plans and specs are essential. Errors in the documents can lead to significant cost overruns. 2) Limited bidding time can lead to overly cautious pricing and/or potential bid errors that lead to cost overruns.

How: 1) Plan ahead, and 2) allot the necessary time to ensure good documents.

o Clear expectations (9.1.6)

Why: The traditional design, bid, build method requires special attention to the responsibilities of, and communication between, the primary entities during construction.

How: 1) The plans and specs must be complete, clear, and correct. 2) The design professional, inspector of record, and contractor responsibilities must be clearly defined. 3) An effective system of communication between all parties must be established and maintained.

o Bid to award/start (9.1.7)

Why: The longer the time between the date of bid and the start of construction, the greater the cost. Several factors contribute to this: 1) bidders typically will inflate their bids to protect against potential labor and material cost increases, 2) anticipated delay in the start date leads to uncertainty and less than competitive pricing, and 3) unanticipated delays lead to reassignment of key personnel and often the lack of availability of subcontractors. The longer the delay, the more the project costs in bid and/or changes.

How: Ensure that the bid to start of construction time is minimized.

o Independent Cost Estimate (9.1.8)

Why: A detailed cost estimate, prepared by an independent construction estimator prior to bid, will help eliminate the "bid bust" and rebidding. In the traditional deign, bid, build method, it is typical for the design professional to prepare a "statement of probable cost" for the project. This is a good practice, but it has two shortcomings: 1) generally the design professional does not do a full construction quantity estimate, and 2) their estimate carries an inherent bias. Therefore, an independent estimate, by a qualified construction estimator will significantly reduce the potential for cost surprises at bid time.

How: Utilize an independent estimate, by a qualified construction estimator.

9.2 Design/Build

o Basic Approach (9.2.1)

This method does not conform to the Public Contract Code, and is only allowed by special legislation. This method modifies the traditional Design, Bid, Build method in that both the design and the construction are the responsibility of the design-build entity. There are numerous variations of this method. The basic approach is one in which the District hires the design-build entity based on qualification, price, or both, prior to design. The "design" portion of the entity designs the project. During the design process, the "build" portion of the entity provides input and estimating to help guide the design decisions. At some agreed stage in the design (usually prior to completion of design) the project is put out to bid to confirm the earlier estimating. The bidding process can be public or private depending on the design-build agreement. Assuming an acceptable confirmation of the cost of the project, the design-build entity is authorized to, and builds, the project. This method relays heavily on qualification in determining who the District will be using for the design and construction of the project. This method is a very interactive (between designer and builder) and significantly reduces the linear, step by step approach. It is can be accelerated to meet critical time sched-

ules. The primary entities are 1) the District, and 2) the design-build entity. Inherent in the process is a loss of independent thinking and advise by the designer on behalf of the District. Opponents of this method, argue that this is a significant problem. Proponents argue that it is not a problem, and that the professionalism of the designer will still serve the District.

o Consider the legal issues (9.2.2)

Why: The interest in Design/Build for schools is growing. This method is used extensively in the private sector and is allowed and used by the University of California, and the California State University systems. At the time of writing these Guidelines, the Public Contract Code, as it applies to schools, does not allow the Design/Build method. However, there is current legislation specifically allowing Design/Build for schools (or some variation of it) that is anticipated to become law, or may be law at the time this is read. In either case, Design/Build is new to schools, and the nuances of its application are still unknown. The two primary restrictions against the Design/Build method for schools has been: 1) The Public Contract Code requires that all construction projects be awarded to the lowest responsible bidder. This on its surface would not prevent Design/Build. However, the basis of the bid must be completed plans and specs. Therefore, a Design/Build contract cannot comply with that requirement. 2) Title 24, that governs school construction, prohibits the design professional from being financially connected to the general contractor in order to avoid any possible conflict of interest. This requirement has been questioned many times, and special legislation has overridden it for individual projects. The new legislation will need to address both of these issues; and the District will need to consider the issues carefully.

How: Be aware of the current statutes effecting Design/Build.

o Type of Project for Design/Build (9.2.3)

Why: It is difficult to categorize which types of projects are well suited, or not, for Design/Build. The opinions varied from "any and all projects" to "only those simple less technical projects." Most proponents argue that Design/Build is applicable to all types of projects, new construction or modernization, simple or complex, big or small. The opponents argue that new construction (as opposed to modernization projects) where a guaranteed maximum price is required, and projects where there are very few unknown conditions or requirements are more appropriate. The U.S. Naval Facilities uses this method on all types of projects, including remodels. All seem to agree that Design/Build can save time. So if the project is time critical, then Design/Build may be the proper method.

How: 1) Familiarize yourself with the various methods, and 2) consider the pros and cons of Design/Build for each particular project.

o Increased District expertise (9.2.4)

Why: Design/Build has been promoted as being an easier method than the traditional Design, Bid, Build method, and therefore, less difficult for the owner. To the contrary, most experienced users of Design/Build believe that this method requires more owner, i.e. District, expertise and involvement. The reasons:

Decision more timely: One of the benefits of the Design/Build method, is shorter overall time frame (from design through construction). Inherent in the process is the desire of the design-build entity to move quickly. This means that the District needs to make decisions more quickly.

Roles different: The basic contractual roles are different; the design professional works for (or is) the contractor. This means that the traditional relationship (where design professional is an independent advisor to the District) no longer exists. Therefore, the District has lost the ability to receive objective opinions from the design professional. This means that the District must have an increased expertise to adjudge the various design and construction issues.

Clear identification of end product: Because the contract for construction is entered into with the design-build entity before the design work is completed (and in some cases before its started) the District must be able to communicate the intended end results in that contract. This can lead to potential ambiguities and extra costs.

Change in sequence of District decisions: This is a little like the timing issues; the District decision process changes. More decisions, earlier in the overall time frame, and quicker is the norm of the Design/Build method.

How: Ensure that the District is capable of handling the additional responsibilities.

o Benefits (9.2.5)

The primary benefits are in the area of time saved and dollars controlled. Most opinions on this subject come from experience outside of the school construction arena. Nonetheless, that experience provides valuable insight. There can be several benefits:

Time to accomplish start to finish: The overall time frame should be reduced. This is due to 1) the decision process is condensed, 2) there can be some overlap in completion of documents and the early stages of construction, and 3) the design-build entity is motivated to move quickly.

Fewer change orders: The Design/Build process involves the builder during the design phase decisions. Because the design build entity is responsible for the plans and specifications, there can be no change orders based on the claim that there are ambiguities in the plans. There can still be change orders for: 1) District requested changes and 2) unknown site conditions. The total cost of changes should be reduced.

Built-in value engineering means better decisions and less costs: The Design/Build process involves the builder during the design phase decisions. This has several benefits: 1) the decisions made will be biased toward the ease of building and therefore less cost, 2) the decisions made will be better informed due to the additional input from the builder, and 3) the builder is fully aware of, and responsible for, the intent of the documents.

Hard cost scope options handled better: The cost of various scope of work options that are typically left to additive or deductive alternates in the traditional Design, Bid, Build method are resolved during design as cost options when the decision is better timed and more cost effective.

Better use of prefabricated components: The Design/Build method makes it easier to explores all options for construction technique since the builder is involved in the entire process. This includes choice of materials, use of prefabrication systems etc.

Reduces adversarial relationship: In the traditional Design, Bid, Build method the contractual separation between design professional and contractor has many benefits, but it also has proven, on occasion, to produce an adversarial (and sometimes even combative) relationship which can hurt the project. The Design/Build method inherently eliminates that situation, providing the members of the design-build entity have worked

together and have a good relationship.

Savings agreements available: the Design/Build method typically provides for, and facilitates the use of, cost saving incentives that are not available under the traditional Design, Bid, Build method.

o Problems (9.2.6)

There are a number of problems with the Design/Build method that the District should be aware of and safeguard against.

Potential reduction in quality of the completed project: The Design/Build method and especially when a guaranteed maximum price is involved, has the risk of reducing the quality of the project for the sake of saving money. Once the price of the project is agreed to, between the District and the design-build entity, subsequent design recommendations and decisions may be unduly biased by cost at the expense of quality. This is a big issue. Opponents argue it strongly; proponents contend that qualified design-build entities with good design professionals can manage this risk.

Reduced District authority: the Design/Build method tends to emphasize time and dollars and therefore can potentially reduce the District's ability to fully achieve what the want.

Potential for less quality AE and/or GC: the concern was expressed that there is a potential the Design/Build team will utilize a design professional, and/or GC, of lesser quality than normally selected under the traditional method. This may be a risk, but can probably be overcome through careful selection procedures.

Design control is reduced: this is an inherent difference between the Design/Build and the traditional Design, Bid, Build methods. Under the traditional Design, Bid, Build method, the design professional works directly for the District rather than for the contractor as in the Design/Build method. This is a definite reduction in control from the District's perspective. However, the real issue to consider is whether that fact diminishes the quality of the design professional's services. Some argue 1) that the design professional is still professionally liable for their services, and 2) the Design/Build team will not stay in business long if their design quality is not acceptable.

o Selection Options (9.2.7)

The Design/Build method requires a higher level of capability of the design-build entity, than of the contractor in the traditional approach. The District is relying solely on the design-build entity for the design and construction success of its project. Thus, there must be a careful process to properly qualify and select the design-build entity. Several procurement options are available:

QBS basis of selection: This option is similar to the Qualifications Based Selection (QBS) process required for selection of the design professional. A similar methodology can be used for the design-build entity. The District publicly advertises the project opportunity, and solicits qualified responses. Interested design-build entities respond with descriptions of their qualifications. Cost of the project is not discussed in the approach. Typically, a short list and interview process takes place. The most qualified design-build entity is identified, and an agreement is negotiated. The agreement includes a mechanism for establishing the cost of the project, but the actual cost is not established until some time during the design phase. This option may request a conceptual design to be submitted as part of the proposal response. However, this can be very misleading, and should only be considered if the District has a professional advisor assisting in the selection process.

GMP bid: This option uses a true bidding process that is based on some form of preliminary documents. The documents can be very brief, or very extensive. Usually, they include a description of the project, some diagrammatic plans, general conditions, and performance specifications. The preliminary documents require the bidder to commit to a Guaranteed Maximum Price (GMP) for doing the design and building the project. The District publicly advertises the project opportunity, and solicits qualified responses. Interested design-build entities respond with sealed bid proposals. The lowest responsible bidder is awarded the contract. The contract includes a mechanism for confirming the cost of the project some time during the design phase. If the GMP is not confirmed (or improved) the District has the option of terminating the contract. Conceptual designs are not submitted as part of the proposer's bid.

Fixed Maximum Price bid: This option uses a true bidding process that is based on some form of preliminary documents. The documents are usually more extensive than the GMP bid approach. Usually, they include a description of the project, some preliminary plans, general conditions, and performance specifications. The preliminary documents require the bidder to commit to, and provide, the best design and construction within the Fixed Maximum Price for doing the design and building the project. This option requires a conceptual design to be submitted as part of the proposal response. This can be very misleading, and should only be considered if the District has a professional advisor assisting in the selection process. The District publicly advertises the project opportunity, and solicits qualified responses. Interested design-build entities respond with sealed bid proposals and a conceptual design. The award of the contract is based on the quality of the design, since the Fixed Maximum Price is already established by the District. The contract includes a mechanism for confirming the cost of the project some time during the design phase. If the Fixed Maximum Price is not confirmed (or improved) the District has the option of terminating the contract.

Best value: This option combines the QBS option with either the GMP or the Fixed Maximum Price option. A value scoring system is established, as part of the bid documents, to evaluate the proposals on both qualifications and price. The price factor may not be a true bid, but include such things as bids for overhead and profit, markup of subcontractor costs, etc. The documents usually include a description of the project, some preliminary plans, general conditions, and performance specifications. The preliminary documents describe the pricing mechanism and require the bidder to commit to, and provide, the best design and construction within: 1) the Fixed Maximum Price if established, or 2) a Guaranteed Maximum Price (GMP) for doing the design and building the project. This option is typically accomplished without requiring a conceptual design to be submitted as part of the proposal response. The District publicly advertises the project opportunity, and solicits qualified responses. Interested design-build entities respond with sealed bid proposals and qualifications. The contract includes a mechanism for confirming the cost of the project some time during the design phase. If the price is not confirmed (or improved) the District has the option of terminating the contract.

Bridging: a variation the Design/Build method, applicable to any of the above options, is a method commonly called "bridging", or more correctly, "Design/Build Bridging". In this method, the District retains the services of a design professional to function as the "bridge" between the District and the design-build entity. This bridge is often identified as the executive architect, or the design architect, or the owner's architect. Their function is to develop the conceptual designs for the project, working out all of the programmatic issues and establishing the design intent. This variation is intended to achieve the best of both the traditional Design, Bid, Build, and the Design/Build methods. It is generally used with the GMP or FMP procurement option and follows similar steps. Several comments apply:

Bid docs can go too far: The Design/Build Bridging bid documents, prepared for the GMP type bid and using the bridging architect, can be carried too far. If this happens, most design-build entities believe that it diminishes their design responsibility and therefore their ability to achieve a more cost effective solution.

Define scope/program intended: The better approach is to keep the bridging design to a description of the intended end results, defining the project scope and the District's needs, and allowing the maximum design flexibility for the Design/Build team. In essence, describe and illustrate what is really important, and leave the rest up to the design-build entity. This is a fine line, and will vary with the type of project. For instance, a classroom wing, could have very limited bridging design, but a performance facility would have extensive bridging design.

District architect continues as advisor: It is best if the bridging architect continues throughout the project to function as an advisor to the District. This seems like a duplication, but in reality it is not, and it serves to provide continuity of direction and assurance the design-build entity's work is in compliance with their contract.

Use allowances to provide flexibility: In any selection option, there are always going to be an unknowns, or unanticipated, requirements that will eventually be identified through the design process. The Design/Build bid documents should always include an appropriate District's allowance in anticipation of such. The allowance would be greatest for QBS and least for GMP Bid options.

o Completeness of design at time of selection (9.2.8)

The following outlines the approximate completeness of the design for each selection and/or contract option described above:

QBS: Initial selection. The design is usually not started; the selection documents describe the project in words. Graphic representations may be included, but there is no definitive design. Percent complete is 0%.

GMP: Formal agreement on cost. The schematic and design development drawings are usually completed and the construction documents are sufficient to establish a cost. Percent complete is approximately 45%.

FMP: Initial selection. The schematic design is usually completed and a part of the selection documents. The bidders response includes a proposed final design presenting the best project for the FMP available. Percent complete is approximately 15%.

Best Value (no design): Initial selection. The design is usually not started; the selection documents describe the project in words. Graphic representations may be included, but there is no definitive design. Percent complete is 0%.

Best Value (with design): Initial selection. The schematic design is usually completed and a part of the selection documents. Percent complete is approximately 15%.

Bridging: Initial selection. The schematic and design development drawings are usually completed (by the bridging design consultant). Percent complete is approximately 35%.

9.3 Developer, Leaseback, Turnkey

o Approach (9.3.1)

This method of project delivery, like all the others, has numerous variations. Basically, it utilizes a form of the Design/Build approach, but adds a significant element, i.e. the expertise and financial capability of the contracting entity to develop the entire project. In simple terms, the District contracts with a "developer" who designs and builds the entire project on behalf of the District. The developer functions in one of several modes: 1) The developer provides expertise and interim financing to design and build the project, selling it to the District at completion. The land is typically provided by the District but can be provided by the developer. 2) The developer provides expertise and long term financing to design and build the project, leasing it to the District at completion. The land is typically part of the developer package.

o Benefits (9.3.2)

The benefits are twofold: 1) the District gains the developer's expertise and "drive" to accomplish the project in the most expeditious manner, and 2) the District gains the developer's financial capability to fund the project.

Land availability: The District can provide their own land or acquire the developer's land as part of the contract. This option works well for non-school facilities, and for school facilities that result from new subdivisions.

Expertise in type project: This is a real benefit for smaller Districts who do not have in-house expertise.

Financial: In some cases, the cost of the project can be contributed by the developer in lieu of their normal developer fee.

Up front costs (cash flow): the District is relieved of funding the up-front costs.

o Problems (9.3.3)

There are also some problems:

Quality: Some argue that the developer approach minimizes the District and community input into both the educational and architectural quality of the project.

Non-school, local building permits: non-school facilities, on developer land, will be permitted under local jurisdiction, which some Districts believe is a potential problem. This can also have a potential problem of dual jurisdiction between the local and the state.

9.4 CM, Advisor

o Approach (9.4.1)

In this method, the construction manager (CM) is a professional advisor to, and acting on behalf of, the District. The CM is hired by the District for the purpose of assisting in the development of the project. The CM's compensation is based on a fee for services rather than a profit on the construction. The method can apply to each of the other methods. Most often, it works with the traditional Design, Bid, Build approach. The CM selection is based on qualifications (QBS). The CM acts first as an advisor (during the design phase) and then as an advisor to oversee the entire construction project. In simple terms, the District contracts with a CM who oversees the designs, estimates the costs of construction (but does not commit to a GMP), assists in the bidding process, and oversees the building of the project on behalf of the District. This method is common in public

projects in California (even within the school arena) and is gaining greater usage.

o Benefits (9.4.2)

The benefits are:

CM by QBS: The CM, Advisor is selected based on their qualifications. This is the same as the design professional, and provides the District with the best assurance of quality services.

More cost, time, and quality control: Because the CM provides estimating, scheduling, and quality control during the design phase, there is more control over their cost, timing and quality of the project.

o Problems (9.4.1)

There problems are:

More fees: The CM Advisor adds an additional entity that must be compensated. The proponents argue that the additional fees are well offset by avoidance of the problems inherent in the traditional method.

9.5 CM @ Risk (GMP)

o Approach (9.5.1)

In this method, a construction manager (CM) is hired by the District for the purpose of building the project. In this method the CM is "at risk", i.e., responsible for the construction of the project at an agreed cost. The compensation of the CM @ Risk is based on a fee for services during design plus a profit on the construction. The method has numerous variations. Most often, it utilizes a form of the traditional Design, Bid, Build approach, but with selection based on qualifications (QBS) and adds the expertise of the construction manager acting first as an advisor (during the design phase) and then as contractor to manage the entire project. In simple terms, the District contracts with a "CM @ Risk" who oversees the designs, bids a GMP, and builds the project (at risk) on behalf of the District. This method is not common in public projects in California (even outside the school arena) but is gaining usage elsewhere. A form of this is often used in private construction where negotiated contracts are allowed.

o Benefits (9.5.2)

There are several benefits:

GC input early in design: The traditional Design, Bid, Build approach involves the general contractor (GC) after the design is complete. The CM @ Risk method uses a contractor who is selected prior to, and involved in, the design. During the design phase, the CM @ Risk functions as advisor on the design. When the design has reached sufficient completion (this can vary with each project) the CM @ Risk commits to a Guaranteed Maximum Price (GMP) the cost of the project and shifts to function as the contractor and builds the project. The benefit is the GC's thinking and input during design.

GMP: Typically, the GMP is arrived at and agreed upon prior to completion of the design documents. This helps the District to confirm its costs early in the process and to make changes (to the design) before the start of construction.

Input on cost impacts of design: The CM @ Risk adds the contractor's point of view all during the design process, and ensure that there are no surprises. This is a significant benefit; the CM @ Risk (just like the design-build entity) cannot claim ambiguity or other deficiencies in the plans and specs, since the CM @ Risk is responsible for overseeing and approving them as part of the GMP commitment.

Savings concept: A savings clause is an incentive to save costs. It is always a part of the GMP approach, and typically provides for sharing cost savings between CM @ Risk and the District. The shared percentage varies based on the agreement between the parties.

Works well on complex projects: This method is felt to work well on complex projects.

Rebid subcontracts: A typical approach within this method, is to publicly bid most if not all subcontract work. This is a benefit in several ways: 1) subcontractors can be pre-qualified, and 2) subcontractor costs are subject to better scrutiny.

o Problem (9.5.3)

The problems are:

PCC selection on bid: The Public Contract Code (PCC) requires selection of the lowest responsible bidder based on completed plan and specs. The CM@Risk method is difficult, if not impossible, to utilize in that manner. Inherent in the GMP concept, is the benefit of cost commitment prior to completion of the plans and specs. Without that ability, the GMP merely becomes a traditional bid.

9.6 CM, Advisor (Multiple Prime/Trade Contracting)

o Approach (9.6.1)

This method serves the District very similarly to the CM @ Risk, except that the CM is not at risk. In this method, the construction manager (CM) is a professional advisor to, and acting on behalf of, the District. The CM is hired by the District for the purpose of building the project. The CM's compensation is based on a fee for services rather than a profit on the construction. The method has numerous variations. Most often, it utilizes a form of the traditional Design, Bid, Build approach. The CM selection is based on qualifications (QBS); all prime and or trade contractors are selected on the lowest responsible bid approach. The CM typically acts first as an advisor (during the design phase if the agreement calls for this service) and then as a manager to manage the entire construction project. In simple terms, the District contracts with a CM who oversees the designs, estimates the costs of construction (but does not commit to a GMP), publicly bids all work to numerous prime and/or trade contractors, and manages the building of the project on behalf of the District. This method is common in public projects in California (even within the school arena) and is gaining greater usage. "Multiple Prime" and "Trade Contracting" are very similar. In either case, the contractors are contracted directly with the District. The only difference is that multiple prime approach contracts with several major contractors (usually three to ten) and the trade contracting contracts with all individual trades (could be 30 to 40).

o Benefits (9.6.2)

The benefits are:

CM by QBS: The CM, Advisor is selected based on their qualifications. This is the same as the design professional, and provides the District with the best assurance of quality services.

More cost control: Because the multiple primes or trades are contracted separately, there is more control over their cost and performance. The District (with the advise of the CM) can tailor the bid packages as broadly or narrowly as it wants, and will receive complete bid information for each subcontractor.

Bond all trades: The District has the ability to qualify and bond any or all trades. This may be of benefit even acknowledging the additional cost.

Control schedule: The District has the ability to control the schedule of the individual contracts. All bids can be issued at the same time or they can be phased to suit the particular needs of the project.

Pre-qualify trades: Any or all of the trades can be pre-qualified.

Ability to rebid trades: Any or all of the trades' bids can be rebid if necessary without jeopardizing the entire work of the project.

Eliminates the "shark": The bid shark syndrome is one in which a bidder (in the traditional Design, Bid, Build method) will provide an excessively low bid to get the job, and then aggressively seek high cost change orders. The CM, Advisor method eliminates this problem due to the fact that the CM does not profit from the value of the construction. There is some risk that the "shark" mentality could be transferred to the major primes. However, this risk is minimal, since any of the prime bids can be rejected without jeopardizing the entire project.

Reduced adversarial relationships: The relationship between the CM, Advisor and the design consultant is improved (as compared to the traditional Design, Bid, Build method) and there is a benefit in minimizing contractual disputes during construction.

o Problems (9.6.3)

The problems are:

Subs not able: Many trade contractors are not accustomed to, or set up to, function on their own as a prime, i.e., with a contract directly with the District. Some will not participate in this method.

Coordination: Issuing numerous bid packages requires careful coordination to ensure that nothing falls between the cracks.

Harder to manage: The responsibility to manage the trades and coordinate their work at the job site falls to the CM. This is no different than the normal general contractor, with one exception: the CM is not at risk if the coordination is less than successful.

Harder for design consultant: The design professional is required to produce numerous bid and construction documents. The overall project may be the same, but separating, and coordinating, the plans and specs into separate sets of documents, is time consuming and prone to error. The design consultant's fee will need to be increased accordingly.

Increased risk to District: Ultimately, the District is at risk, and this method increases that risk.

Worker comp risk: There is a potential increase in worker compensation claims.

More markup: Each trade now has their own site general conditions, overhead and profit

which in the aggregate may be more than under a traditional method.

9.7 Hybrid Methods

o Systems Design/Build (9.7.1)

Another variation of the traditional Design, Bid, Build method is one in which the contractor is selected on the traditional bid basis, but with certain building systems (such as relocatable classrooms, mechanical, plumbing, fire sprinkler systems, etc.) based on a design /build basis. This approach is allowed under the PCC, with the requirement that the systems design be approved by DSA prior to construction.

o Negotiated Select Team (9.7.2)

A variation of the traditional Design, Bid, Build method is one in which the contractor is selected for qualifications (similar to CM@Risk) and a contract is negotiated. This is not allowed by the Public Contract Code (PCC) but is very successfully used in the private sector. It is mentioned here as a reference only.

o Owner/builder (9.7.3)

Another variation, is where the District, as owner, functions as the builder, and is responsible for the construction. This approach is not unlike the CM, Advisor (Prime, Trade Contracting) approach since the District contracts directly with all trade contractors. This approach is allowed under the PCC, with the requirement that the trades contracts are awarded through public bid. Several points apply:

Reuse existing design: The District can simply reuse an existing design with the plans and specs updated as needed. This approach would save time.

Better end results: Some proponents argue that the District should be able to get better end results because they are total in control of the work. However, this will not be the case unless the District has capable, construction personnel of staff.

Overview

Project budgeting is one of the most critical elements of the design and construction process. Good budgeting is essential. Yet, all too often, budgeting is done haphazardly and incompletely. Several factors contribute to this problem:

1. The is no universally accepted budget form or content to guide the Districts. This leaves each District on its own, dependent on staff and/or consultant expertise. This in turn, means every District approaches budgeting differently, and often without success.

2. The old Lease Purchase Program (LPP) funding was based on allowances for various building elements. The allowances were, at best, approximations of real costs, and at worst, misleading ingredients for a budget. The allowances did not include all project costs, and they were not accurate reflections of a proper budget. Unfortunately, Districts tended to rely on the allowances to develop their project budgets.

3. There is no usable data on the cost of existing schools. OPSC has data on those projects funded by the state, but the data covers only part of the total project costs, and is skewed by the program's allowances. Additionally, the data is not analyzed or presented in such a way as to be usable for budgeting purposes.

In order to effectively utilize their capital outlay resources, the District will need to budget more accurately and completely. This includes both long range fiscal planning, and short range project planning.

A Change in Approach

The entire approach to project budgeting has changed with the advent of the School Facilities Program (SFP).

The old LPP budgeting was affected by OPSC established allowances for "eligible" building elements and square footage. This had a significant impact on the project design and the cost of both new construction and modernization. In essence, a project budget was developed by adding up all of the allowance elements. Thus, the strategy was to maximize the eligible items and minimize the ineligible. For example, the full area of an interior corridor was charged against the building's allowable area, where as only one third of an exterior corridor was charged. Thus, most designs utilized exterior corridors even if they were more costly and/or less usable. Project budgets were less a matter of cost efficiency and more a matter of maximizing state funds.

Under the SFP, the District's eligibility (state grant plus District match) sets the total project budget, and the District must decide what project elements and areas will be included. While the old LPP was a "bottom up" approach (adding up the allowances to get to the total) the new SFP is top down. This is an entirely different approach. It will require a better understanding of the cost of the various elements such as classrooms, multipurpose areas etc. The District will need to decide what elements to include and what size they should be. This will require 1) prioritizing the educational needs, 2) optimizing the space utilization, and 3) designing more cost-effective solutions. Fundamental to this change is the need for better knowledge of the space and costs allocations for the various elements of a project.

Identifying the Parts

The typical project budget consists of three basic parts: 1) site acquisition costs, 2) consultant services (soft) costs, and 3) construction (hard) costs. Each is comprised of various subparts. The following is a typical list of the line items that should be included in the District's project budget. The actual list will vary from project to project, but this is a good starting point.

Site Acquisition Costs

Land Purchase Costs
Real Estate Fees
CEQA Mitigation Costs
Entitlement Costs

Soft Costs

Project Management Fees
Legal Fees
Financing Costs
A/E Design Fees
Special Consultants Fees
Geotechnical Fees
Testing & Inspection Costs
Permits
Construction Management Fees
Contingency Allowances

Hard Costs

Site Improvement Costs
Building Construction Costs
Furniture & Equipment Costs
Contingency Allowances

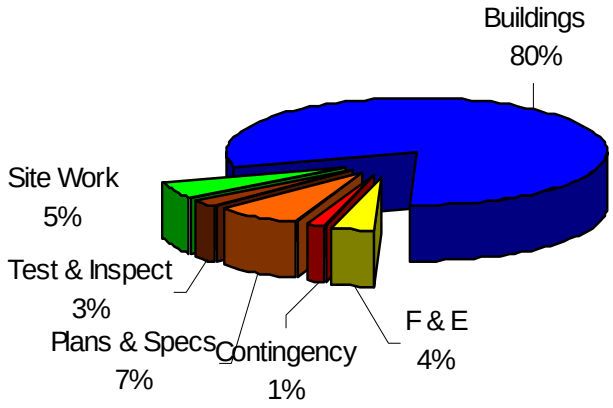
Knowing what to include in a project budget is the first step. Knowing how much cost to allocate to each item is the essential next step.

Past Experience

How much does a school cost?

The question is often asked, but seldom answered. OPSC has extensive data on state funded schools, but as mentioned above, the data is biased toward the allowances of the old LPP and limited in its utilization. For these Guidelines, data from more than a hundred schools, that bid in 1996 and 1997, were summarized by OPSC staff. The following data includes all "eligible" hard and soft costs generally associated with a typical school project, except for site acquisition costs. Site acquisition costs varied significantly from location to location, such that the data was not meaningful.

Average Cost Distribution for 58 Elementary Schools



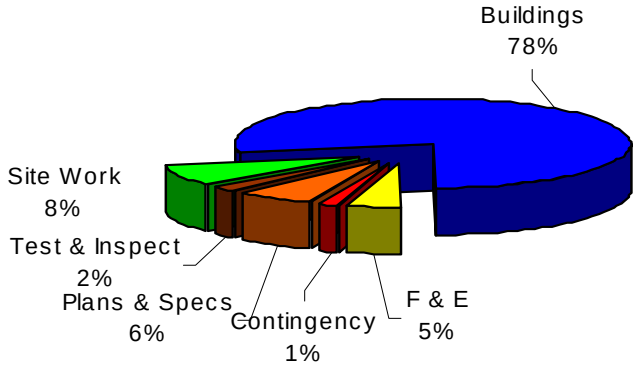
The average area per elementary school student was 62 sf

The average cost per square foot of elementary school was $182/ sf

The average cost per elementary school student was $11,300

The average cost per elementary school classroom was $282,200

Average Cost Distribution for 27 Middle Schools



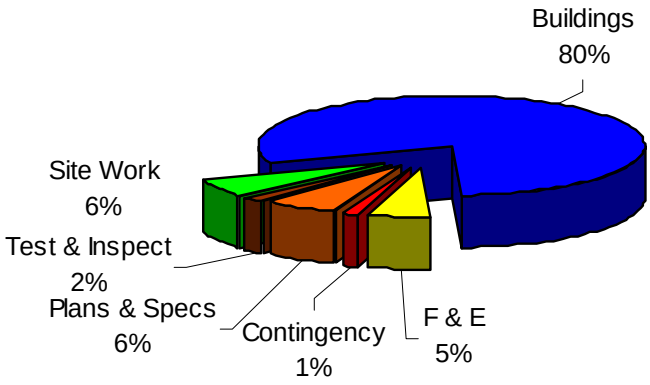
The average area per middle school student was 80 sf

The average cost per square foot of middle school was $187/ sf

The average cost per middle school student was $15,000

The average cost per middle school classroom was $374,800

Average Cost Distribution for 38 High Schools



The average area per high school student was 90 sf

The average cost per square foot of high school was $200/ sf

The average cost per high school student was $18,000

The average cost per high school classroom was $484,400

Several factors need to be emphasized:

1. The data does not include costs that the District incurred beyond those eligible under the program.
2. The site acquisition costs are not included.
3. The area and costs are skewed by the allowances of the program. Area and costs budgeted under the new program may vary considerably.

The Bottom Line Ratios

Traditionally, the design and construction community has characterized project costs in terms of dollars per gross square foot ($/gsf). That focus was perpetuated through the allowances of the old Lease Purchase Program. However, a better and more important measure of costs is one that measures the dollars per student housed ($/student). This is after all, the bottom line; how much is being spent to house each student.

The bottom line ratios are expressed, in these Guidelines, in terms of $/student as well as $/gsf, so that the District may have a common vocabulary for budgeting their future projects.

Summary Numbers

The following numbers present summary information of the hard costs of four elementary schools. They were selected from the OPSC group of 58 elementary schools to illustrate their overall costs in terms of $/gsf and $/student. The projects were built under the old LPP, and the data is from OPSC records without further analysis. The number of students shown has been changed to equal 25 students per classroom, to better relate the cost per student to the new SFP.

Elementary A	**Elementary B**	**Elementary C**	**Elementary D**
K-5	K-5	K-6	K-6
525 students	550 students	550 students	600 students
42,724 gsf	43,554 gsf	45,010 gsf	40,885 gsf
80 gsf/student	***79 gsf/student***	***82 gsf/student***	***68 gsf/student***
21 classrooms	22 classrooms	22 classrooms	24 classrooms
Admin	Admin	Admin	Admin
Multipurpose	Multipurpose	Multipurpose	Multipurpose
$6,676,000	$6,861,000	$6,968,000	$6,270,000
$156/gsf	***$158/gsf***	***$155/gsf***	***$154/gsf***
$12,700/student	***$12,500/student***	***$12,700/student***	***$10,500/student***

The comparison raises the question of why the three schools (A, B, and C) are very close in cost per student, and one is approximately 20% less, even though the cost per square foot is similar. Assuming that all schools achieved their intended educational program, then "D" is more cost-effective. The answer may be obvious; Elementary D planned and built less area per student than the other three. On the surface, it would appear that the District had made some programmatic decisions beyond the old LPP allowances. These are the kinds of decisions that must be made on all projects in the future.

Detailed Numbers

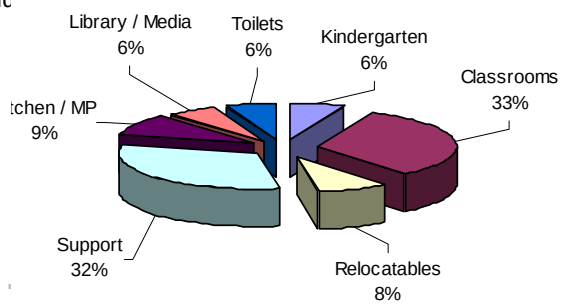
The following numbers present a more detailed look at the hard costs of two elementary schools. They were selected from the same group, of 58 elementary schools, to illustrate their space utilization as well as overall costs in terms of $/gsf and $/student. The projects were also built under the old LPP. However, the data is from the architect's records of final costs and has been analyzed to find out why there is a cost difference. The number of students shown has been changed to equal 25 students per classroom, to better relate the cost per student to the new SFP.

Citrus Elementary School

The information for this school was provided by Fontana Unified School District and HMC Architects.

District	Fontana Unified			
Architect	HMC Group			
Site	Citrus Elementary			
Bid Date	May 20, 1998			
Grade Level	K-5			
Pupil Capacity	525			
Site Acreage	12.7			
Total GSF	42,724			
Teaching Stations	21			
GSF/Pupil	81			
Buildings	$5,135,484	$	120	$ / gsf
Site Costs	$1,540,516	$	36	$ / gsf
Total Costs	$6,676,000	$	156	$ / gsf
Cost/Student		$	12,716	$ / Stuc

Spaces	**Total SF**	**% Total**
Kindergarten	2,748	6.4%
Classrooms	13,946	32.6%
Relocatables	3,600	8.4%
Support	13,461	31.5%
Kitchen / MP	4,018	9.4%
Library / Media	2469	5.8%
Toilets	2,481	5.8%
Total SF =	42,724	

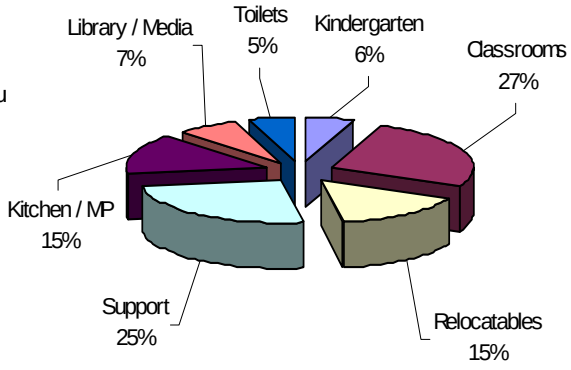


San Joaquin Elementary School

The information for this school was provided by Stockton Unified School District and Stafford, King, Wiese Architects.

District	Stockton Unified			
Architect	Stafford, King, Wiese			
Site	San Joaquin Elementary			
Bid Date	May 7, 1998			
Grade Level	K-6			
Pupil Capacity	550			
Site Acreage	9			
Total GSF	43,554			
Teaching Stations	22			
GSF/Pupil	79			
Buildings	$5,120,000	$	118	$ / SF
Site Costs	$1,741,300	$	40	$ / SF
Total Costs	$6,861,300	$	158	$ / SF
Cost/Student		$	12,475	$ / Stu

Spaces	**Total SF**	**% Total**
Kindergarten	2,428	5.6%
Classrooms	11,520	26.5%
Relocatables	6,720	15.4%
Support	10,816	24.8%
Kitchen / MP	6,721	15.4%
Library / Media	3,056	7.0%
Toilets	2,293	5.3%
Total SF =	43,554	



Comparing the Two; Are they really the same?

The numbers for the two projects are very similar; they are nearly identical in cost per square foot and in cost per student. Yet, they are considerably different in plan layout, material and systems design. One is a very simple plan configuration and the other is a more complicated arrangement of small building pods. One is wood frame, and the other is steel frame.

Analyzing the costs in detail, reveals numerous differences not apparent at the summary level. In simple terms, the project with the more expensive building shape used the less expensive building materials and systems.

Two conclusions can be made: 1) the architects both worked to the maximum state allowances but arrived at the solution in differing ways, and 2) a similar facility in terms of educational program could have been built for less money by combining the more cost-effective shape with the cost effective materials and systems.

Conclusion

In order to reduce the cost of each individual project, and thereby accomplish more projects, the Districts must 1) be better prepared, 2) do better planning, 3) prioritize their needs, 4) set realistic budgets, and 5) manage the process better.

In the past, project budgeting focused on maximizing the state allowances. Now, with those allowances no longer prescribed, the District is free to, and must, decide how to best plan and budget its projects. The proper design and construction process includes:

1. A good Facilities Master Plan
2. Well established District priorities
3. Careful needs assessment of existing facilities
4. Realistic project budgeting and financial projections
5. Strong project and construction management
6. Cost-effective design solutions
7. Utilization of good contractors and systems

The Districts have an opportunity, and an obligation, to provide the best school facilities possible within the limited resources available. The key will be in knowing how to set realistic budgets and in ensuring that project designs adhere to those budgets.

Overview

The following is a list of agencies and associations that are actively involved in public school construction. Each agency or association has a unique responibility, and can serve as a valuable resource to the District. Districts are encouraged to become familiar with each of them, and utilize their services.

Associated Builders & Contractors, Inc.
1300 N. Seventeenth St., Suite 800,
Rosslyn, VA 22209
(703) 812-2000
www.abc.org/index.html

Open Shop Information
Project Labor Agreement
Construction Information
Safety, Health & Environment

Association of General Contractors (AGC)
3095 Beacon Blvd.,
West Sacramento, CA 95691
(916) 371-2422
www.agc-ca.org

Insurance Programs
Fiscal Insurance & Risk Management

California Association of School Business Officials (CASBO)
1531 Street, Suite 310
Sacramento, CA 95814
(916) 447-3783
www.casbo.org

Administers and spends funds for charitable and educational purposes
Assists schools and school systems to operate more effectively and efficiently by exchange of information
Encourages research concerning school business management and administration

California School Boards Association (CSBA)
3100 Beacon Blvd.,
West Sacramento, CA 95691
(916) 371-4691
www.csba.org

Policy analysis and legislative advocacy
School Facility Task Force for school facilities and school construction needs
CSBA is a non-prfit association representing nearly 1,000 K-12 school districts

CDE School Facilities Planning Division (CDE, SFPD)
660 J Street, 3rd Floor, Suite 350
Sacramento, CA 95814
(916) 322-2470
www.cde.ca.gov

Assists school districts and their communities in creating well-planned K-12 environments
Maintains a library of publications regarding resources for School Facilities Planning
Plan Review
Site Review

Coalition for Adequate School Housing (CASH)
1130 K Street, Suite 210
Sacramento, CA 95814
(916) 448-8577
www.cashnet.org

Promote, develop and support state and local funding for K-12 construction

Consulting Engineers and Surveyors of California (CELSOC)
1303 J Street, Suite 450,
Sacramento, CA 95814
(916) 441-7991
www.celsoc.org/

Business and profession of the private consulting engineering and land surveying industry
Insurance packages
Legislative representation
Geotechnical, surveying and civil, structural, mechanical, and electrical engineering services to public and private entities

Council of Educational Facility Planners, International (CEFPI)
9180 E. Desert Cove, Suite 104
Scottsdale, AZ 85260
(480) 391-0840
www.cefpi.com

Training & information dissemination
Workshops tailored to current issues in facilities planning
Research using Educational Facilities Guidelines
Disseminates current, pertinent research findings

Department of Toxic Substance Control (DTSC)
Headquarters Office MAIL: P. O. Box 806, 400 P Street, 4th Floor
Sacramento, CA 95814
(916) 324-1788
www.dtsc.ca.gov

Protects public health and the environment from harmful exposure to hazardous substances

Division of State Architect (DSA)
1130 K Street, Suite 101
Sacramento, CA 95814
(916) 445-8100
www.dsa.ca.gov

Responsible for reviewing the plans and construction of publicly-funded schools and essential services buildings

National Clearinghouse on Educational Facilities (NCEF)
1090 Vermont Ave., N.W., Suite 700
Washington, D.C. 20005-4905
(202) 289-7800
www.edfacilities.org

Is an information resource for people who plan, design, build, operate and maintain K-12 schools

Office of Public School Construction (OPSC)
1130 K Street, Suite 400
Sacramento, CA 95814
(916) 445-3160
www.opsc.dgs.ca.gov

Works with school districts to assist them throughout the application process
Responsible for ensuring that funds are disbursed properly
Prepares agendas for the SAB meetings

School Facilities Manufacturers' Association (SFMA)
1130 K Street, Suite 210
Sacramento, CA 95814-3927
(916) 441-3300

D.S.A.—Factory Build
Portable—Relocatables
Permanent Modular Construction

State Allocation Board (SAB)
1130 K Street, Suite 400
Sacramento, CA 95814
(916) 445-3159
www.opsc.dgs.ca.gov

Responsible for determining the allocation of state resources (proceeds from General Obligation Bond Issues and other designated State funds) used for the new construction and modernization of local public school facilities

The American Institute of Architects, California

Council (AIACC)
1303 J Street, Suite 200
Sacramento, CA 95814
(916) 448-9082
www.aiacc.org

Composed of three primary programs:
Legislative Affairs
Regulation & Practice
Communications/Public Affairs
Provides members with the basic tools, services and resources necessary to run a successful professional architectural practice

VANIR

980 Ninth Street, Suite 900, Sacramento, CA 95814