State of Arkansas

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Task Force to Joint Committee on Educational Facilities

Prototypical Building Designs

Recommendations Regarding the Development and Implementation of Prototypical Building Designs for the Construction of New K-12 Educational Facilities

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Background:

On its face, the potential of reducing engineering and design costs by developing a series of standard prototypical building plans and specifications for educational facilities seems so intuitive that it is difficult for laypeople to understand why we have not considered this solution before. Since architectural and engineering professional fees typically represent approximately 6% of the total construction costs of a school building, it seems that there is potential to save a significant portion of these costs by developing prototypical school building designs.

Prototypical building designs also seem to be a vehicle to establish that our educational facilities are both adequate and substantially equal as required by the Lake View case all across the state. Many legislators and administration officials are asking why such a facilities design strategy could not directly benefit the citizens, students, taxpayers, and educational administrators of the State of Arkansas.

Many suggestions have been offered for such a strategy. Most of the suggestions focus on developing a series of designs that would cover school buildings of various sizes depending on enrollment that would meet the curricula requirements for elementary, middle, and high schools. The designs would provide for modern technology and equipment with periodic updates. Schools could avoid the “cookie-cutter” look as individual school districts would be responsible for selecting the exterior design features and trim for their schools. The standard design element would be basically limited to the structure and infrastructure of the building.

Because this strategy seems so good, one must wonder why this has not been done before. The fact is, it has been done before. In America, we have had prototypical school building design strategies in various states since the beginning of state provided public education and the one room school house. States have documented prototypical design strategies beginning in the late 1920’s in the State of Virginia. Since this strategy has been employed in at least fifteen (15) other states since that time, it would be wise for us to learn from the experiences of other states regarding their experiences in the actual implementation of prototypical school building designs.

Limitations:

But, before we get into the specifics of a prototypical design strategy, we must point out that this strategy will only apply to the construction of new buildings. In the State of Arkansas, the current inventory of educational facilities represents an investment of approximately 5,700 buildings covering 81 million square feet of space. The greatest current facilities need will be in the area of maintenance, remodeling, renovation, and the expansion of current facilities. These requirements will be known after the current educational facilities adequacy assessment is completed in November 2004. The fact remains that the largest investment in educational facilities will derive little or no benefit from a prototypical design strategy.

There are other important issues that become limitations to prototypical designs that have been experienced by other states that are listed here without priority to provide a perspective on design factors:

- If prototypical plans are developed at the state level, a large staff of architects and engineers would be required to continually update and modify standard plans and specifications to keep them current.

- A large number of designs might be necessary for various sizes of schools and grade organizations as well as site variations that have a significant influence on design.

- Each school needs to be designed to meet the needs, desires, and financial capability of those for which the school is designed. Differences in the financial abilities of the various districts in itself would eliminate the feasibility of prototypical plans. The only way the stock plans would work from this point of view, is for the state to provide facilities on a state wide basis regardless of the financial ability of the district.

- Prototypical plans eliminate the broad and open competition among the various methods of construction and materials used in school buildings, and therefore the encouragement of open competition for the schools within the state will be reduced. Under the present system, the competition is active even before the individual school design is begun.

- Code requirements change yearly and any stock plan would soon become obsolete even with yearly updating.

- Prototypical plans do not eliminate the necessity for employing architects and engineers to adapt the stock plan to fit a new site with different soil conditions, topography, and/or site location in relationship to all incoming utilities and to structural changes to allow for differing snow, water, wind, and soil loads.

- Arkansas is divided into seismic design regions that require different forms of construction. A standard prototypical plan would need to cover seismic construction methods that would unnecessarily increase the cost of school buildings in non-seismic areas.

- Even with a prototypical plan, an architect is still needed to supervise construction, check payments to the contractor, advise the owner on construction and design problems, check drawings against performance, and approve samples of materials. Likewise, someone needs to make sure the prototypical plan conforms to local fire, health, and sanitation laws.

- The liability question all but eliminates any money saving of architect's fees. Is the state willing to assume the liabilities of an "in-house" produced plan or absolve the architect of his liabilities in a contract-produced set of stock plans?

What Can be Learned From Other States?

In the early 1990's, the State of Georgia was heavily engaged in developing a school construction strategy. The Facilities Services Section of the Georgia Department of Education was tasked with the responsibility of determining the efficacy of prototypical building designs for their educational facilities. On September 5, 1991, Georgia mailed a survey to the fifty (50) State Departments of Education and to 184 public school superintendents in the State of Georgia. The survey instrument was designed to determine if any state or any public school system in Georgia had ever used and/or currently used prototypical or stock plans for the construction of new schools.

Much can be learned from the experience of Georgia in evaluating the survey that guided them in developing their educational facilities construction strategy. Since the Georgia survey was nation-wide in scope, and specifically focused on the use of prototypical plans for the construction of new schools, most of the data that would be of interest to the State of Arkansas has already been developed. Therefore, we would like to report the contents of the Georgia survey.

Summary of Georgia Survey Data:

Responses Received From Other States:

Of the fifty (50) surveys mailed to State Departments of Education, forty-one (41) responses were received. Other research conducted by the American Institute of Architects (AIA) in 1953 reported that fifteen (15) states had used stock plans some time in the past. Only four (4) states responding to the Georgia survey reported that standard or stock plans had ever been used in their state. One of these four states (Colorado) indicated that standard or stock plans were being used for "portable-type" two classroom structures only. Therefore, the response from Colorado was treated as though the state had responded that they did not use standard or stock plans. Only three other states (Maine, New York, and Virginia) responded that they had used prototypical plans in the past. None of these states reported that they were currently using standard plans and specifications for the construction of new schools. Although this sample size is much too small to generalize on other populations, it is interesting to note that these three states do not recommend the use of prototypical plans for the construction of elementary, middle, nor high school buildings (not even for the four to ten room schools constructed in Maine).

Like Georgia, nine states indicated that their legislatures had requested data regarding the feasibility of developing and using prototypical or stock plans for the construction of new schools. Since the data and documentation submitted by each of these states is very large, the attached summary provides an overview of the documentation submitted by each of these states, as well as their stated position regarding this issue. Based on the survey data, none of the states are currently using standard or stock plans and specifications for the construction of new schools.

Responses Received From Georgia School Systems:

Of the one hundred eighty-four (184) surveys mailed to Georgia School Superintendents, a total of one hundred fifty-four (154) surveys were returned. This represents a response rate of 83.69 percent. A total of ten (10) Georgia school systems responded that they had used or were using prototypical plans; however, further investigation revealed that nine (9) of these school systems were referring to the use of plans developed specifically for their school system that had been used more than one time. During the period from 1950 to 1993, a total of thirty-nine (39) new schools have been completed from plans and specifications that were used more than one time by these nine (9) school systems. One of the nine (9) systems indicated that they intend to reuse plans and specifications developed for a school that is currently under construction; however, use of these plans and specifications for construction of a second (or subsequent) school is not planned in the immediate future.

Although the sample of school systems responding to the use of plans and specifications more than one time within their school system is too small to generalize to the larger population, it is interesting to note that the most important advantage ranked by these systems was the provision of comparable facilities within their school system. Of the most important disadvantages, site adaptation was ranked highest, with obsolescence of plans and programmatic constraints ranked next in importance.

Conclusion:

It is the recommendation of the Executive Committee of the Task Force to Joint Committee on Educational Facilities that the proposal to consider the development of prototypical standard

building plans and specifications for new school construction be rejected. Based on national research, documentation of past experience regarding the use of standard plans and specifications for the construction of new public school facilities, and a consensus of the design and construction community in the State of Arkansas, the feasibility of using this approach does not appear economical and/or practical to meet the educational facilities needs of the State of Arkansas. The State of Virginia began using stock plans in the late 1920's. They have since rejected this strategy. We agree with their current recommendation which states that "*We recommend "program generated" plans as the most satisfactory and economical designs. The rapidly changing program requirements and options that are occurring in public education require facilities that are designed around the program to be used and promoted by the teaching staff."*

Due to the large rural demographic of Arkansas, we are committed to the concept of multiple use educational facilities that allow for the incorporation of public libraries, public health clinics, community centers, adult education, recreation sites, and other communal use that would not interfere with the primary educational process. Prototypical designs would prevent smaller communities from using imaginative solutions to meet broad community needs for small populations.

In order to incorporate best practices into the design and construction of new educational facilities, the Joint Committee on Educational Facilities has approved the development of ***The Arkansas School Facility Manual*** .This is a unique document designed specifically to assist school districts throughout the State of Arkansas with the planning, design, and construction / renovation of educational facilities. In addition, the manual will illustrate the policies and procedures of various state agencies, establish a level of equity and equality in the construction and renovation of current and future schools, provide a framework for custodial and maintenance procedures, and indicate how to procure furniture, fixtures and equipment.

The Manual will be a compilation of input from individuals in the field of education, state agencies, and other regulatory bodies. In addition to regulations, recommendations, and guidelines, the Manual will contain educational best practices and suggestions from around the nation.

The Manual will encompass four sections reflecting various aspects of educational facilities. Section One, containing eleven chapters, outlines policies and procedures that should be followed during the planning, design and construction of schools. Section Two contains nine chapters and establishes the standards that will be used to assess existing educational facilities. Section Three pertains to custodial and maintenance and Section Four involves furniture, fixtures, and unattached equipment procurement.

This manual should become the basis for design, construction, and operations of educational facilities in the State of Arkansas for the foreseeable future.

The Executive Committee
Task Force to the Joint Committee on Educational Facilities
August 16, 2004

Appendix A

SUMMARY OF COMMENTS AND INFORMATION RECEIVED FROM OTHER STATES

Georgia Department of Education – Facilities Services Section
A National Survey on Stock Plans for School Buildings

CALIFORNIA:

California reported that they had never used prototypical plans. However, they provided a copy of "Stock Plans for Schools – Chimera or Panacea?" developed by the Bureau of School Planning, California State Department of Education. This document poses and provides answers for the following questions:

1) Are there such things as stock plans?

2) Would school districts use stock plans if they were available?

3) Can architectural services and fees be eliminated by using stock plans?

4) Can districts benefit from the stock plan approach?

A statement of California's position regarding the use of stock plans is:

"Because of the huge school building program in California, the Legislature has studied various possible economies in construction. The idea of stock plans has been extensively explored and the preponderance of available facts and opinions has prompted us to reject stock plan proposals as neither sound nor economical."

COLORADO:

Colorado uses stock plans for 24 x 60 foot two classroom portable buildings only.

INDIANA:

The Indiana State Legislature provided legislation for the development of stock plans for elementary schools in 1951. State funds were not provided to implement this provision; consequently, the statute was repealed in 1972.

MAINE:

The State of Maine used stock plans during 1950 – 1960 for elementary schools and some high schools. A total of 55 schools were constructed during this ten year period. A total of 49 elementary schools with enrollment of 19 to 140 students; 3 middle schools with enrollment of 85 to 190 students; and three high schools with enrollment of 120 to 360 students were constructed

during this period. Based on their experience, disadvantages outweighed advantages (even for these extremely small schools) and the use of stock plans did not produce satisfactory results. Maine did not recommend the use of stock plans.

MARYLAND:

The issue of stock plans, prototype plans, and repeat plans was considered when Maryland's Governor appointed a task force on school construction in 1985. The conclusion reached by the task force was:

"*Stock plans should not be developed for use in Maryland public schools, and prototype or repeat plans can be developed and used by a local board of education, but the decision should be made after a careful review and analysis has been conducted."*

NEW YORK:

In the early 1960's, the New York State Legislature passed a law whereby the State Architect's Office, in consultation with the State Education Department, was authorized to have eighteen (18) separate plans prepared. Private architects were commissioned for the design and production of working drawings and specifications. However, only nine (9) sets of plans were developed. Plans incorporated the educational spaces currently thought to be desirable as well as fallout shelters. Finishes, in general, were good and the plans did not result in "cheap" buildings.

Approximately $650,000 (of the $1,000,000 appropriated) was extended for the nine (9) plans developed. After the plans became available in 1963, there were only two schools built. One was a senior high school and the other was a junior high school. The high school plan was used by a district where bond referenda for a school had been defeated a number of times. Although the finished building is an attractive building, a total of forty (40) addenda drawings were developed as a result of departures from the original standard plan. During construction, there were also fifty-eight (58) change orders. The junior high school was built with little deviation from the plans and specifications. These plans have not been used by any other school system although many individual sets of plans were sent out to districts which only wished to compare the plans with those prepared by their own architects.

Based on articles published in the *New York Times* and *The New Yorker,* New York City is currently experimenting with "component" building designs for schools. Prototype components were developed by private architectural firms specifically for the New York City Projects. Both of these articles are very positive; however, there appears to be a "wait and see" tone.

NORTH CAROLINA:

North Carolina indicated that they had not used stock plans. However, the issue had been discussed and rejected several times in the past for the following reasons:

1) When local school systems have developed prototype plans, they have rarely repeated the plan more than three to four times. Cost savings for the prototype have been minimal.

2) If stock plans are developed at the state level, a large staff of architects and engineers would be required to update and modify plans to keep them current and usable by school systems.

3) Development and use of stock plans would place the state in a competitive position with private architectural and engineering firms. This would have a negative impact on the private design sector.

4) The major portion of the school construction budget in North Carolina is for renovation and additions to existing schools. Stock plans would not be applicable to these activities.

PENNSYLVANIA:

Pennsylvania indicated that stock plans were never used. However, the following comments were included with their response to the questionnaire:

1) An unlimited number of designs might be necessary for various sizes of schools and grade organizations as well as site variations that have significant influence on design.

2) Program variations from one system to another would require different space sizes, equipment, etc.

3) Staff with the expertise and sufficient staff hours delegated to keep the plans, specifications, and materials lists updated would be required.

4) Standard (or prototypical) plans would not apply for addition and alteration projects that constitute a substantial percentage of Pennsylvania's projects.

SOUTH CAROLINA:

South Carolina has pursued the idea of using stock plans but has rejected the idea for the following reasons cited in their comments:

1) Each school needs to be designed to the needs, desires, and financial capability of those for which the school is designed. Differences in the financial abilities of the various districts in itself would eliminate the feasibility of stock plans. The only way stock plans would work from this point of view, is for the state to provide facilities on a state-wide basis regardless of the financial ability of the district.

2) Standard plans eliminate the wide competition among the various types of construction and materials used in school buildings, and therefore the drive of open competition to produce the most cost-effective construction for the schools within the state would be reduced. Under the present system, the competition is there even before the individual design is begun.

3) Schools are constructed with tax deferred funds and all segments of the building industry provide these taxes and each segment should have its chance to participate in accordance with its competitive edge. To eliminate, as an example, the brick manufacturer or the steel manufacturer in an individual school is one thing, but to eliminate any component on a state-wide basis, is in my mind unthinkable in the open capitalistic system that we have in the United States.

4) Code requirements change yearly and any stock plan soon becomes obsolete even with yearly updating. The time element would soon make stock plans unworkable. Each year code changes come into effect in April or May which would put plan development or changes into the next year and legislative approval possible into the following year. This

process would probably produce plans that were obsolete even before the construction is started.

5) Stock plans do not eliminate the necessity for employing architects and engineers to adapt the stock plan to a new site with different soil conditions, topography, and location in relationship to all incoming utilities and to structural changes for snow, water, wind, and soil. An architect is needed to supervise construction, check payments to the contractor, advise the owner on construction and design problems, check drawings against performance, and approve samples of materials. Likewise, someone needs to make sure the stock plan conforms to local fire, health, and sanitation laws.

6) The liability question all but eliminates any money saving of architects fees. Is the state willing to assume the liabilities of an "in-house" produced plan or absolve the architect of his liabilities in a contract-produced set of stock plans?

7) The South Carolina School Facilities Planning and Construction Guide states:

    a. The idea of so-called stock plans for school use on a statewide level has been considered at one time or another in South Carolina and in many other states. However, the general consensus is that it is a counterproductive process and saves little if any public funds. There are many factors involved, which space here does not permit a detailed discussion of, but is sufficient to say that the stock plan procedure was tried as far back as the 1940's and 1950's by at least 15 states but was subsequently abandoned by all. Today, to our knowledge, no state uses stock plans except for temporary buildings.

    b. On an individual district basis, there have been successful cases where a particular school has been duplicated either as part of a single building program, or a second school built within a fairly short time span after the original. In these cases, the enrollments were the same, the types of sites were generally similar, and the educational concepts and needs were the same. However, even in duplicating a single building, the belief that most of the architect's fee will be saved on the second building is incorrect.

VIRGINIA:

Virginia used stock plans from the late 1920's to the late 1930's. However, neither the number of schools constructed nor the size and type of schools constructed were provided. Recommendations in the comments section of the survey instrument stated:

"*We recommend "program generated" plans as the most satisfactory and economical designs. The rapidly changing program requirements and options that are occurring in public education require facilities that are designed around the program to be used and promoted by the teaching staff."*

ALL OTHER STATES RESPONDING TO THE SURVEY:

All other states responding to the survey indicated that they had not used standard or stock plans. These states did not provide additional information or comments substantially different than those made by other states and previously cited in this summary.