Educational Specifications

Linking Design of School Facilities to Educational Program

CALIFORNIA DEPARTMENT OF EDUCATION
Sacramento, 1997

Educational Specifications

Linking Design of School Facilities to Educational Program

Prepared by
School Facilities Planning Division
California Department of Education

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Prepared for publication
by CSEA members

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Foreword

The shape of our students' learning environment must be carefully planned to support our educational objectives as well as to provide safe, clean, and technologically up-to-date facilities. The planning process begins with the definition of educational goals and the development of educational specifications.

The California Department of Education has prepared this document, *Educational Specifications: Linking Design of School Facilities to Educational Program,* to help school districts develop specifications based on a fundamental principle of modern architecture: form follows function. Educationally effective facilities must correspond to and support the curriculum function they are designed to house.

The facilities should reflect the belief of adults in our society that education is important. Our students are young, but they are not stupid. They have been to the mall. They know what buildings look like when adults are serious, caring, and engaged about the purpose of those buildings.

As new educational concepts emerge, school design must follow those concepts. Until recently, educational reform has understandably been focused primarily on developing high-quality teachers and promoting excellence in instructional methods and technology. Recent research, however, has revealed a critical relationship between learning and the physical environment in which it occurs. An awareness is growing that a school facility may do more than simply *house* the instructional program. The facility is a *part* of the program.

Educating our diverse student population presents challenges that can be met only by carefully defining each community's needs and designing a curriculum to meet those needs. The educational specification becomes the vehicle the architect uses to translate the curriculum and the instructional program into a beautiful, economical, and functional educational environment that can help shape the way our communities enter the twenty-first century and influence the quality of life in our neighborhoods thereafter.

This document is intended to be a guide in that process. I hope that you will find it useful.

DELAINE EASTIN
State Superintendent of Public Instruction

Preface

In 1994 the California Department of Education was directed by the Legislature to formalize regulations governing standards for the design and construction of new school facilities. Included with those standards are requirements for the submittal of educational specifications. (See the *California Code of Regulations, Title 5,* Section 14034, on the application of standards to locally funded school districts.) Those requirements are delineated in *Education Code* Section 39101(c). They are also listed in the *California Code of Regulations, Title 5,* Section 14030(a), as follows:

> Educational specifications for school design shall be prepared based on the district's goals, objectives, policies, and community input that determine the educational program and define the following:
>
> - Enrollment of the school and the grade-level configuration
> - Emphasis in curriculum content or teaching methodology that influences school design
> - Type, number, size, function, special characteristics of each space, and spatial relationships of the instructional area that are consistent with the educational program
> - Community functions that may affect the school design

To implement the regulations and assist school districts in preparing educational specifications, the Department has provided two options for districts to consider when requesting plan approvals. Districts may submit (1) complete educational specifications as suggested in this document; or (2) minimum specifications. Copies of the forms to be submitted and advice on their use can be obtained from the School Facilities Planning Division, California Department of Education; telephone (916) 322-2470.

In most cases, especially for large projects, school districts will submit the complete educational specifications rather than the minimal ones. Submitting educational specifications with schematic design-phase documents (preliminary plans) will facilitate the approval process in the California Department of Education.

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Acknowledgments

The State Superintendent of Public Instruction and the California Department of Education are indebted to everyone who contributed ideas and critiques during the development of this document, especially to those school districts and their design consultants that used the rough draft as a guide for developing educational specifications for their projects. The generous feedback they provided was invaluable.

The Superintendent and the Department are also grateful to the members of the many professional organizations that provided information to expand the document's scope. Included in this list are the American Institute of Architects, California Council; the Coalition for Adequate School Housing; the Council of Educational Facilities Planners, International; and the California School Boards Association.

The list of individuals to be thanked includes past and present members of the Department of Education's School Facilities Planning Division who worked long and hard to develop the document and other Department employees who contributed information and comments. Special thanks are extended to Jan Agee, Duwayne Brooks, Michelle Collins, Lorene Euerle, Julian Gonzales, Henry Heydt, Cecelia James, Tom Payne, Sue Pendleton, Patricia Jones Penn, Urvan Rodriguez, Patricia Rose, Stan Rose, Leroy R. Small, and Robert D. Williams. Special thanks are also extended to Anne Taylor, Educational Consultant, who reviewed the draft for conformance with current educational theory.

Introduction: How to Use This Document

The purpose of this document is to assist school district staff, in cooperation with school and community leaders, in preparing educational specifications. The document includes a definition of the specifications, suggested procedures, and a model format. More importantly, the purpose is to help craft visions for educational programs for the twenty-first century and the facilities necessary to support those visionary goals.

Note: The intent of this guide is to provide a model only. Both the form and the content of a district's document should reflect the specific goals and plans of the district and the community. Although parts of this guide may be inappropriate for a particular project because of its size or type, topics should be reviewed to discover whether they are relevant.

Organization of This Document

This document is divided into chapters to parallel the logical development of educational specifications:

- *Chapter 1* discusses the meaning of educational specifications.
- *Chapter 2* delineates the role of educational specifications in facility planning and the effects of a restructured curriculum on those specifications.
- *Chapter 3* describes the process of developing educational specifications.
- *Chapter 4* suggests a format for the educational specifications document. The outline is divided into five parts: (I) Project Description; (II) Project Design Factors; (III) Activity-Area Requirements; (IV) Summary of Area Relationships; and (V) Summary of Space Requirements. It is presented in skeletal form to give a quick overall view of what is included in educational specifications.
- *Chapter 5* presents an annotated outline of the specifications for Part I, "Project Description," and Part II, "Project Design Factors."
- *Chapter 6* contains Part III, titled "Activity-Area Requirements," of the annotated outline.
- *Chapter 7* contains the last two parts of the annotated outline—Part IV, "Summary of Area Relationships," and Part V, "Summary of Space Requirements."

- The *appendixes* contain short articles providing background information.

Note: Completion of the annotated outline and sample form for all five parts, together with public review, will produce the data needed to prepare a complete educational specifications document.

Importance of Educational Specifications

Complete documentation of all project requirements will help district and school staff respond to public comment on what is included in the project, what is not included, and why items were included or omitted.

The complete documentation of project requirements before the design process is begun helps in all phases: design, construction, occupancy, and postoccupancy evaluation. The project should be reviewed in relation to the educational specifications at each phase so that elements needed to support the curriculum are not lost in process. Examples might include the following:

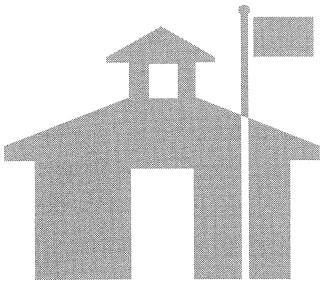
- If the project architect does not include teacher preparation space or other spaces necessary to support learning in design development, such spaces can be included in a later phase of the project only with difficulty. If, however, the design development documents are reviewed in relation to the educational specifications before the acceptance of the design development phase, the needed changes can be made easily and cost-effectively. The value of that approach holds true for the multitude of spaces, elements, and systems that exist in every project.
- If, in design development, conflicts arise between educational requirements and budget constraints that necessitate elimination of one space in favor of another, referring to a well-written educational specification may make it easier to decide what to eliminate. It may also help to illustrate where joint use may be possible. For example, offices might double as conference spaces; or two departments might be able to use the same preparation space.
- If a plug or switch necessary for the operation of equipment is forgotten in the preparation of construction documents or during construction, a formal review of the educational specifications document during those phases will make the correction of the oversight easier and more cost-effective to accomplish. The educational specifications review should be used to avoid expensive change orders. If, after the project has been completed, someone on the staff or in the community objects to the way the school operates, a review of the educational specifications will show how the school meets requirements previously agreed on. This publication emphasizes the importance of developing consensus on educational specifications *before* a project is designed.

Comprehensive educational specifications link facility design to the educational program and serve as documentation for the completed facility. In future evaluations understanding the reasons that shaped the spaces may be valuable in implementing changes necessitated by new developments in teaching or technology.

Educators must remain active in facility development and not delegate program decisions or interpretations to others. They are the only qualified advocates for the cultural and developmental needs of the ultimate clients; that is, the students and the teachers who serve them.

The best projects evolve from constructive dialogue between designer and educator. An architect can offer new alternatives in design and technology but may not be proficient in educational theory or instructional delivery systems. Educators must work with architects and district business officials collaboratively to apply creative problem solving to facility issues without losing sight of educational issues. A complete educational specifications document helps keep the educator in charge and facilitates communication within the project stakeholder group. To be effective in this role, however, the educational specifications document must reflect consensus in educational goals by all stakeholders: educators, students, administrators, classified staff, parents, and the general public.

"A complete educational specifications document helps keep the educator in charge and facilitates communication within the project stakeholder group."



Chapter 1

The Meaning of Educational Specifications

Uncertainty sometimes exists as to the precise meaning of the term *educational specifications.* For that reason this chapter is devoted to defining the term and distinguishing it from other terms with which it can be confused.

What Educational Specifications Are

Educational specifications are interrelated statements that communicate (or specify) to the architect, the public, and other interested parties what educators believe is required of a proposed educational facility to support a specific educational program.

Educational specifications serve as the link between the educational program and the school facilities. They translate the physical requirements of the educational program into words and enable the architect to visualize the educational activity to be conducted so that the architectural concepts and solutions support the stated educational program.

From this definition two aspects of educational specifications emerge: (1) *instructional* matters, often referred to as the *educational program;* and (2) the *physical* requirements of instruction, often referred to as the *building/architectural program.*

Educational Program

The educational program describes the curricula, learning support programs, activities, and persons to be served; defines educational requirements; and represents local community consensus on educational priorities. It should be prepared by educators and should not prematurely suggest architectural solutions.

Building/Architectural Program

The building/architectural program deals with the numbers of students to be housed and numbers and kinds of spaces required and describes

areas, spatial relationships, materials, and special features (e.g., use of technology in the classroom) needed to serve the requirements of the educational program. The architect may lead in the development of the building program but needs guidance from educators in interpreting requirements and determining priorities.

What Educational Specifications Are Not

Educational specifications are sometimes confused with *construction specifications* and are often confused with a *facilities master plan.*

Construction Specifications

Construction specifications are documents developed by the architect as part of the contract documents (contract, drawings, construction specifications, and change orders) to delineate the construction materials, methods, and systems necessary to complete the project. Educational specifications are not a part of the construction specifications except as specifically included in the contract documents because of the project delivery method selected. (See Appendix 5.)

Facilities Master Plan

A facilities master plan is a compilation of information, policies, and statistical data about a school district. The plan is organized to provide a continuing basis for planning educational facilities that will meet the changing needs of a community and offer alternatives in allocating resources to achieve the district's goals and objectives. The relationship of educational specifications to a facilities master plan can be seen in the following outline:

A Facilities Master Plan:

1. Articulates district educational goals and philosophy
2. Establishes desired standards and practices related to the district's educational facilities
3. Sets guidelines and addresses major facilities issues to assist in the decision-making process
4. Assesses the condition and adequacy of existing facilities
5. Identifies needed improvements and their implementation costs
6. *Establishes guidelines for educational specifications (specific to each site)*
7. Establishes procedures for selecting an architect
8. Formulates a capital improvement plan, including estimated costs, timeline for construction, and project delivery methods
9. Documents and analyzes local demographic information, including predictions for community growth

"Educational specifications are a part of a total planning process, a natural outgrowth of a comprehensive facilities master plan."

10. Establishes criteria for site selection and outlines procedures for acquisition
11. Delineates working relationships with city and county governments
12. Allows for community participation, support, and use of facilities when appropriate

Educational specifications are a *part* of a *total planning process,* a natural outgrowth of a comprehensive facilities master plan. The cost of implementing the educational specifications is folded into the capital improvement plan. Educational specifications rely on many of the elements of the facilities master plan but pertain to a *specific* building project or group of projects. A facilities master plan pertains to *districtwide* objectives over a longer period of time. (See Appendix 1.)

Chapter 2

The Role of Educational Specifications in Facility Planning

Although the development of educational specifications is the keystone of the facility planning process, it is only one part of it. The process is a continuum, as shown in Figure 1.

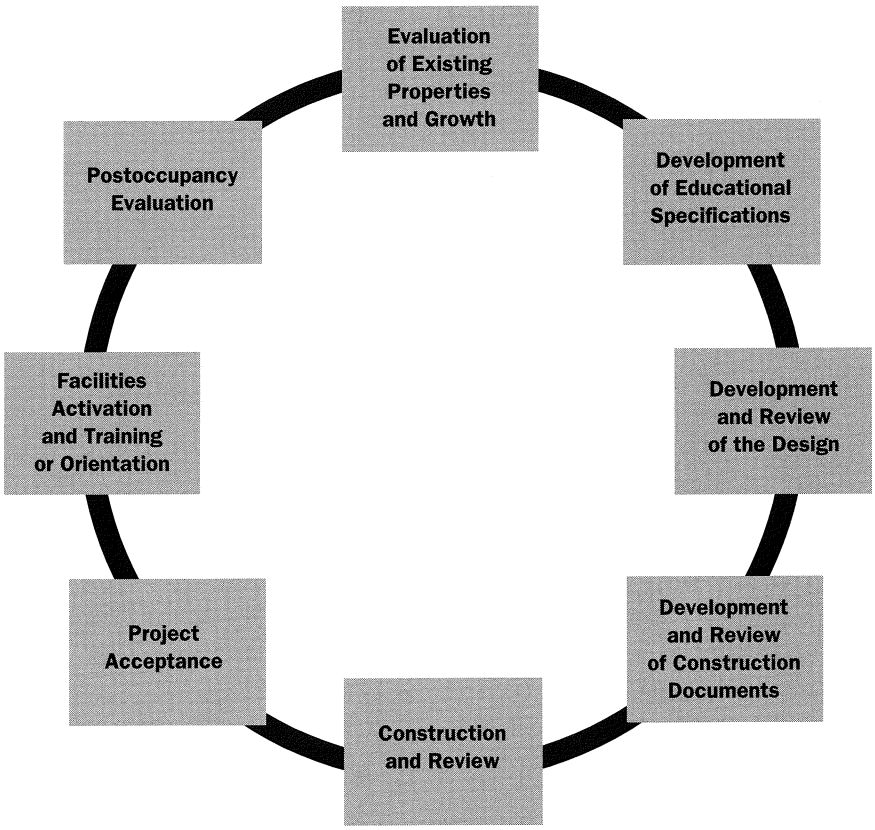
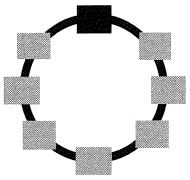
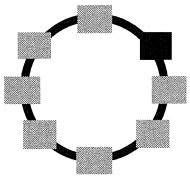


Fig. 1. Planning Process Circle



Evaluation of Existing Properties and Growth

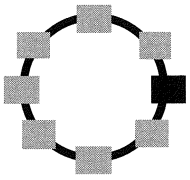
The first step in any educational project is to assess the existing situation and define what actions are to be undertaken. To be included are a determination of what is to be taught, how it will be taught, and what education and learning support activities are to be housed; the number of students to be housed; grade-level organization; review of district goals and policies; assessment of existing facilities; population projections; community needs; and site selection if necessary. Evaluation of sites includes a review of environmental impact and geotechnical reports that may be applicable to the site under consideration. (See appendixes 1 and 9.)



Development of Educational Specifications

The architect should be asked to *design* a school after a complete set of educational specifications is developed.

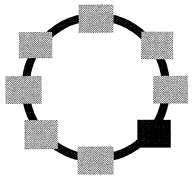
If the school district does not have staff with expertise in writing educational specifications, then the programming or preparation of educational specifications may be included in the contract with the architect. (This responsibility may properly be negotiated as extra services.) Although the architect may not be an educator, his or her past experience with school planning and knowledge of the relationship between function and design can make a valuable contribution. If the architect is inexperienced in writing educational specifications, it may be advisable to contract with consultants who have cross-disciplinary backgrounds and are specifically experienced in facility programming.



Development and Review of the Design

Design development cannot be successful until the project requirements are defined. During this phase the district and the architect must compromise on conflicts contained in those requirements. Compromise decisions must be documented and addenda made to the educational specifications. A detailed review of those specifications should be made at several points during development.

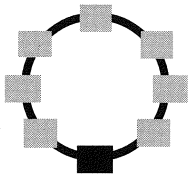
Decisions on project delivery (e.g., traditional contractor/architect method, construction management, design/build) must be made during this phase because the design development documents (including the educational specifications) become part of the contract documents in some types of project delivery. (See Appendix 5.)



Development and Review of Construction Documents

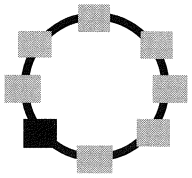
As construction documents are developed, a review of the documents in relation to the requirements in the educational specifications should occur at several points. The architect is *unqualified* to evaluate educational requirements alone and *should not be allowed to do so.* At each step the educator or education committee in charge of the project should ensure that the educational program is not compromised. When addenda to the educational specifications are necessary, they should be approved by the school district governing body.

A description of the formal review process for the construction phase should be included in the contract documents for the project. The contractor should be required to schedule meetings specifically to review, with the architect and the district, conformance with the educational specifications.



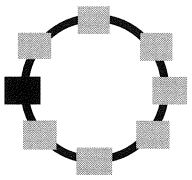
Construction and Review

During construction the inspector for the project and representatives of the educational specifications committee and the school board should continually examine the project in relation to the requirements of the educational specifications. Items necessary to the educational program, such as required storage, must not be sacrificed to accommodate building equipment that should have been allocated more space in the design phase. Construction review should become a formal process held at specific increments, possibly weekly. And the requirements for such a process should be included in the contract documents.



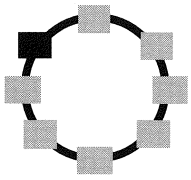
Project Acceptance

The project should not be accepted if contract requirements for conformance to the educational specifications are not met. The "finished" project should be reviewed in relation to the educational specifications, together with any addenda to the specifications made during the development of the construction documents and during construction. Ideally, all components required in the educational specifications should be included in the construction documents.



Facilities Activation and Training or Orientation

The intent and operation of the buildings should be explained to the users during the activation and training period. Further, how the project meets the objectives of the educational specifications should be explained to the users and, where necessary, to the public.



Postoccupancy Evaluation

After it has been in use for some predetermined period of time (such as the first semester or the school year), the completed project should be evaluated. How well the project fulfills the intent of the educational specifications and whether the educational specifications for the next project need adjustment should be determined. Postoccupancy evaluations should be carefully documented. (See Appendix 9.)

Effects of a Restructured Curriculum on Educational Specifications

Educational specifications are based on a fundamental principle of modern architecture: form follows function. Educationally effective buildings must support the teaching and learning functions they are intended to house.

As new educational concepts emerge, school design must follow those concepts. Winston Churchill is reported to have said that "we shape our buildings, and thereafter they shape us." The environment can be seen as a learning tool (e.g., in learning landscape ecology). If, then, the physical environment can directly affect the persons housed there and the activities that take place there, facility planners and instructional leaders must give due consideration to planning for schools.

Curriculum reform (the restructuring of such concepts as curriculum integration, multiple intelligences, multiple-age grouping, coordinated support services, community use of facilities, and team teaching and of such newer programs as year-round calendars, Challenge schools, and class-size reduction) must be implemented effectively. The most advantageous way to do so is to develop for each proposed project educational specifications describing the goals and facility requirements of the restructured curriculum. In this manner form, as designed by the architect, can follow educational function.

"Form follows function."

For more information on educational restructuring, see the California Department of Education's task force report titled *The Form of Reform* (1997). The task force included educators, architects, teachers, and others involved in the planning of new facilities and the remodeling of existing ones. It reviewed the reform documents titled *Here They Come: Ready or Not* (1988), *It's Elementary* (1992), *Caught in the Middle* (1987), and *Second to None* (1992), published by the California Department of Education, and determined the design implications of the reforms recommended in those documents.

"We shape our buildings, and thereafter they shape us."

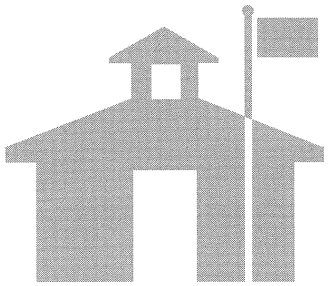
Winston Churchill

The design implications of the restructured curriculum demand close cooperation between educator and designer if facilities are to support educational goals effectively. Recognition of separate roles and responsibilities will effectively bring each participant's expertise to the project:

- *First,* the educational community must develop a consensus as to which concepts in the new curriculum and instructional delivery systems are feasible and desirable to adopt in their district.
- *Second,* the educational community, with the help of the architect or consultants (or both), must develop comprehensive educational specifications so that the designer will not waste architectural design time on space for programs that will not be implemented.
- *Third,* the architect, with direction from educators, must translate the educational specifications into settings for activities and a facility that will support the desired results for students.

Chapter 3

Development of Educational Specifications



"District goals should be reexamined and updated before a new educational specifications document is developed."

Before the architect begins a design, the educational planners should develop complete educational specifications. The development process may take six months to a year (or more) and should involve faculty, staff, students, parents, and community advisers. That period of time is necessary for a project to succeed because it allows the establishment of partnerships among the planning group so that they can communicate with the larger community.

It may be advisable to include the architect in the process of developing the educational specifications. Early involvement helps the architect better understand what the educators' goals are and what the educational specifications communicate.

Developing procedures and programs before beginning design will expedite all phases of the project and will result in a facility that will help meet and not impede educational objectives. District goals should be reexamined and updated before a new educational specifications document is developed. If the school is to be supported by the public, school leaders should make sure that district goals do not conflict with what parents, the community, and the children themselves perceive as legitimate goals.

Available Sources of Information

The School Facilities Planning Division, California Department of Education, has staff consultants who can help you develop your educational specifications. Telephone (916) 322-2470.

Data for facility requirements should be gathered from all potential users of the facility, including staff, students, and the public. (See chapters 4–7.)

Development of Procedures and Organization

The following procedures include but are not limited to those needed to develop successful educational specifications. The exact procedures, the organization of the educational specifications committee, and the need for consultants will vary depending on the size or complexity of the project.

Selection of the Program Director

The program director will have overall responsibility for developing educational specifications. The first step in developing procedures to implement the facilities planning process should, therefore, be the selection of the director. Attributes to be looked for in selecting a director are as follows:

- Administrative ability, including leadership characteristics, mediation skills, ability to delegate, and oral and written communication skills
- Background in and understanding of educational issues

Establishment of the Required Organization

The size of the required organization may be as small as one person (for a small remodeling project) or as complex as the example of the committee outlined below. In any case the organization should remain in place until the project is occupied.

The *educational specifications advisory committee* reports to the project director and writes, reviews, approves, and presents to the board and the public the data and documents produced by its subcommittees. Various subcommittees report to the advisory committee. The number of subcommittees will vary to reflect the size and complexity of the proposed project.

- The *steering subcommittee* nominates committee members and consultants for approval by the project director and the district's governing board.
- *Administration subcommittees* collect data for each administration or support function. Contributions from all certificated and classified staff should be represented in the data collection.
- *Educational subcommittees* collect data from the teaching and curriculum staff and from curriculum guides for each educational discipline. Contributions from all certificated and classified educational staff should be represented in the data collection.
- The *coordination subcommittee* reviews data from subcommittees, presents the data to the advisory committee, arranges for support functions, and develops the timeline for development of educational specifications.

Selection of Committee Members and Consultants

Representatives in the organization might be board members, community leaders, personnel from the district staff, principals, teachers, classified personnel, parents, students, school-linked services providers, city and county planners, architects, consultants, developers, or representatives of the chamber of commerce and the building industry. The board's expectations should be clear.

Assignment of Roles to All Members

Overall responsibility for facilities planning should be assigned to one person, the program director. The organization will require clerical support and a budget to cover consultant fees, staff salaries, and other costs, such as expenses for field trips to exemplary projects in other communities. (If such field trips are planned, examples must be analyzed so that bad practices are not copied.) The following work sheet includes basic roles that should be addressed in the process of developing educational specifications regardless of the size of the organization.

Roles and Actions

Action	*Responsible group or individual*
1. Appoint committee members.	
2. Provide leadership and establish goals and objectives (for committee and for district).	
3. Determine discernible trends: teaching/learning methods, population trends/demographics, socioeconomic factors, community-services needs.	
4. Determine enrollment information: minimum/maximum class size, total enrollment.	
5. Determine mobility information. Will students, individually or in small or large groups, move from the facility to other areas or facilities? How many students go from where to where? At what times?	
6. Report to school board.	
7. Schedule and coordinate meetings.	

Action	*Responsible group or individual*
8. Define functions to be housed according to the educational program in each grouping or area of instruction.	
9. Organize subcommittee information for review by other committee groups.	
10. Review and comment on educational specifications in process.	
11. Collect and analyze data from documents. Coordinate reports. Include the impact of the district facilities master plan, the technology master plan, and other long-range plans on the project.	
12. Consider the need for consultants for coordination or specialized expertise. Select the architect (see Appendix 4). Determine the method of project delivery (see Appendix 5).	
13. Prepare a rough draft.	
14. Review contents and revise rough draft.	
15. Prepare final documents.	
16. Present points of view to the community, district, and the board. Ensure that all points of view are adequately considered. (Set up a design communication center or hotline to facilitate public awareness of the programming and planning process.)	
17. Interact with other agencies, such as the city planning and recreation districts, and keep them informed of project progress. Consider the joint use of facilities, such as playfields, libraries, assembly spaces, and gymnasiums.	
18. Obtain committee sign-off and board approval.	
19. Other.	

Communication Protocol

Who informs whom? Who receives copies of data, rough drafts, and so on? Who handles public relations? Each person should have specific instructions on communication within the educational specifications advisory committee and with other interested stakeholders, parents, students, staff, and the general public, including media contacts. Communication should be open and two-way if schools are to be considered part of the social solution and therefore supported by the community they serve. Support does not come to groups, no matter how well meaning, if they seem inaccessible and thus unresponsive to the public. (See Appendix 3.)

Approval Process and Authority

The work sheet below includes some of the possible persons who hold authority or who need to be informed of the progress of the committee. Develop a diagram illustrating the approval process so that everyone knows who is to be kept informed.

Group or individual	*Assigned area of authority or span of responsibility*
1. School administration	
2. Staff: certificated/classified	
3. Media	
4. Public, including governmental agencies, such as planning, parks and recreation, and other joint-use partners	
5. Board of education (trustees)	
6. Parents (and students)	
7. Other	

Human Resources

List groups or individuals and their possible contributions. Use the following work sheet as a sample guide.

Group	*Individual*	*Contribution*
1. Board members		
2. Administrators		
3. Teachers (including athletic directors and counselors), and paraprofessional instructional staff		

Group	*Individual*	*Contribution*
4. Consultants		
5. Clerical staff		
6. Maintenance, grounds, and custodial staff		
7. Food service staff		
8. Students		
9. Parents		
10. Community groups, chamber of commerce, and so on		
11. City and county officials		
12. Special program staff (e.g., special education, Healthy Start, Head Start)		
13. School nurse		
14. Other		

Documents for Educational Specifications Committee

Document	*Have or procure*
1. California *Education Code*	
2. *California Code of Regulations, Title 5*	
3. District goals, objectives, and philosophy	
4. Educational program expressed in state and local curriculum guides	
5. *The Guide for Planning Educational Facilities* (1996). Available from the Council of Educational Facility Planners, International (CEFPI), 8687 E.Via de Ventura, Suite 311, Scottsdale, AZ 85258-3347; telephone (602) 948-2337. Other CEFPI planning documents include *Preparing Your School Building for Technology* (1996), *Designing Places for Learning* (1995), and *The Guide for School Facility Appraisal* (1986).	

Document	*Have or procure*
6. District needs assessment/master plan	
7. Community general plan (county or city)	
8. Publications available from the California Department of Education. Call the Publications Division, Sales Office, at 1-800-995-4099 for a catalog of curriculum guides and other publications:	
a. *Building the Future: K–12 Technology Network Planning Guide* (1994)	
b. *California Environmental Education Resource Guide* (1995)	
c. *Caught in the Middle: Educational Reform for Young Adolescents in California Public Schools* (1987)	
d. *The Form of Reform: School Facility Design—Implications for California Educational Reform* (1997)	
e. *Here They Come, Ready or Not: Report of the School Readiness Task Force* (1988)	
f. *It's Elementary! Elementary Grades Task Force Report* (1992)	
g. *Safe Schools: A Planning Guide for Action* (1995)	
h. *School Facilities Planning Guide* (1997)	
i. *School Nutrition Facility Planning Guide* (1992)	
j. *Schools for the Twenty-First Century* (1990)	

Document	*Have or procure*
k. *Science Facilities Design for California Public Schools* (1992)	
l. *Second to None—A Vision of the New California High School: The Report of the California High School Task Force* (1992)	
9. Publications available from the School Facilities Planning Division; telephone (916) 322-2470:	
a. *Facilities Performance Profile* (1988)	
b. *Guide for the Development of a Long-Range Facilities Plan* (1986)	
c. *Indoor Air Quality: A Guide for Educators* (1994)	
d. *School Site Analysis and Development Guide* (1987)	
e. *School Site Selection and Approval Guide* (1989)	
f. *Self-Assessment Guide for School District Fiscal Policy Teams: Facilities Planning and Construction* (1991)	
g. *Virtual Schoolhouse: A Report to the Legislature on Distribution Infrastructures for Advanced Technologies in the Construction of New Schools, K–12.* Prepared by the Office of the State Architect, California Department of General Services (1993).	
10. Publications available from the California School Boards Association pertaining to planning and financing school construction. Address: 3100 Beacon Blvd., West Sacramento, CA 95691; telephone (916) 371-4691.	

Document	*Have or procure*
11. Postoccupancy evaluations of district schools	
12. *Handbook on Project Delivery* (1996). Available from the American Institute of Architects, California Council; telephone (916) 448-9082.	
13. *Indoor Air Quality: Tools for Schools Action Kit* (1996). Developed by the U. S. Environmental Protection Agency. Available from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 371954, Pittsburgh, PA 1520-7954 (order processing code: 3209); FAX (202) 512-2250; telephone (202) 512-1800.	
14. *School Area Pedestrian Safety* (1993). Available from the California Department of Transportation, 1900 Royal Oaks Drive, Sacramento, CA 95815-3800; telephone (916) 445-3520.	
15. *Handbook for Public Playground Safety* (current edition). Available from the U.S. Consumer Product Safety Commission, Washington, DC 20207. Contact the California Department of Health Services for information on current playground safety regulations; telephone (916) 322-6283.	
16. Other. See Selected References at the back of this document for other publications that may be of interest to the educational specifications committee.	

Educational Specifications Schedule

Phase	*Start*	*Review*	*Approvals*	*Completion*
1. Data collection				
2. Development of educational specifications				
3. Community input				
4. Evaluations and revisions				
5. Approvals				
6. Other				

Budget and Approval for Development of Educational Specifications

Item	*Amount*
1. Staff, support, consultants, salaries, and travel costs	
2. Printing and duplicating costs	
3. Miscellaneous	

Forms for Uniform Data Collection

See chapters 4–7.

Selection of an Architect

"The architect will be a major influence in determining how well the facility serves its intended purpose. . . ."

An architect should be selected early in the planning process and should be asked to help in selecting the site and translating the educational program into the building program. Because the architect will be a major influence in determining how well the facility serves its intended purpose, he or she should know and appreciate the student group to be served. Selection should, therefore, not be informal or casual. In addition, the selection of architects and other design professionals is subject to the provisions of the *California Public Contract Code,* Section 10100 et seq. The process must, therefore, be open to any interested party and subject to public review. For additional information please refer to the current *California Public Contract Code* and contact the California Department of Education, School Facilities Planning Division; telephone (916) 322-2470. The American Institute of Architects, California Council, can also supply information and booklets on selecting an architect; telephone (916) 448-9082. (See Appendix 4.)

The contract or agreement between the architect and the school district should delineate clearly the responsibilities of both. A good contract, for example, sets forth provisions governing the scope of the project, the responsibilities of the participants, schedules, deliverables (content of plans), interdisciplinary coordination, constructibility and value engineering reviews, and construction observation.

Discussion of Project Delivery

Information on current project delivery methodologies is contained in the *Handbook on Project Delivery.* (See Appendix 5.)

How educational specifications are written will depend on your selected method of project delivery (design and construction) and should be discussed with a legal adviser.

Each school board should use the project delivery method that is most appropriate for the project and is in accordance with legal constraints.

Project delivery should be discussed early in the development of educational specifications to determine whether alternate forms of project delivery might be advantageous. Nontraditional forms of project delivery may require that educational specifications be more complete so that they can be used as part of the contract documents. (See Appendix 5.)

Prequalification of Bidders

The *California Public Contract Code,* Section 20111 et seq., allows prequalification of bidders by public agencies and lists requirements for the lowest responsible bidders. However, you should not prequalify bidders until after you have sought legal advice. Section 20111.5 allows prequalification, and Section 20111.5(a) allows for prequalification based on experience.

Procedures to prequalify bidders must be in place before a project is developed. Such procedures *may not* be undertaken as part of a project. Because prequalification can take a considerable amount of time, it should be undertaken early in the educational specifications process.

The San Bernardino County Cooperative for Adequate Schools Today, San Bernardino County Office of Education, has a program in place. For additional information contact Linda Sweaney, 4595 Hallmark Parkway, San Bernardino, CA 92407; telephone (909) 887-7515; FAX (909) 887-7528.

Selection of a Site

Appropriate site selection is a fundamental starting point in efforts to enhance a school district's educational program. If the placement of neighborhood schools is a concern, then that element must be decided on well before the educational specifications are prepared. Whatever the district holds important in instruction for young people, selecting an appropriate school site must be seen as an integral part of the planning process.

"Selecting an appropriate school site must be seen as an integral part of the planning process."

The site or sites selected should also accommodate the needs of the community. How does the site location affect transportation access? Does the location increase congestion to an unacceptable level? Those questions cannot be answered by the district alone. Site selection must be planned in cooperation with other public agencies, developers, and other necessary planning groups. Has the district considered joint use of playfields, assembly spaces, library, and so on with other community agencies? Has the district considered consulting students about site selection and environmental impact studies?

Refer to Department of Education publications on site selection. For additional information contact the School Facilities Planning Division; telephone (916) 322-2470.

Process for Development of Documents

Once the committee is constituted, the process for development of the educational specifications documents may be started. The process may be divided into three phases:

1. *Publish and distribute* the names and duties of the program director and the educational specifications advisory committee and its subcommittees and consultants. Include the schedule and budget if appropriate.
2. *Distribute data collection forms* to users, consultants, and others. Include in the instructions due dates for return. Some data collection efforts become stalled until those involved become knowledgeable as to the meaning and purpose of educational specifications and the reasons for the acquisition of certain data. For that reason discussion meetings or short training sessions for staff persons asked to provide program information are useful. (Data collection forms are suggested in parts I, II, III, IV, and V in chapters 4–7.)
3. *Summarize and compile data collected,* again using forms similar to those used in data collection. The summary can be done by an individual or by a writing committee. One of the most efficient, democratic, and time-saving methods is the *charrette* process, in which all participants meet together for perhaps three days of intensive interaction. All decision makers are present, and all data collected are presented, discussed, and recorded. By the end of the third day, typically, a rough draft of the data is presented to the group for review and approval. Final editing can then be done by an appointed individual or committee.

Chapter 4

Suggested Format for Educational Specifications

Educational specifications should convey clear educational objectives to the design team.

Good design solutions depend on careful interpretation of the educational specifications by designers and feedback from members of the educational specifications committee. They require repeated refinement and revisions of the preliminary design documents and prioritization of educational specifications requirements.

A well-designed educational project has a staff that clearly documents project requirements and remains in charge during the design, construction, and occupancy phases, including postoccupancy evaluation. The following is presented to help facilitate the process:

Organization and Content of the Document

Document organization must be logical and user friendly. For example:

Title page:

Educational specifications
Name of school
Type of school
Name of local educational agency
List of local board of education members
List of committee members and consultants
Contact person
Date of board approval

Table of contents:

Part I	Project Description
Part II	Project Design Factors: Overall Considerations
Part III	Activity-Area Requirements
Part IV	Summary of Area Relationships
Part V	Summary of Space Requirements

Suggested Outline for Educational Specifications

The following outline expands the table of contents and gives a clearer picture of what is to be included under educational specifications and how it can be organized.

Part I Project Description

A. Introduction (project justification and rationale)
B. The Community
C. School Board Policies
D. Educational Program
E. Staff Support
F. Scope of Work and Enrollment Projections
G. Budget
H. Schedule

Part II Project Design Factors

A. Building Design Concepts

1. Single Story Versus Multistory Building
2. Compact Building Versus Detached, Campus Style
3. Open or Closed Campus
4. Enrollment
5. Phasing
6. Integration of Portables
7. Community Use
8. Joint Ventures with Other Agencies
9. Multitrack year-round schedule
10. Curriculum concepts

B. Building Systems

1. Acoustics
2. Building Support Spaces
3. Cleanliness and Health
4. Climate Control
5. Electrical
6. Electronics
7. Fire/Life Safety Systems

8. Handicapped Access
9. Lighting
10. Public Access
11. Safety
12. Security
13. Signage
14. Structural
15. Utilities

C. Site Considerations

1. Landscaping (Ecology: Learning Landscapes/Garden Projects)
2. Playfields
3. Parking and Traffic Circulation
4. Policies
5. Security
6. Unique Site Conditions
7. Utilities

Part III Activity-Area Requirements

A. Name of Activity Area
B. Program Philosophy/Goals/Expected Outcomes
C. Curriculum/Anticipated Use
D. Discernible Trends/Innovations/Experimental Ideas/ Other Planned Uses
E. General Requirements/Grouping and Adjacency Considerations
F. Space Requirements
G. Individual Space Description: Microenvironmental Needs

1. Name of Space
2. Activities
3. Acoustical
4. Cabinetry/Built-in Casework
5. Ceiling
6. Communications/Technology
7. Display Spaces
8. Doors
9. Electrical
10. Fencing
11. Floors
12. Furniture and Equipment
13. Gas and Air
14. Handicapped Access
15. Heating/Cooling/Ventilation
16. Lighting
17. Parking
18. Safety
19. Security
20. Service Drives
21. Walls
22. Water
23. Windows
24. Writing Surface
25. Other Needs

Part IV Summary of Area Relationships

A. Lists and Diagrams/Sample Bubble Diagrams
B. Facility Space Relationships
   1. Adjacencies
   2. Views
   3. Isolation from One Another

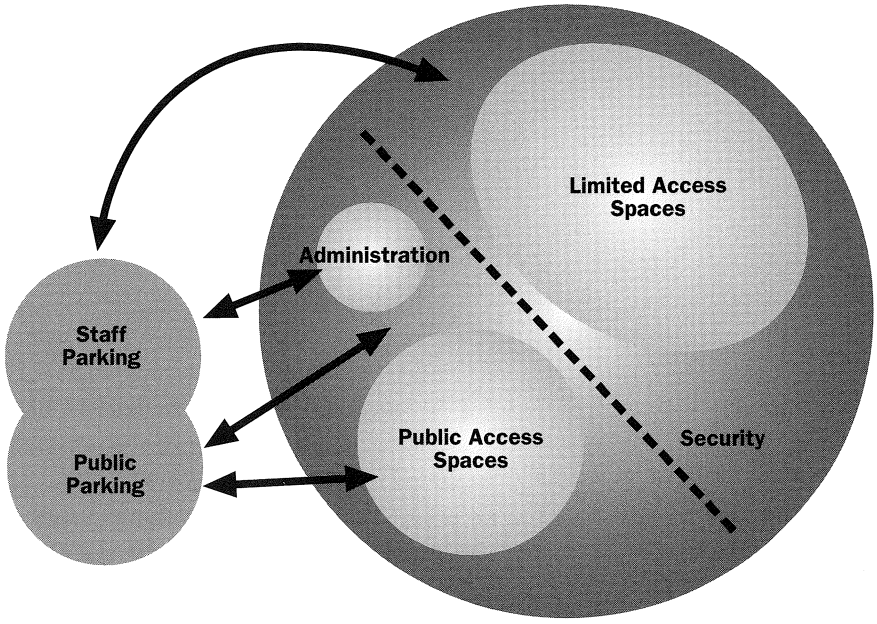


Fig. 2. Sample Bubble Diagram. Courtesy Stafford, King, and Weise, Architects.

Part V Summary of Space Requirements

A. List of Requirements
B. Relationship to Architectural Services Contract (Design Development Phase)
C. California State School Building Program Requirements

Chapter 5

Annotated Outline for an Educational Specifications Document: Parts I and II

The skeletal outline provided in Chapter 4 can be annotated to give a more detailed picture of the complete format and the items to be included in educational specifications. This annotated outline, consisting of parts I, II, III, IV, and V, can be used as a guide to collect and organize information for the educational specifications document. (Because of the complexity and critical nature of information needed for Part III, a sample data collection form (ES-1) is provided in Chapter 6.)

Part I: Project Description

The project description should be as complete as possible and should be agreed to by all stakeholders. It should describe concepts and philosophies held by the local community that are fundamental to the design and character of the school. Agreed-on concepts and philosophy should be clearly documented for reference.

A. Introduction

1. What is the justification or need for the project?
2. How does this proposed school relate to other schools in the district?
3. What vision is held as to this project's place in the community?
4. What environmental and sustainability goals are associated with this project?
5. Other?

B. *The Community.* Provide a brief description and history of the community. Project economic conditions, enrollment, cultural change, residential, growth, commercial growth, and industrial growth over the next five or ten years. Provide a map of the community and surrounding area. Indicate school location, attendance area, and demographics. List resources in the community that can be used by the schools. Questions to be addressed include the following:

1. What are the population trends?
2. What are the demographics, including socioeconomic factors?
3. Is there other pertinent information (community expectations for the school as a community center, recreation facility, and so forth)?

C. *School Board Policies*

1. Which policies have a direct impact on facilities?
   a. Is there community use of facilities and playing fields?
   b. Which teaching/learning methods will affect needs for educational spaces?
   c. What is the board's policy on facility development and maintenance? For building exteriors? For landscaping? For playgrounds?
   d. What are the staffing ratios?
   e. What is to be the total school enrollment?
   f. What is to be the maximum capacity of the school?
   g. What is the grade-level organization?
   h. What justification is required to establish minimum/maximum class size?
   i. What is the impact of district facilities master plan (or five-year plan) on the proposed project?
   j. What is the district policy on busing?
   k. What is the district policy on flexibility and mobility?
      (1) Will students, individually or in small or large groups, move within the facility?
      (2) Will students move to and from other facilities?
      (3) Will equipment move with the students?
      (4) How many students go from where to where? At what times? For what purpose?
      (5) How are students and equipment transported?
2. Are there other policies that affect facilities (e.g., multitrack year-round calendar or joint use of all or part of the facilities)?
3. What support services will be housed at the site for students, family, elders, children in day care, and so forth?

D. *Educational Program*

1. What concepts and philosophies guide the school's curriculum and educational program?
2. In what ways will the facility contribute to educational functions and promote the occupants' educational, physical, and emotional well-being?
3. How much flexibility is to be provided to adjust to future technological and curriculum demands?
4. What are the plans for educational technology? What electronic systems are proposed for the school?

E. *Staff Support.* What is the school's staffing organization? What is the number of persons in each category, including part-time employees?

Staff		*Number*
Instructional:	Teachers	
	Counselors, psychologists, nurses	
	Librarians	
	Specialists	
	Aides	
	Volunteers	
	Others	
Administrative:	Principal	
	Assistant principal(s)	
	Secretaries	
	Clerks	
	Business manager	
	Nurse	
	Others	
Operational:	Supervisors	
	Custodians	
	Maintenance workers	
	Food service workers	
	Others	

Staff		*Number*
Community functions:	Healthy Start	
	Child care and development	
	Public safety officers	
	Probation officers	
	Community parks and recreation	
	Social services	
	Mentors	
	Home and after-school programs	
	Other functions per school board policy	

F. Scope of Work and Enrollment Projections

1. Provide a written description of the scope of the work, the nature and extent of facilities construction involved in this project, including any areas to be renovated. Indicate how much future expansion, if any, is to be accommodated.
2. What are the enrollment projections for the next five years by grade level?
3. Which grades are to be accommodated in this project? Include preschool and adult students if applicable.
4. What are needs for future expansion?

G. Budget

1. What are your sources of funds?
2. Are state funds to be used?
   a. Have they been applied for?
   b. Have they been granted?
   c. Is the district self-certifying? See the *California Code of Regulations, Title 5,* Section 14031 et seq.
   d. What amount of gross square footage is eligible for state funding? Call the School Facilities Planning Division, California Department of Education, for the most recent data; telephone (916) 322-2470.

3. What are the district's direct costs? Verify funding sources. The following work sheet includes most items:

Item	*Amount*
1. Site acquisition	
2. Environmental impact reports	
3. Testing	
4. Preparation of educational specifications	
5. Other	
Subtotal, district's direct costs	$_____

6. What is the architect's preliminary estimate of costs based on areas developed in parts II, III, IV, and V of the educational specifications? The following work sheet includes most items required in a preliminary estimate:

Item	*Amount*
a. Site work	
b. Construction	
c. Contingency for change orders	
d. Design fees	
e. Other fees	
f. Other expenses	
Subtotal, architect's estimate	$_____
Total project costs (architect's estimate plus district's direct costs)	$_____

H. Schedule. Do you have enough information to develop a project schedule? Include the following phases:

Phase	*Start*	*Review*	*Approval*	*Completion*
1. Educational specifications				
2. Schematic design				
3. Acquisition of funds				
4. Design development				
5. Construction documents				
6. Advertising for bids and bidding				
7. Contract development and award				
8. Permits				
9. Construction				
10. Punch list and correction period (list of items to be corrected by contractor, within a specified time, before district acceptance)				
11. Outfitting of building				
12. Project acceptance				
13. Occupancy				
14. Warranty period (contract time for unsatisfactory conditions to appear in project and be subject to correction by contractor)				
15. Project closeout				
16. Postoccupancy evaluation (see Appendix 9 for additional information)				

Part II: Project Design Factors

A. *Building Design Concepts*

1. Will the building be single story or multistory?
2. Is a compact design desired? Or are detached, campus-style buildings preferred?
3. Is the campus open or closed?
4. Will there be a need for future additions or reductions because of changes in school enrollment?
5. Will this project be done in phases?
6. How should portable buildings be integrated into the overall design?
7. How will planned community use affect design?
8. Will any construction be done jointly with others?
9. Will the building be designed to accommodate a multitrack year-round calendar?
10. What curriculum concepts (e.g., in mathematics, science, social studies) can be incorporated into the building systems as learning tools?

B. *Building Systems (List if not included under "Activity-Area Requirements" in Chapter 6.)*

1. *Acoustics.* What are sources of noise? Evaluate for health and safety as well as aesthetics.
   a. Uncontrollable exterior noise: low-flying aircraft; heavy traffic; systems-generated noise: heating, ventilating, and air conditioning (HVAC); fans and motors; duct turbulence; fluorescent lights; other
   b. Activity areas that generate noise: noise suppression within spaces, noise isolation, other
2. *Building Support Spaces.* What are required support spaces? Can they be used as learning tools?
   a. Mechanical and electrical spaces
   b. Equipment repair areas
   c. Wiring, conduits, and distribution spaces
   d. Custodial spaces, delivery areas, and storage
   e. Other
3. *Cleanliness and Health*
   a. Are the finish materials in wall and outdoor and indoor equipment smooth enough not to present an abrasion hazard to passersby and still repel graffiti and vandalism?
   b. Custodial storage for ease of use
   c. Adequate drinking fountains
   d. Hand-washing facilities

e. Adequate toilet facilities (for both sexes; for students, staff, and public)
f. Vandal-resistant components and hardware
g. Air quality, ventilation
h. Lighting
i. Adequate dining facilities, food preparation areas, and storage
j. Other

4. *Climate Control.* What needs for heating, ventilation, and air conditioning are not included under "Activity-Area Requirements" in Chapter 6?
   a. Special climate-control zones
   b. Indoor air quality
   c. Energy conservation
   d. After-hours use and on/off switching
   e. Year-round education, including sunshades for playground use in the summer
   f. Other
5. *Electrical.* What are system needs?
   a. Emergency power
   b. Backup systems
   c. Energy savings
   d. Other
6. *Electronics (Infrastructure Technology).* What electronic systems are proposed for the facility? What are system performance and space needs?

System	*Description*
a. Air-conditioning controls	
b. Computer network	
c. Energy management	
d. Lighting controls	
e. Public address	
f. Security	
g. Telephone/intercom	
h. Television/radio	
i. Other	

7. *Fire/Life Safety Systems.* What are desired performance requirements of safety systems not included under "Activity-Area Requirements" in Chapter 6?
   a. Alarms
   b. Controls
   c. Monitors
   d. Sensors
   e. Other

8. *Handicapped Access.* What requirements are not included in Part III? Refer to the *California Code of Regulations, Title 24.* (Consult the architect.)

   Note: The Americans with Disabilities Act (1992) requires that all facilities and programs to be accessible. (Consult the architect.)

9. *Lighting.* What are the interior and exterior lighting requirements not included under "Activity-Area Requirements" in Chapter 6?
   a. Day and night lighting, including use of natural light (solar)
   b. Energy savings
   c. Parking lots and outdoor spaces (evenly illuminated)
   d. Task lighting
   e. Other

10. *Public Access.* What are the needs for public-use areas and access?
    a. Normal school hours
    b. Weekends, holidays, and evenings
    c. Rest rooms for public use
    d. Security needs
    e. Other

11. *Safety.* Building, site, and equipment safety issues are those items that, with thought in selection of materials, design of details, and the maintenance of the facility, can prevent injury in the use of the facility.
    a. Adequate lighting
    b. Adjacent land use
    c. Central, easily observed entry to campus
    d. Comfort of neighbors
    e. Compliance with the *Handbook for Public Playground Safety* and current California Department of Health Services regulations
    f. Ease of supervision: central office; police patrols; neighbors

g. Access to emergency vehicles
h. Presence of toxic materials in building materials and in finishes on outdoor play equipment
i. Fencing and grilles (well designed) and locks to prevent unauthorized or accidental entry
j. Implementation of measures addressed in *School Area Pedestrian Safety*
k. Local fire department approval; compliance with regulations from the fire marshal as to the design of buildings, storage of materials, and evacuation procedures and drills
l. Provision for safety equipment (e.g., fire hydrants, speed bumps, contrasting paving)
m. Securing the campus
n. Selection and location of plant materials
o. Separation of pedestrians, bicycles, automobiles, buses, and delivery vehicles
p. Street access
q. Traffic volume
r. Unauthorized access to rooftops, electrical equipment, and other
s. Walking surfaces resistant to slipping and tripping; other surfaces smooth, with no sharp edges
t. Window projections and door swings located so that they cannot injure users or passersby

u. Criminal Activities
   (1) Attention should be given to the neighborhood crime rate.
   (2) Have the recommendations in *Safe Schools: A Planning Guide for Action* been implemented?

v. Natural Disasters
   (1) School disaster preparedness plan. *Education Code* sections 35295–35297 require earthquake preparedness planning and indicate that districts may cooperate with other public agencies, such as the Seismic Safety Commission and the Office of Emergency Services. If a district or school preparedness plan does not exist, that fact should be brought to the attention of the school district governing body.
   (2) Floods, earthquakes, and other natural disasters may require evacuation; short-term storage of supplies; provision of shelter for displaced persons; and cooperation with local, state, and federal agencies.

(3) Protection from the elements is needed: snow, rain, wind, heat, and so on.
(4) Other

12. *Security*
    a. Does the location of the site require special security provisions?
    b. Are there governmental requirements or policies?
        (1) Local school board (e.g., community use)
        (2) Local government (e.g., building codes)
        (3) Other

13. *Signage.* Will the signs have a theme? Will they be uniform? Will they be put in particular locations? To what extent does signage need to be multilingual?

Copy	*Size*	*Location*
a. Access (ADA compliance)		
b. Building name		
c. Directional signs		
d. Parking signs		
e. Room identification		
f. Other		

14. *Structural.* Which program needs affect the design of the structural system?
    a. Equipment or activities that require specific distances between walls or columns
    b. Equipment or activities that require specific floor to ceiling heights
    c. Equipment or activities that require personal or small spaces
    d. Need for under-floor conduits, pits, or service areas for equipment or site features, such as amphitheaters
    e. Unique requirements for reinforcing walls, ceilings, or floors
    f. Other

15. *Utilities.* List all utility needs not included under "Activity-Area Requirements" in Chapter 6.
    a. Gas
    b. Electricity

c. Telephone
d. Television and computers
e. Water
f. Waste removal and recycling
g. Energy- and water-conservation systems (e.g., meters)
h. Other

C. *Site Considerations*

1. *Landscaping (Ecology: Learning Landscapes)*
   a. What type of landscaping and outdoor play equipment will be provided?
   b. Where will landscaping occur (e.g., on interior courts, at the perimeter, around buildings)?
   c. Will landscaping be low-maintenance and drought-resistant?
   d. Can it contribute to learning, as in ecoliteracy? Study of agriculture? Garden projects?
2. *Parking and Traffic Circulation.* What are the requirements for pedestrian, truck, school bus, and automobile traffic? Student pickup and drop-off? Parking? Maintenance and operations? Food service and other deliveries? Total parking (define and separate pedestrian paths): automobiles, trucks, buses, bicycles?

Item	*Number of vehicles*	*Separation requirements*
Staff		Separate area
Visitors		Close to administration
Students		Separate area
Handicapped		Student, staff, and visitor areas
Trucks		Separate access
Buses		Separate access
Bicycles		Separate access
Pickup and drop-off		Pedestrians to be protected Separate access for kindergarten

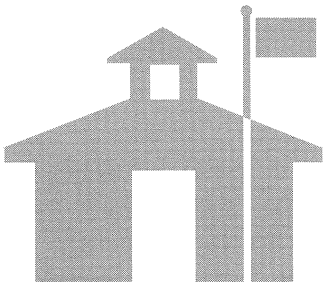
3. *Playfields.* (This information is also collected in Chapter 6.) What are the requirements for playfields, courts, play equipment, and structures to fulfill physical education requirements for graduation and provide for extracurricular and community

use? Refer to the *School Site Analysis and Development Guide.* Provide shade areas for year-round schools.

a. Type, number, and size
b. Location in relationship to other facilities (See Chapter 6 and " Summary of Space Relationships" in Chapter 7.)
c. Handicapped and community access
d. Other

4. *Policies.* Are there governmental requirements or policies (e.g., community use)?
5. *Security.* Does the location of the site require special security provisions?
6. *Unique Site Conditions.* Are there conditions that need to be considered or mitigated in project design?
   a. Wind and prevailing weather patterns
   b. Traffic or other noise sources
   c. Shaded play areas (heat)
   d. Retaining walls, erosion control
   e. Special features, (e.g., archaeological or historic areas, benches)
   f. Site drainage, berms
   g. Other
7. *Utilities.* What utilities are or will be available? Identify those provided by public utilities and those provided on site. Provide names and addresses.

Utility	*Provider*
Electricity	
Gas	
Sewer	
Water	
Telephone	
Cable	
Other	



Chapter 6

Part III of the Annotated Outline: Activity-Area Requirements

Although based on the data generated in parts I and II, Part III is the essential element, the heart of educational specifications. The data in Part III help the architect fully understand the function and physical characteristics of every space in the school so that those spaces can support the educational program.

Data must be provided by each staff person who uses the facility so that planners/architects include everything that is necessary to implement all of the proposed educational program. A similar process should also be developed to encourage student input to project requirements.

Collecting the Data: Sample Form ES-1

Part III brings together the educational program and the building program into a unified statement by describing goals, functions, and activities and their resultant needs for space in the school.

Sample Form ES-1, a suggested tool for organizing the input, is shown on the next several pages. The form should be filled out by every person on the staff so that all items needed to support educational goals can be included. The form should be presented to all staff members with the instructions (ideally on computer disk), and training sessions in its use should be conducted as necessary.

The form should include space for the user's name, title, department, date, project, and activity area or space name.

The educational specifications committee should then tabulate the data, set priorities, and determine constraints on needs. All users should provide input so that educational support items are not lost in committee and therefore not transmitted to facility programmers and architects.

Immediately after Sample Form ES-1 are lists of *typical activity areas or settings* for elementary, schools, middle schools, and high schools. The

lists are provided to give an idea of the multitude of spaces that need to be described. Because the data collection forms may be voluminous, the educational specifications committee will need to develop a system to evaluate the data and determine priorities. All interested parties should have a chance to input their needs for each space.

The data collected here are not all the data required. Questions asked and information called for in parts I, II, IV, and V also need to be answered and collected. Sample Form ES-2, "Information from the Architect and Other Design Consultants," located in Chapter 7, is intended to ensure that all the information needed is collected and understood by the designers.

SAMPLE FORM ES-1

Instructions for Collection of Space-User Information

Your input to the preparation of educational specifications is needed so that facility programmers can include everything required to implement or support the proposed curricula.

Please consider all the major and minor activities you participate in and divide requirements into absolute needs and optional wants. The educational specifications committee will compile data and attempt to fill everyone's needs within the constraints of budget and space.

Provide a description of each educational program and service function in your area of responsibility. Indicate where you could easily share a space with other activities. Be explicit. Identify support spaces, such as preparation areas, toilets, storerooms, and space for equipment. Include all desired spaces or parts of spaces. Use a separate form for each distinct space. Use extra sheets for more information as needed.

SAMPLE FORM ES-1

Activity-Area Requirements

Name: _____

Title: _____

Department: _____

Date: _____

Project: _____

A. Name of Activity Area

Identify the area according to its main function (e.g., department, grade level, administration, media center, food service, custodial). See the list of typical activity areas starting on page 44.

B. Program Philosophy

Describe concepts, philosophy, goals, and expected outcomes. *Note:* This item may not be applicable for some noninstructional areas.

C. Discernible Trends/Innovations/Experimental Ideas/ Other Planned Uses

The purpose of this information is to help the architect provide flexibility for future needs. One example might be the trend toward increasing the number of computers per pupil in the classroom. *Connect, Compute, and Compete: The Report of the California Education Technology Task Force* (California Department of Education, 1996) recommends the following hardware for each classroom: six to eight networked multimedia computers with high-quality monitors and headphones; special interfaces for persons with disabilities; a scanner; a networked laser printer; a 27-inch or larger television monitor; an overhead projector and screen; a telephone; and furniture and security equipment. That document and others, such as the task force reports on both reading and mathematics, can be ordered from the California Department of Education; telephone 1-800-995-4099. The Department has other publications on various topics, such as the academic disciplines and school-to-career or vocational education.

D. Curriculum/Anticipated Use

The school's curriculum should be thoroughly reviewed and developed *before* educational specifications are completed. The review is

SAMPLE FORM ES-1
(Continued)

intended to incorporate and translate curriculum concepts as design criteria into the architecture of the learning environment. Educational specifications call for decisions regarding the number of classrooms for certain subjects, the relationship of one space to another, special built-in equipment, and a host of physical features that can be made only *after* the curriculum is known and agreed upon.

List the courses taught in each activity area and describe curriculum-related items, such as the use of technology to deliver and support the curriculum, school-to-career requirements for career/vocational education, academic programs, and populations with unique needs (e.g., limited-English-proficient students and special education students).

Noninstructional areas should describe anticipated use.

E. General Requirements/Grouping and Adjacency

Describe general requirements, groupings, shared spaces, location in relation to other areas, and any desired isolation. Indicate any essential, indirect, or convenient adjacencies and access. Identify the anticipated size of the groups and indicate the number of persons in each grouping. State any need for subdividing or combining an activity area with an adjacent one and the frequency of such adjustment. (Use bubble diagrams if desired. Bubble diagrams show adjacencies of function and are neither drawn to scale nor designed to show relative size. See your architect for examples.)

F. Space Requirements

Indicate the seating capacity and approximate square footage needed to accommodate each type of use.

Sample Format for a High School English Department

Main Activity Area: English

Individual spaces	*Number of spaces*	*Number of staff per space*	*Total number of staff*	*Number of students per space*	*Total number of students*	*Square feet per space*	*Total number of square feet*
Classrooms	10	1	10	28	280	960	9,600
Journalism classroom	1	1	1	28	28	960	960
Yearbook office	1			10	10	150	150
Department office	1	11	(11)			350	350
Department storage	1					150	150
Department total	14		11		318		11,210

Note: List also number of computers and special equipment required in each space.

SAMPLE FORM ES-1
(Continued)

G. *Individual Space Description: Microenvironmental Needs*

1. *Name of Space.* For example: English Classrooms, Yearbook Office, Storage. *A separate Item G form will be needed for each individual space.*
2. *Activities.* Activities elaborate on curriculum and anticipated use and are a critical aspect of school planning. The practices that implement the curriculum or use of a space rely heavily on physical features of the building and can be supported by or impeded by the facility. The architect needs to know what activities are planned for the school and what the physical and environmental requirements of those activities are. List and describe the instructional or noninstructional activities (or both) to be accommodated in this space. Be specific. Describe who does what and how. A few sample activities are listed as follows:

   Instructional
   Large-group instruction
   Small-group instruction
   Cooperative learning/collaboration
   Individual study
   Computer-assisted instruction
   Cross or shared activities
   Team teaching
   Laboratory/lecture
   Special programs: (e.g., Healthy Start, parent center)

   Noninstructional
   Individual office work
   Clerical work related to attendance area
   Bulk storage of supplies
   Custodial break room/meetings/lunch
   Dining/large meetings/dances
   Student waiting for each service function
   Reading/research/material checkout
   Before-school and after-school programs
   Other community-use programs

3. *Acoustical.* Most areas will be standard. Special areas should include statements concerning the need for baffles, insulation, reverberation, and so forth.
4. *Cabinetry/Built-in Casework.* Category includes, for example, work counters, cabinets, shelves, stages, risers, storage cubicles, tackboards, chalkboards, AV screens, map rails, and pegboards. Indicate number required, size (dimensions), location, adjustability of shelves, and finish desired. For storage, identify items to be stored. Free-standing cases and cabinets should be

SAMPLE FORM ES-1
(Continued)

listed in the furniture and equipment section, although parking space for movables needs mention here.

5. *Ceiling.* Most areas will be standard. Special areas should specify height or other requirements.
6. *Communications/Technology.* Describe television, radio, and computer requirements. Include such items as computers, printers, scanners, closed-circuit TV, satellite antenna, provision for fiber optics, cable, computer labs, interschool networking, home-to-school networks, interactive video, videotape, and film. Indicate the need for and type of intercom. List clock requirements and telephone needs, including location; lines, such as extension or direct; and access to pay telephones.
7. *Display Spaces.* List type of display, location, and size. Describe items to be displayed and security requirements.
8. *Doors.* Most programs will have standard doors. Special programs may need double, dutch, sliding, overhead, extra-wide, metal, or gate-type doors. The need for special doors (e.g., vandal-proof, heavy-duty, handicapped-access) should be delineated.
9. *Electrical.* Indicate the number, type, and location of electrical outlets needed. Types of outlets include duplex convenience outlets and 220-volt outlets. The outlets may be located in floors, in walls, above counters, in the ceiling, outside, and in other places.
10. *Fencing.* Most programs will indicate N/A (not applicable). Special programs requiring outdoor work or storage should indicate size of area to be fenced, height of fence, type of fence, gates, and entrances.
11. *Floor.* Describe floor surface desired for each space. Examples include carpet, ceramic tile, quarry tile, vinyl tile, sealed concrete, and wood.
12. *Furniture and Equipment.* List the movable furniture and equipment required for each activity space. State quantities in meaningful terms (number, size, special requirements, and so forth. Do *not* include built-in casework or built-in instructional aids in this section.) Include computers and other special equipment required. Outdoor play equipment should be listed.
13. *Gas and Air.* Most programs will indicate N/A. Special programs should specify the number of gas or compressed-air outlets (or both) needed, their location, and special cutoff features.
14. *Handicapped Access.* The requirements of the *California Code of Regulations, Title 24,* and the federal requirements of the Americans with Disabilities Act (ADA) of 1992 are the responsibility of the architect. List the special requirements of your program, such as doors, heights of countertops and fixtures, elevators, or lifts.

SAMPLE FORM ES-1
(Continued)

Please be aware that the ADA requires that programs as well as facilities to be fully accessible.

15. *Heating/Cooling/Ventilation.* Describe what is desired. Include statements concerning exhaust fans, vents, exterior windows, fume hoods, dust control, stove hood exhausts, and so forth. Indicate preferred locations for controls. Consider the impact of energy conservation.
16. *Lighting.* Describe the type of lighting desired. Describe the type of controls needed (e.g., area, rheostat, master). Describe special needs (e.g., spotlights, outdoor lights, color, special needs related to computer monitors and projection screens).
17. *Parking.* Most programs will indicate N/A. General parking will be included in Part II, "Project Design Factors: Overall Considerations." But special programs may need to specify additional parking for parents, aides, and so forth. Special programs should state need according to days per school week, weekends, hours, frequency, and number of persons and vehicles, including bicycles.
18. *Safety.* Most programs will indicate N/A. Special programs utilizing chemicals and machinery will need to specify such items as eye washes, safety showers, panic buttons, alarms, sensors, monitors, and extinguishers.
19. *Security.* Most security provisions will be included in Part II, "Project Design Factors: Overall Considerations." Special programs may include after-hours use, special locks, surveillance, and so forth. It may also be desirable to provide panic buttons or telephones or both for teacher use in classrooms.
20. *Service Access Drives.* Most programs will indicate N/A. Special programs should state the need for service access drives, the manner in which they will be used, and their location.
21. *Walls.* Describe the type of walls needed to separate spaces. Examples include tackboard surface, permanent, folding, demountable, and sight dividers. If movable, state frequency of use.
22. *Water.* Describe the number, type, height, and location of sinks desired, such as single, double, utility, and hand washing. Indicate the need for cold and hot water. Include the need for and locations of hose bibs. Special areas may need grease traps, floor drains, clay traps, temperature controls, and drinking fountains.
23. *Windows.* Include statements about the desirability of exterior windows. Identify their location, height, and light control. Describe interior window needs, such as the number, type, location, and size of observation windows.
24. *Writing Surfaces.* Describe the type, location, and size of writing surfaces, such as markerboards, chalkboards, and screens.
25. *Other Needs*

Elementary School

Typical Activity Areas: Reference List for Form ES-1

Individual activity areas are subsumed under the main headings for activity areas. These are examples only; nomenclature and spaces will vary depending on the program in use.

Kindergarten
Classrooms/Learning Environment
Work Sinks
Toilets
Teacher Planning
Storage
Playground
Garden/Environmental Area

Regular Classrooms/Learning Environments
Grades 1–3
Work Sinks
Grades 4–6
Small-Group Instruction
Teacher Planning
Storage

Music Classroom/Learning Environment
Instrument Storage
Practice Rooms
Music Library/Storage
Teacher Planning

Computer Laboratory
Teacher Planning
Storage
Computer Areas Throughout

Special Education
Classrooms/Learning Environments
Teacher Planning
Resource Specialist
Special Day Classes
Facilities for Severely Handicapped
Speech Therapist/Psychologist

Administration
Reception
Principal's Office
Principal's Secretary
Vice-Principal's Office
Clerical Areas
Conference Room
Records Storage
Materials Storage
Workroom
Student Waiting Area
Teachers' Workroom
Teachers' Lounge
Nurse's Office
Nurse's Waiting Area
Cot Room
Nurse's Toilet
Storage
Staff Toilets
Parent Center

Multipurpose Room
Floor Area
Chair/Table Storage
Kitchen/Food Preparation
Kitchen Storage
Garbage Disposal/Storage Area
Recycling Area
Delivery Service Area
Stage
Stage Work/Storage Area
Audiovisual Equipment Area
Toilets

Special Programs
Storage/Day Care
Child Care and Development (before-school and after-school activities)
Healthy Start
Parent Center

Media Center/Library
Community Use
Reading Area
Textbook Storage
Special-Use Classroom/Learning Environment
Computer/Technology Area
AV Storage
Librarian/Clerk Planning
Material Checkout Area
Central Control for CCTV

Outdoor Facilities
Hardcourts
Basketball
Volleyball
Tetherball
Apparatus Area (e.g., Play Equipment, Climbing Area)
Soccer
Softball/Baseball
Garden/Environmental Areas

Patios
Dining
Learning Environment
Recreation/Group Focal Areas

Custodial
Central Custodial Room
Satellite Custodial Closets
Electrical Equipment Space
Mechanical Equipment Space
Telephone and Computer Equipment Rooms

Toilets
Staff
Students
Public
Toilets for Public Events (if applicable)

Middle School

Typical Activity Areas: Reference List for Form ES-1

Individual activity areas are subsumed under the main headings for activity areas. These are examples only; nomenclature and spaces will vary depending on the program in use.

General Classrooms/Learning Environments
English
Mathematics
Social Studies
Others
Small-Group Instruction
Teacher Planning
Storage

Science Classroom/Laboratory/ Learning Environment
Material Storage
Project Storage
Preparation
Teacher Planning
Career Center

Art Classroom/Learning Environment
Storage
Teacher Planning
Ceramics
Storage
Kiln

Administration
Principal's Office
Principal's Secretary
Vice-Principal's Office
Clerical Areas
Deans' Offices
Attendance Reception
General Reception (Lobby)
Bookkeeping Area
Production/Workroom
Conference Room
Records/Vault
Nurse's Office
Nurse's Reception Area
Nurse's Toilet
Cot Room
Storage
School Store
Student Activities

Guidance
Reception Area
Counselors' Offices
Secretarial Area
Student Records
Career Center
Speech/Psychologist
Hearing Testing
Police/Probation Office
Confidential Conference

Band Classroom/Learning Environment
Ensemble
Practice Rooms
Instrument Storage
Material Storage

Vocal Music Classroom/ Learning Environment
Practice Rooms
Music Library/Storage
Robe Storage
Teacher Planning (Band/Vocal)

Special Education
Resource Specialist
Special Day Classes
Facilities for Severely Handicapped
Teacher Planning
Storage
Equipment Storage

School-to-Career Classroom/ Learning Environment
Technology Laboratory
Material Storage
Project Storage
Teacher Planning

Media Center/Library
Reading Room
Checkout Area
Stacks
Periodical Storage
Textbook Storage
Technical Processing
AV Storage
Conference
Closed Circuit TV Production, Distribution, and Control
Media Production Lab
Dark Room
Copying Room
Viewing Room
Media Director's Office
Secretarial Office
Clerical Work Area

Faculty
Teachers' Workroom
Teachers' Lounge/Dining
Toilets

Physical Education Gymnasium
Lockers
Showers
Drying Area
Toilets
Laundry/Towel Area
Equipment Storage
Lobby
Public Toilets
Teacher Planning
Teacher Locker/Shower/Toilet
P. E. Classroom

Special Programs
Community Use
Child Care and Development
Before-School and After-School Activities
Healthy Start
Parent Center

Middle School

Typical Activity Areas: Reference List for Form ES-1 (Continued)

Outdoor Facilities
Hardcourts
Basketball
Volleyball
Apparatus Area
Soccer
Softball
Baseball
Garden/Environmental Area

Toilets
Student Toilets
Staff Toilets
Public Toilets
Toilets for Public Events (if applicable)

Multipurpose Room
Floor Area
Chair/Table Storage
Stage
Stage Work Area
Stage Storage
Toilets
Kitchen/Food Preparation
Kitchen Storage
Serving Areas
Convenience Kitchen
Dressing Room /Lockers
Toilets
Delivery Service Area
Garbage Disposal/Storage Area
Recycling Area
Audiovisual Equipment Area

Custodial
Central Custodial Room
Satellite Custodial Closets
Flammable Storage
Equipment Storage
Receiving Storage
Telephone and Computer Equipment Rooms

Patios
Dining and Recreation Areas
Learning Environments
Group Focal Areas

High School

Typical Activity Areas: Reference List for Form ES-1

Individual activity areas are subsumed under the main headings for activity areas. These are examples only; nomenclature and spaces will vary depending on the program in use.

Art
Art Classrooms/Learning Environment
Ceramic Classroom/Learning Environment
Ceramics Storage
Kiln Enclosure
Photography Lab/Classroom/Learning Environment
Darkroom
Department Storage
Teacher Planning

Business Learning Environments
Typing Classroom
Computer Literacy Classroom
Accounting Classroom
General Business Classroom
Teacher Planning
Department Storage

Language Arts Learning Environments
English Classrooms
Foreign Language Classroom
Speech Classroom
Remedial Reading Classroom
Journalism Classroom
Journalism Storage
Yearbook Office
Teacher Planning
Department Storage

Mathematics Learning Environments
Mathematics Classrooms
Department Storage
Teacher Planning

Social Studies Learning Environments
Social Studies Classrooms
Teacher Planning
Department Storage

Performing Arts
Band Room
Instrument Storage
Uniform Storage
Practice Rooms
Music Library Storage
Vocal Music Room
Robe Storage
Practice Rooms
Music Library Storage
Drama Classroom
Stage
Dressing/Makeup
Costume/Prop Storage
Teacher Planning
Toilets

Science Learning Environments
General Science Classrooms
General Science Prep/Storage
Biology Labs
Biology Prep/Projects
Biology Storage
Chemistry Lab
Chemistry Storage
Teacher Planning
Department Storage

Home Economics Learning Environments
Foods Classroom
Preparation/Workroom
Clothing Classroom
Consumer Classroom
Teacher Planning
Department Storage

Administration
Principal's Office
Lobby/Reception
Principal's Secretary
Vice-Principal's Office
Clerical Areas
Bookkeeping Office/Cashier
Conference Room
Production/Workroom
Teachers' Workroom/Mail
Teachers' Lounge
Staff Toilets
Public Toilets

Registration
Registrar Clerk
Vault
Records Storage

Industrial Technology Learning Environments
Auto Shop
Wood Shop
Electronics Lab
Technology Lab
Drafting Room/Cad Lab
Agriculture Classroom
Agriculture Shop
Greenhouse
Conference/Projects
Teacher Planning
Department Storage

Special Education Learning Environments
Resource Specialist Resource Rooms
Special Day Classes
Facilities for Severely Handicapped
Teacher Planning
Department Storage

Media Center
Reading Room
Classroom/Learning Environment
Checkout Area
Stacks
Textbook Storage
Periodical Storage
Technical Processing
AV Storage
Conference
Closed-Circuit TV Production, Distribution, and Control

High School

Typical Activity Areas: Reference List for Form ES-1 (Continued)

Media Production Lab
Darkroom
Copying Room
Viewing Room
Media Director's Office
Secretarial Office
Clerical Work Area
Toilets

Attendance
Attendance Clerk
Deans' Offices
Student Waiting
Storage

Guidance
Student Lobby
Counseling Clerk
Counselors' Offices
Psychologist's Office
Speech/Hearing/Testing
Conference Room
Storage
Police/Probation Office

Nurse
Lobby/Waiting
Office
Cot Room
Toilet

Student Services
Athletic Director's Office
Student Store
Storage for Student Store
Student Activity Director
Student Body Officers' Room
Cashier's Office

Physical Education
Gymnasium
Locker/Shower Rooms
Drying Areas
Laundry/Towel Area
Weight Room
Dance Room
Team Room
Gymnastic Storage
Athletic Equipment Storage
Lobby/Ticket Booth
Concessions
Public Toilets
Student Toilets
Staff Toilets
Staff Locker/Shower Rooms
Teacher Planning
P.E. Equipment Storage

School to College/Career Center
College/Career Center Classroom/ Learning Environment
College/Career Center Library
Offices
Storage

Food Service
Cafeteria
Chair/Table Storage
Faculty Dining Room
Kitchen/Convenience Kitchen
Preparation Area
Serving Area
Office
Dry Storage
Refrigerator/Freezer
Dishwashing
Change Room/Lockers
Delivery Service Area
Garbage Disposal/Storage
Recycling Area
Service Area
Public Toilets
Staff Toilets
Student Toilets

Maintenance
Central Custodial Room
Custodial Office
Satellite Custodial Closets
Mechanical Room
Equipment Storage
Flammable Storage Room
Telephone and Computer Equipment Rooms

Special Programs
Healthy Start
Community Use
Adult Education
Student Organizations
Parent Center

Outdoor Facilities
Football/Soccer/Track
General Playfield
Stadium/Bleachers
Varsity Baseball
JV Baseball
Softball
Tennis
Basketball
Volleyball
Apparatus Area
Field House
Swimming Pool
Garden/Environmental Area

Patios
Dining and Recreation Areas
Learning Environments
Group Focal Areas

Toilets
Staff
Student
Public
Toilets for Public Events

Assembly Areas
Performance Auditorium
Amphitheater
Little Theater
Lecture Halls

Chapter 7

Parts IV and V of the Annotated Outline: Summaries of Area Relationships and Space Requirements

Communication of the information generated in parts I, II, and III is the essential purpose of the educational specifications document. Summarizing data in lists and diagrams will help clarify requirements for the architect and other interested parties.

Part IV: Summary of Area Relationships

Bubble diagrams of area relationships, including internal relationships, should be developed in cooperation with the district's architect. The following is an *example* of the type of information that might be useful in a preliminary list. Different program philosophies will require different relationships depending on the level of consideration: (1) health and safety; (2) function; and (3) psychological comfort or aesthetic satisfaction. Listed headings for activity-area groupings are common for most elementary and secondary schools.

Area Relationships

Area	*Near*	*View to*	*Isolate from*
Administration	Main Entrance Health Guidance*	Main Entrance Kindergarten Student Drop Bicycle Parking	Workroom Music Shops Athletics Dining
Art	Photography Industrial Arts	Patios	—
Athletic Fields	Gymnasium Parking Street Access	—	Academic Classrooms Administration Driveways
Auditorium	Street Access Parking Lots Main Entrance Music	Patios	Gymnasium Industrial Arts Library/Media
Book Storage	Classrooms Library/Media Center	—	General Storage Custodial Storage
Career and Technology Education	Classrooms Library/Media Center Industrial Technology	—	Music Athletics
Classrooms	Library/Media Center Computer Lab	—	Music Shops Athletics
Conference Rooms	Administration Guidance	—	Laboratories Shops Music Dining Athletics
Custodial Workroom and Storage	Utilities Storage Receiving	—	Classrooms Administration Library/Media Main Entrance

*Consider a separate student service center, with guidance, health, police, probation, and other counseling and social services located for privacy.

Area Relationships (Continued)

Area	*Near*	*View to*	*Isolate from*
Dining (Cafeteria) Teachers' Lounge Kitchen	Storage Receiving	Patios	Administration Classrooms
Driveways	Administration Main Entrance Storage and Receiving Music Auditorium Cafeteria Athletic Fields	—	Play Areas Classrooms
Guidance	Administration Main Entrance Career Center	—	Direct Access to Administration
Health Services	Administration Main Entrance Supervision	—	—
Homemaking	Art	Patios	Food Service*
Industrial Arts	Art	Patios	Auditorium Administration Classrooms Music
Kindergarten and Day Care	Separate Play Area Driveway Rest Rooms Storage Cafeteria	Patios	Other classrooms Traffic
Library/Media Center	Classrooms Computer Lab	Patios	Auditorium Athletic Areas Music Shops

*For programs that do not want to integrate homemaking foods classes with food service.

Area Relationships (Continued)

Area	*Near*	*View to*	*Isolate from*
Main Entrance	Administration Access Streets Parking Athletic Fields Auditorium Gymnasium Maintenance	— —	Storage and Receiving Shops Playgrounds Parking
Music	Auditorium	Patios	Administration Classrooms Library
Patios	Administration Art Auditorium Cafeteria Library/Media Center Science	—	Athletics Shops
Rest Rooms	Athletics Classrooms Playgrounds Public Areas Supervision	—	—
Science	Growing Areas Laboratories Library/Media Center Nature Areas	—	—
Service Areas	Access Drives Storage and Receiving	—	Playfields Classrooms Other Buildings
Shops	Access Drives Storage and Receiving	—	Other Buildings
Special Education	Library/Media Center Other Classrooms	—	Athletics Shops
Other			

Part V: Summary of Space Requirements

When all the necessary information on space requirements has been collected, a summary must be developed. The summary should include the net square footage required for each activity area and estimates of the amount of space needed for circulation, mechanical devices, toilet areas, wall thicknesses, and so forth. Added together, the figures will provide the total gross square footage required for the facility. The summary should be prepared with the assistance of the district architect. *Note:* The writing of educational specifications is often an extra charge in an architectural contract. The contract with the architect should be negotiated to include all services required, and all contracts should be executed with the aid of legal counsel.

If the planned project is to be built with state funds (wholly or in part), contact the School Facilities Planning Division, California Department of Education, for the latest information on allowable spaces for various functions; telephone (916) 322-2470.

SAMPLE FORM ES-2

Information from the Architect and Other Design Consultants

Name: _____

Title: _____

Firm or department: _____

Date: _____

Project: _____

Suggested Procedure

Your input to educational specifications preparation is invited to help ensure that everything necessary to implement or support the proposed educational program is included in the project.

Please review all of the information presented by the staff in Form ES-1 (or whatever equivalent form the staff may be using) and in the educational specifications (as described in parts I, II, III, and IV of this document), the preparation of which may now be under way in the district.

Please be aware that the preparers are not design professionals and that the documents are not to be assumed to include everything necessary for the facility.

SAMPLE FORM ES-2
(Continued)

The district's educational specifications committee will inform you of educational needs. It will be your privilege and responsibility to augment such information with architectural data necessary to the project and to provide a facility, within budget and space constraints, that meets all requirements.

Before you begin to design the project, please request the information you need and pose the questions you want answered regarding each educational program and service function.

Using the *annotated outline* in chapters 5–7 as a guide, please consider the following questions:

Part I Project Description

1. Do you have all the information you need concerning:
   A. Project rationale?
   B. The community?
   C. School board policies?
   D. The educational program?
   E. Staff support?
   F. Scope of work?
   G. Budget?
   H. Schedule?
2. Do you have copies of all maps, reports, surveys, and so forth required to describe the site and community?
3. Do you have copies of the environmental impact reports, soils reports, and other data required to design the project? If not, request from the district such data that may be applicable to the project under consideration.

Part II Project Design: Overall Considerations

1. Do you have all the information you need concerning:
   A. Building design concepts?
   B. Building systems?
   C. Site considerations?
   D. Project delivery methods (see Appendix 5)?
2. What additional information do you need?

Part III Activity-Area Requirements

Item A. *Activity Area*

Do you have a Form ES-1 (or its equivalent) for each activity area? Is the information complete?

Item B. *Program Philosophy*

Are concepts, philosophy, and goals clearly stated for your purposes?

SAMPLE FORM ES-2
(Continued)

Item C. *Discernible Trends*

Have trends, innovations, experimental ideas, and other planned uses been described so that implementation can be accommodated in design?

Item D. *Curriculum/Anticipated Use*

Is the educational function and anticipated use of each area described so that you would be able to develop design concepts and solutions to support the educational requirements?

Item E. *General Requirements/Groupings and Adjacency Considerations*

1. Can you design the space that is needed to accommodate educational requirements? Are requirements for grouping, subdividing, and combining activity areas and the frequency of such adjustment included?
2. Can you identify adjacencies or isolation from other activities?
3. Can you identify essential, indirect, and convenient space relationships and access with the information you have?
4. Prepare bubble diagrams for each distinct grouping or subgrouping of activity areas and discuss with committee.

Item F. *Space Requirements*

Do you have the number of users, or person capacity, and approximate square footage needed to accommodate each type of use in the activity area?

Item G. *Individual Space Description: Microenvironmental Needs*

1. Do you have a description for each individual space?
2. From the activities as described, can you imagine every detail of what goes on in this space so that you would be able to develop architectural concepts and solutions to support the educational requirements? Do you have all information on special requirements usual and unique to each activity area as described in the following items:
3. Acoustical?
4. Cabinetry/built-in casework?

SAMPLE FORM ES-2
(Continued)

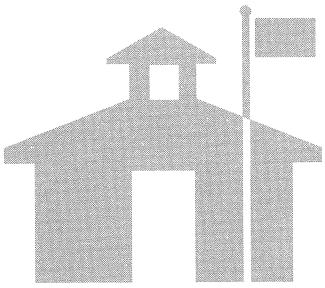
5. Ceiling?
6. Communications/technology?
7. Display spaces?
8. Doors?
9. Electrical?
10. Fencing?
11. Floor?
12. Furniture and equipment?
13. Gas and air?
14. Handicapped access?
15. Heating/cooling/ventilation?
16. Lighting?
17. Parking?
18. Safety?
19. Security?
20. Service drives?
21. Walls?
22. Water?
23. Windows?
24. Writing surfaces?
25. Other?

Part IV Summary of Space Relationships

1. Do you have a copy of the matrix prepared to show space relationships?
2. Prepare bubble diagrams and discuss with committee.

Part V Summary of Space Requirements

1. Do you have enough information to prepare a summary of space requirements?
2. Prepare a summary and discuss with committee.



Conclusion

After an educational specifications document has been developed, an evaluation of the process and the document should begin. A properly executed document provides a useful tool for evaluating every phase of the project: preliminary design, design, construction document development, construction, and occupancy.

The development of educational specifications also provides an opportunity for school districts to define their goals and elicit community involvement. When clearly stated and published, the specifications can be a powerful tool for districts to use in preparing the educational community and the community at large for twenty-first century schools.

The process of developing the document should, then, be open to the community. The school district should provide opportunities for public comments early on; hold public forums to discuss issues; and encourage the local media (newspapers and television) to comment on the document. The result can be greater community ownership and support of the district's educational vision.

While teaching and learning are becoming more complex and exciting as society changes, the number of diverse stakeholders in the educational process has been increasing dramatically. Each of those groups has its own requirements. By keeping those needs in mind as educational specifications are being prepared for each new or remodeled facility, our schools can play a major role in building a strong community in which all groups have a part.

Appendixes

Appendix 1: Master Planning and Overall Goals

Appendix 2: Remodeling Facilities

Appendix 3: Public Relations

Appendix 4: Selecting the Architect

Appendix 5: Project Delivery

Appendix 6: Site Selection

Appendix 7: Safe Architecture for Schools

Appendix 8: School Disaster Preparedness Plan

Appendix 9: Facility Activation, Orientation, and Postoccupancy Evaluation

Appendix 10: Sample Form ES-3: Facilities Inspection Summary

Appendix 11: Constructibility Reviews

Appendix 1

Master Planning and Overall Goals

What Is Facility Master Planning? Why Do It?

The preparation of educational specifications for a new facility is an opportunity to update the district's facilities master plan. It is also an opportunity to review the overall goals of the school and the district. The updating should be completed before the process of developing educational specifications is begun.

A facilities master plan should be a working document adopted by formal resolution of the school board after public hearings. Updated frequently to keep pace with developing trends and financing alternatives, it should be amended as the district philosophy changes or new programs or facilities are needed. The facilities master plan should also provide the basis for budgeting future capital improvements and creating and implementing plans for financing facilities. Further, it should justify the collection of developer fees and provide documentation of facility needs and costs that can be used in legal cases.

The facilities master plan should define and describe which facilities are needed to support the program.

Components of a Facilities Master Plan

A. Statement of Purpose

- District goals and philosophy
- Existing policies and assumptions used in planning process
- Rationale for the master plan

B. Description of the Planning Process

- Roles and responsibilities of those involved (including policy regarding cooperation and coordination with other public agencies)
- Extent of community involvement
- Board review and adoption

C. Description of the Community

- Economic trends
- Employment base
- Residential base
- Socioeconomic makeup
- Inventory of physical resources and needs

D. Description of the Educational Program

- Guidelines for educational specifications
- Grade-level organization
- Staffing and time patterns
- District plans to use technology in teaching and designing facilities
- Criteria for site design
- Enrollment-size policy
- Class-size policy, including impact of class-size reduction
- Attendance area designations
- Special programs, such as Healthy Start and before-school and after-school programs
- Support services

E. Analysis of Existing Facilities

- Physical adequacy/potential for expansion
- Educational adequacy
- Student capacity related to enrollment
- Joint use with other agencies, schools, and private businesses
- Equity among facilities
- Adequacy for technology

F. Demographic Study

- Housing development history/projected building activity
- Student yield rate per dwelling unit
- Land-use policies and zoning holding capacities
- Study areas (by elementary attendance areas, census tracts, neighborhoods)
- Studies of birthrates
- Patterns of migration
- Historical enrollments/cohort projections
- Forecasts of economic conditions
- Planned industrial/commercial development
- City/county general plan

G. Site Selection

- Analysis of demographic study to determine areas of projected student population
- Review of size, location, grade levels, and attendance areas of existing schools and any related policies
- Consideration of district's transportation capabilities
- Establishment of criteria by which site is to be judged
- Determination of site-selection process and recommendation as to who will be involved
- Proximity to other potential joint-use sites

H. Financing

- Development of a capital planning budget addressing
  1. Site purchase
  2. New construction
  3. Modernization
  4. Alterations
  5. Maintenance, including yearly set-aside funds for deferred maintenance
- Development of a capital planning budget that:
  1. Sets priorities and delineates a step-by-step implementation plan for project funding
  2. Projects needs on a yearly basis over the next five to 15 years
- Identification of sources and availability of income

I. Evaluation of the Plan

- Policy for reviewing and evaluating the long-range facilities master plan
- Policy and suggested mechanism for user orientation and postoccupancy evaluation of new facilities
- Policy for updating the long-range facilities master plan when changes occur in program, facilities, finances, or demographic data
- Asset management
- Surplus property

Appendix 2

Remodeling Facilities

"A remodeling project requires the same approach to educational specifications as does a new facility."

A remodeling project requires the same approach to educational specifications as does a new facility. *First,* educational issues and trends in curriculum requirements, programs and practices, and community involvement must be addressed and evaluated.

Second, demographics and enrollment projections must be determined. Census data should be used to create a picture of the school attendance area or the district (or both) as to income level, educational attainment, age distribution, ethnic and racial distribution, and housing units. Local city and county planners can provide data on future (planned) growth or nongrowth. Unemployment rates, the financial outlook of the district, bond capacity, and the district's assessed valuation may impact programs and funding availability, thus determining facility needs.

Third, a facilities needs assessment can be conducted by engaging a team of engineers and architects to inspect existing facilities and thereby provide an assessment of the condition of the school(s). Examine major building systems, site conditions, compliance with the American with Disabilities Act, and health and life safety codes.

Inspect all spaces for conformance with current standards in lighting, acoustics, square footage, heating and cooling, electrical outlets, and adaptability for future technology systems. Rate according to current standards and develop options for remediating identified problems. Estimate cost to bring the facilities up to standards. Anticipate ongoing maintenance and upkeep costs. (See the *Facilities Performance Profile.* See also Sample Form ES-3, "Facilities Inspection Summary," in Appendix 10 of this publication.)

Develop scenarios to determine whether remodeling or building new facilities is more cost-effective. Examples follow:

- *Option 1.* Imagine a project that includes all *Health and Safety Code* upgrades and adheres to district standards as required, together with additional classrooms and ancillary spaces as

required, to make the facilities more conducive to a good teaching and learning environment. Include requirements for all curriculum and instructional needs as well as for such programs as Challenge Schools, Class-Size Reduction, Head Start, and Healthy Start. Include also media centers, computer labs, science labs, and exploratory labs. Estimate the cost and extended life of the facilities.

- *Option 2.* Include all of Option 1 plus new multipurpose facilities. Estimate the cost and extended life of the remodeled facilities.
- *Option 3.* Assume that the maintenance and operating cost of the older facilities are not cost-effective. Demolish and build a new school that meets current standards and adequately addresses the curriculum and instructional needs of the district. Estimate the cost and life of the proposed construction.

Use value engineering concepts for comparison of options to make decisions that get the most for the facility dollar. For instance, it is not cost-effective to spend one-half as much to remodel as to build new if the remodeling extends the life of the facility only a few years and a new school would give another 30 years of service.

Develop a standard district facilities inspection summary form similar to the one shown in Appendix 10 to help evaluate existing facilities. Use the inspection summary form to record postoccupancy evaluation.

Appendix 3

Public Relations

The district should have an ongoing program to reach the community for support. Appendix 9 of this document, in the paragraphs on orientation, refers to public information programs designed to promote acceptance of the educational program and its relationship to the facility. Activities to inform people about the school include media features, brochures, and open-house tours that discuss and illustrate the ways the educational community works to educate children. The need for new educational facilities must be explained. The district's best outreach people may be the students themselves. Early involvement of children in planning schools means they will take the message home with enthusiasm. The more the community is connected to its schools, the more support it will give.

"The district's best outreach people may be the students themselves."

Financing new construction, including remodeling, requires public money. The public needs to understand why the facilities are absolutely necessary to support the educational program.

"The need for new educational facilities must be explained."

Community outreach communication should be open and two-way. Ways to garner the support needed include cooperation with the local media (newspapers and television); sponsorship of public forums; invitations to the public to sit on committees, such as educational specifications or master plan development committees; and distribution of written communications available for review by the public. Support is easier to obtain if advocates are accessible and responsive to the public.

Cooperation with the Media

The California School Boards Association (CSBA) publishes documents on public relations and related topics. *School Boards, Public Relations, and the Media* (CSBA, 1988) discusses in practical terms how to interact with the media to develop a public relations program that works.

Schools are subject to the scrutiny, comment, and criticism of the press. How this concern affects a school district depends on the district's

development of an effective communications plan. In the CSBA publication mentioned previously, Carl F. Hauver, former president of the Public Relations Society of America, states that "public relations is the management function which provides the professional skills necessary to communicate truth effectively to concerned publics."

Doing good is not enough; it must be effectively communicated. The following are concepts that are more fully explored in the CSBA publication:

"Be ready for input from your public."

- Do good and let the public know what you are doing.
- Elected officials govern from public consent gained from trust.
- Talk to the public through various formal and informal means, including listening opportunities. Two-way communication is crucial. Be ready for input from your public.
- To communicate effectively, you must identify the segments of your public, establishing who are they are and what concepts are important to each of them. Parents, educators, students, the general public (without children), seniors, neighborhood groups, elected officials, civic and church leaders, the business community, and businesses involved in partnerships with the schools are only a few of the diverse groups that have needs, sometimes conflicting, that must be addressed.

Public Forums

Formal face-to-face programs are a necessary part of an effective public relations program. They may be the most important part of communication. Various avenues that need to be considered are as follows:

- Have people ready to answer concerns at PTA meetings and other public gatherings.
- Host bag-lunch affairs for parents or other specific groups.
- Invite stakeholder groups to open-house evenings and to classrooms during the day.
- Have school administrators and board members participate in civic organizations.
- Be available to give speeches to civic groups, perhaps through a speakers' bureau. Provide fact sheets to hand out at these gatherings.
- Make regular board meetings open and welcoming.
- Invite community members, students, parents, and others to join in school planning as soon as evidence shows that more schools are needed or modernization is necessary.

Public Participation

The development of a new educational specification is an opportunity to invite members of the public to participate in the educational process and thus become vested in the school. Opportunities for public participation include the following:

- Development of a facilities master plan for the district
- Development of educational specifications
- Volunteer service as a teacher's aide or as a helper in a special education program
- Guest speakers to groups of the public, children, or teachers
- School/business roundtable discussion groups to explore common goals
- Establishment of committees to explore specific educational or fiscal issues of concern to the board

Written Communications

Every written communication from a school, a central office, or a school board is a part of the public relations plan (or nonplan) of the district. Included are report cards, daily correspondence, and other necessary communications. Each communication should be easy to read and accurate, address the concerns of the addressee, and reflect positively on the district. Content must be coherent and have correct spelling and grammar. In addition to necessary communication, the following list includes specific items that can be included in the public relations plan for the district:

- Brochures for each school site to illustrate facilities and services available
- Educational specifications documents available for public comment
- Facilities master plan documents available for public comment
- Fact sheets giving demographics, age of facilities, program intent, and school needs
- Newsletters for distribution to parents, students, and school employees
- Letters to the editor of the local newspaper, especially from parents supporting district positions or policies
- Articles in local business publications
- Press releases, including minutes of board meetings

Every written piece of material from each school should be reviewed with public relations in mind. Media presentations should be responded to with thanks or rebuttal as appropriate. The public relations impact of all media presentations should be evaluated and immediately corrected if there are errors.

Conclusion

"Being a good neighbor and keeping lines of communication open are good public relations."

A public relations plan begins at the school site. The front office should be neat, organized, and welcoming. Reception personnel must be caring and responsive. Each site should have an ongoing training program in public relations emphasizing the responsibilities of every staff member. Other topics to be considered at the school site include the following:

- Programs to enhance the public's trust in and familiarity with the teacher
- Recognition of the multitude of tasks necessary for good public relations and the tasks that are the responsibility of the principal
- Outreach programs to diverse parent groups
- Site newsletters for distribution to staff and parents
- Gatherings and parties, open houses, carnivals, and fund-raisers. The activities should have a theme, preferably one that honors the accomplishments of students (and staff). Time during every gathering should be used to discuss the district's current issues.

Notification to neighbors of events can help create friends of the school. Each school can increase the credibility of the school system through small acts of consideration. Being a good neighbor and keeping lines of communication open are good public relations.

Appendix 4

Selecting the Architect

Because the architect will be a major influence in determining how well the facility serves its intended purpose, he or she should know and appreciate the student group to be served. Selection of the architect should not, therefore, be informal. In addition, the selection of an architect and other design professionals is subject to the State Contract Act. The process must, therefore, be open to any interested party and subject to public review (see the *California Public Contract Code*). The following paragraphs are based on the publication titled *Selecting Architects for Public Projects* (American Institute of Architects, 1970) and publications developed by the School Facilities Planning Division, California Department of Education.

Selection Committee

Ensure that the selection committee represents the diversity present in the community and different points of view (educators; architects and other planning professionals; community leaders; parents; teachers; and, perhaps, students). Subcommittees include the following:

- The *proposal screening subcommittee* should have enough members to review all submittals adequately.
- The *preliminary interview subcommittee* selects firms to be interviewed by the governing body of the district. There should be no fewer than three members and probably no more than five members on this subcommittee. A noncompeting architect might usefully be asked to serve on this panel.

Selection Process

A fair and open selection process ensures consideration of the best architects for the project and includes the following:

Announcement

Advertise the project in the *State Contract Register,* in the bulletin of the local chapter of the American Institute of Architects, and in the area's most circulated general newspapers. Notify the builders' exchange or

"A fair and open selection process ensures consideration of the best architects. . . ."

other public plan room in your area. It is important that the announcement be published widely. For the advertisement to attract the most suitable firms, it should include type of project, scope of services required, budget and time constraints, evaluation criteria, forms on which statements of interest and qualifications are to be submitted, submittal deadline, and district contact person.

Request for Qualifications

Request for qualifications forms should be sent to all interested firms. The forms package should include everything needed to evaluate the information and emphasize that submittals in any other form will not be considered.

The task of comparing the qualifications and experience of competitors is difficult. Requiring the use of standard forms will simplify the process. The following may be helpful: standard forms SF 254, "Architects-Engineers and Related Services Questionnaire" (Stock number 7540-01-152-8073) and SF 255, "Architects-Engineers and Related Services Questionnaire for Specific Projects" (Stock number 7540-01-152-8074.) Both are available from Forms and Publications, U. S. General Services; telephone 1-800-786-0258; FAX 1-800-603-8357.

Note: Form SF 254 provides an overall profile of the firm's size, experience, volume of business, and area of specialization. Form SF 255 lists the firm's experience with projects of similar scope and the special expertise of personnel who would be assigned to the project.

Form B-431, a standard questionnaire, is available from the American Institute of Architects, 1735 New York Avenue, N.W., Washington, DC 20006-5292; telephone (202) 626-7475.

The district should develop a specially designed form requiring additional detailed information as required by the project or the district's governing board.

"If a firm cannot be responsive to district needs in relatively minor requirements, it may be unresponsive in more critical ways on a building project."

Evaluation

Evaluation of submittals is done by the proposal screening subcommittee and should be documented. A record of who did the preliminary screening should be kept of all submittals, especially unsuccessful ones.

In the effort to procure the best architect, the screening process should be uncompromising in two areas. Late submittals, incomplete submittals, and submittals not on the required forms should be returned to the sender with an explanatory note.

If a firm cannot be responsive to district needs in relatively minor requirements, it may be unresponsive in more critical ways on a building project.

Properly submitted and timely submittals should be reviewed with documented criteria, including specific interest in the project, the

relevant school experience and expertise of the architect and consultants, performance on previous projects, the availability of key personnel, projected workloads, and any other criteria of interest to the district.

Each of the criteria should be ranked separately. If items are incomplete or are omitted without explanation, the submittal should be rejected at the discretion of the school district. Arrange or list the remaining proposals in ranks that reflect the relative responsiveness of the submittals. Pass this list to the preliminary interview subcommittee, which will select a manageable number of firms for reference checks, personal interviews, and project and office visits. Check several references because not all factors that make for unsuccessful projects are within the control of the designers.

Preliminary Interviews

Firms invited to a preliminary interview should be given all available information; for example, the scope of the project, the size and makeup of the interviewing panel, the criteria for ranking, and the division of time between formal presentation and question/answer period. The project scope documents should expand on the original advertisement and include a copy of the educational specifications. The interview panel should be identified by occupation and title if not by name.

Ranking criteria to identify the best qualified firm might include such items as design ability, philosophy, experience, demonstrated interest in the project, understanding of project requirements, relevance of previous projects presented during the interview, availability of key personnel, and schedule and budget performance on previous projects.

When the preliminary interviews are complete, select several of the top firms and visit some of their completed projects. Examine postoccupancy evaluations if available. Visit offices to see staff in action and to examine typical plans, specifications, and other documents. Ask questions about office procedures in handling schedules and construction supervision. Select the top three to five firms acceptable to the preliminary interview subcommittee and present the names to the district's governing board for final interview.

Selection

Selection of the top-ranked firm is then made by the district governing board. Negotiation of the architect's compensation completes the selection process. (For more on this subject, see *Compensation at U.S. Architectural Firms* ([American Institute of Architects, 1977].)

Debriefing

Notify unsuccessful firms. Their considerable effort and expense in applying should be appreciated and acknowledged by the district. Provide

debriefing if requested. Unsuccessful firms need to be educated in the requirements of the district. Explanations of why a firm is unsuccessful are necessary to dispel appearances of favoritism and to encourage future participation in the submittal process. Be prepared to explain your criteria for selection and tell how the individual firm did not meet your needs. Discussing the successful firm's presentation with others should be limited to indicating that the winner was able to meet your criteria better than other contestants.

A well-defined district policy on procuring design services is necessary for having good response to requests for proposals. If your agency does not have a formal procedure and the above examples do not fit your needs, contact the School Facilities Planning Division, California Department of Education, or the local chapter of the American Institute of Architects (or both) for advice and counsel. Additional information can also be obtained from the American Institute of Architects, California Council, 1303 J Street, Suite 200, Sacramento, CA 95814; telephone (916) 448-9082; FAX (916) 442-5346.

Appendix 5

Project Delivery

The district should explore the subject of project delivery during its development of educational specifications to determine whether seeking new forms of project delivery would be advantageous. How educational specifications are written will depend on your selected method of project delivery (design plus construction) and should be discussed with a legal adviser early in the project. Each school board should use the project delivery methodology that is most appropriate for the project and is in accordance with legal constraints.

"Each school board should use the project delivery methodology that is most appropriate for the project and is in accordance with legal constraints."

A guide to the use of current project delivery methodologies is provided in the *Handbook on Project Delivery.* The following paragraphs present an overview of the subject beginning with the executive summary from the *Handbook:*

> When hiring the team to design and build a building today, an owner will find that there are many different ways to structure the work. Within the building industry, conventional ways of doing work are being challenged in attempts to save time, spend less money, reduce litigation, create less conflict, or heighten the building's quality. While minor variations make each working arrangement unique, the major differences fall into one of three categories: traditional methods, construction management, and design/build. Each of these different project delivery options—meaning, how the various individuals organize their participation and responsibilities to complete a building project—creates certain advantages and holds potential limitations. In the case of each distinct project, the relative merits of the employable delivery systems must be evaluated. The methods can be characterized by various means, most clearly by the number of central players: design-bid-build has three, construction management four, and design/build two. This executive summary outlines the key characteristics, phases, uses, and relationships which distinguish one project delivery option from another and which are described extensively in the *Handbook on Project Delivery.*

A. Traditional Methods

Most building projects follow a traditional model in which an owner hires an architect at the beginning of the process to develop a design and prepare the documents needed to build it. According to convention the owner then hires a general contractor to construct the building that has been designed. The owner thus has two separate contracts with two unrelated parties, both of whom are expected to act in the owner's interest. The architects' fee is proportional to the services delivered, and the contractor's compensation is built into the cost of construction.

1. *Design-Bid-Build.* The most common form of project delivery, design-bid-build, is characterized by its three phases, its two independent contracts with the owner, and the linear sequencing of the work. There are three prime players: owner, architect, and contractor.

   The typical process involves three phases. *First,* the owner engages the architect to design and prepare construction documents for the project. *Second,* the owner uses those documents in conducting the bidding process, after which a contractor is selected and cost commitments are made. *Third,* the owner hires the contractor to build the project.

   This method is the conventional one common to all types of undertakings, particularly those initiated by public clients required to select the low-bidding contractor. Its principal advantages are its widespread use and familiarity, the clear roles assigned to each party, the thorough determination of design and cost prior to construction, and the linear process, which is easy for owners to manage.

2. *Negotiated Select Team.* This delivery option, sometimes called design-assist, is a variant of design-bid-build. The bidding process is eliminated. This option is not appropriate for school projects except in limited emergencies and should not be undertaken without legal advice. In this option the owner, at the beginning of the project, uses an informal process to select an architect and a contractor with whom fees are negotiated. The three prime players—owner, architect, and contractor—work together cooperatively from the project's inception.

B. Construction Management

Construction management is a broad term covering a variety of project delivery scenarios in which a construction manager is added to the building team to oversee such issues as schedule, cost, construction, project management, and building technology. The construction manager, who may be trained in construction or may be an architect, contractor, or

developer, can serve in different capacities with varying degrees of authority depending on how the project is structured. A fee is paid to the construction manager relative to the services to be performed, which may range from advising during a particular phase of the building process to acting as the owner's agent in all matters. Construction management may be appropriate for relatively complex projects, for projects in which budget or schedule must be closely monitored, and for those requiring extensive coordination of consultants or subcontractors. It should be undertaken by school districts only with legal advice and after careful development of contracts with the construction manager, the architect, and the contractor. The contracts should be designed as a set so that liability is not obscured and duties are not duplicated.

1. *Construction Manager as Adviser.* This project delivery option is characterized by the additional consultant brought to the building team; that is, a construction manager who acts as adviser to the owner. Although the authority given to this adviser varies (including helping to select the architect), the architect and contractor generally maintain their conventional roles. There are four prime players: owner, construction manager, architect, and contractor.

   The construction manager is added to the team at the outset of the project or on the completion of the design. This option proceeds in three phases. *First,* the owner contracts with an architect to prepare the design and construction documents. When hired in this phase, the construction manager adviser will oversee the design as to its implications for cost, schedule, and constructibility. *Second,* construction documents are used for construction bidding or negotiations. A contractor is selected with the advice of the construction manager, and cost commitments are made. *Third,* the owner hires the contractor to build the project. The construction manager stays on as adviser through the completion of construction.

   Because this method adds a consultant and the associated fee, it is more appropriate for large, complex projects than relatively small, simple ones. This option is also appropriate for owners who want to hire an architect and contractor directly but do not have the time or in-house expertise to oversee the building process. The principal advantages are the direct contractual relationships with the owner, careful monitoring of costs and schedule, and continual oversight throughout a linear process easy for owners to manage.

2. *Construction Manager as Agent.* In this option the owner releases authority to a construction manager, allowing the owner to step back from the project. This option requires careful selection of the construction manager because the power of the district to shape a project to meet curriculum needs may be diluted. There are four

prime players in this option: the owner, the construction manager, the architect, and the contractor.

This option typically involves four phases. *First,* the construction manager is hired by the owner to act as agent and to oversee all project activities through the completion of construction. *Second,* the architect, who contracts through the construction manager, is hired. Development of educational specifications, design of the project, and construction documentation now occur. *Third,* the project is bid or negotiated to select a general contractor. Cost commitments are made at this stage. *Fourth,* the contractor directs the building of the project.

Note: This method *may not be appropriate for school districts.* Your legal adviser should be consulted.

3. *Construction Manager as General Contractor.* In this delivery method the construction manager is hired before the design is completed. The manager serves as project coordinator and general contractor and assumes all the liability and responsibility of the general contractor. There are three prime players: owner, architect, and construction manager.

   This option typically involves three phases. *First,* the owner contracts with the architect for the design of the project. When the design is about 50 percent complete, the scope of work documents are prepared. *Second,* on the basis of those documents, the project is bid in order to select the construction manager. *Third,* the owner hires the construction manager to advise during preconstruction and to build the project. When the construction documents have been completed, the manager generally rebids some or all of the construction to other contractors. *Note:* This method should be undertaken only with the advice of legal counsel as to its applicability under the State Contract Act.

   This method is common for owners for whom cost, schedule, or construction is expected to be complicated, as when a project will be *fast-tracked.* The principal advantages are the initial focus on design issues, construction advice during the design process, careful oversight of costs and schedule, early cost commitments, and opportunities to shorten the overall project schedule.

4. *Other Options.* Other variations of construction and project management include "CM at risk" and "multiple prime" contracting. Again, they should be undertaken only after seeking legal advice.

C. Design/Build

Design/build is a form of project delivery in which the owner contracts with a single entity, the design/builder, to provide both design and

"Educational specifications are especially critical in a design/build project."

construction services under one contract. The design/builder may be a single firm, a consortium of experts, or a joint-venture undertaking. Typically, the team includes an architect and a construction contractor, who may be partners in the undertaking or one a subcontractor to the other. Although contractors commonly head the design/build team, architects who maintain necessary insurance and construction bonds can also serve in that capacity. The principal advantages of design/build are the single point of responsibility and the potential to collapse otherwise independent phases and, therefore, save valuable time. *Note:* Design/build is not legal in some states, and its use is limited under the State Contract Act and by Field Act requirements contained in the *Education Code.* Design/build should be undertaken only with legal counsel. Educational specifications are especially critical in a design/build project. They must be complete and part of the contract documents because they are the owner's only input into the design and construction process.

1. *Design/Build by Constructor.* Design/build by constructor is characterized by the assignment of total responsibility for the project to the design/build entity. The constructor is responsible for both design and construction services under one contract so that there are only two prime players, the owner and the design/builder. This method is the most commonly employed form of design/build.
2. *Design/Build by Developer.* This design/build delivery option incorporates the functions of design and construction. In addition, the design/build entity takes on some responsibilities of real estate development. Also known as *turnkey* construction or *sale-lease back,* this method is characterized by the legal transfer of title to real property. It is distinct from speculative development because an owner initiates the process and contracts for services with the design/build developer. There are two prime players—the owner who initiates the project and will purchase it upon completion and the design/builder. *Note:* This option may not be appropriate for school projects because of State Contract Act and *Education Code* restrictions and should be undertaken only with the advice of legal counsel.
3. *Bridging.* Bridging is characterized as the merging of design-bid-build with design/build. Initially, the owner contracts with an architect to develop a project through the design development phase. The architect helps determine needs and the direction of the design work. After arriving at a satisfactory design scheme, the owner contracts with a design/build-constructor entity to complete the project. The design/builder completes design documentation and acts as the architect of record. There are three prime players: the

owner, the owner's architect, and, later, the design/builder. *Note:* This option may not be appropriate for school projects because of State Contract Act and *Education Code* restrictions and should be undertaken only with the advice of legal counsel.

This method is common for public and private owners who wish to maintain the advantages of contracting with an architect while gaining advantages associated with design/build and who also intend to engage in competitive bidding. Its principal advantages include focused attention on design issues, competitive bidding, and single point or responsibility during design documentation and construction.

These descriptions briefly summarize eight basic options available to owners, architects, contractors, and construction managers in the undertaking of a building project. The *Handbook on Project Delivery* includes extensive information organized to permit ready comparison of options. The choice of project delivery methods has become a significant factor in the building industry, and the handbook offers guidelines for making such choices.

Appendix 6

Site Selection

"Whatever your district holds important in instruction for young people, selecting an appropriate site must be seen as an integral part of the planning process."

Appropriate site selection is a fundamental starting point in efforts to enhance a school district's educational program. If the placement of neighborhood schools is a concern, then that element must be decided on well before the educational specifications are prepared. Whatever your district holds important in instruction for young people, selecting an appropriate site must be seen as an integral part of the planning process.

Selection Procedures

Planning for site selection includes a number of considerations, all of which are related to master planning and some of which are related to educational specifications. Steps to be considered include (1) an analysis of the demographic study to determine areas of projected student population growth and the numbers and ages of students expected; (2) a review of the size, location, grade levels, and attendance areas of existing schools and any proposed policy changes relating to those factors; (3) the district's transportation capabilities; (4) a determination of who will be involved in site selection; (5) the establishment of criteria by which the site is to be judged; (6) the establishment of a timeline to guide the process; and (7) financing.

A critical element of advance planning is to follow consistent and appropriate site selection procedures. Special consideration should be given to safety, aesthetics, environmental features, and other aspects of the site that will contribute to the learning environment and educational opportunities for students. Accordingly, environmental regulations, the property acquisition requirements (Title 5) of all state agencies, and all local requirements, including fire, safety, and the general plan, must be strictly adhered to. Site selection must be planned in cooperation with other public agencies, developers, and interested planning groups.

Because site acquisition can be a lengthy process, selection procedures should begin well in advance of expected need with the establishment of a broadly represented site selection committee. Sites should be purchased several years before actual need because (1) early purchase may save money in times of steadily increasing land values; (2) early purchase helps ensure a good selection (as areas develop, availability is reduced); (3) postponement may result in the necessity of exercising eminent domain or in accepting a site that is too small, poorly located, or difficult to develop; and (4) tardy acquisition may delay plans for design and construction, thereby exacerbating overcrowding in existing schools.

Selection Criteria

Site selection criteria should be thoughtfully developed and the process itself carefully understood. Sites should be located to serve the proposed attendance area with maximum convenience and safety of access. Schools should be located in an area free of excessive noise, obnoxious odors, and toxic conditions affecting air, soil, or water and away from such hazards as airports, electromagnetic fields, earthquake faults, and floods. Joint-use arrangements with libraries and parks should be considered. The *School Site Selection and Approval Guide* and the *School Site Analysis and Development Guide* should be used as references in establishing site selection criteria and in understanding the site approval process.

Site Acquisition

Once alternative sites have been reviewed and a first choice has been made, acquisition is the next step. Negotiation for site acquisition should be handled by one person (e.g., the facilities planner, the business manager, the superintendent, or an attorney—but not a board member). Two appraisals should be obtained. The governing board's inclination to pursue condemnation, if necessary, should be determined.

Educational Appropriateness

Existing and proposed site plans should show the layout of existing buildings and grounds, parking and roads, and playfield areas to ensure that the site will support the proposed educational program. The plans should also show future additions and the expansions necessary to accommodate each site's maximum proposed enrollment. Prepared by an architect and the district's facilities planner, the plan serves as a decision-making tool in determining future facility needs and managing implementation strategies.

Appendix 7

Safe Architecture for Schools

This appendix addresses some of the building and equipment safety issues that need to be considered in developing educational specifications. It also includes a facility design response to natural disasters and criminal activity included in your school disaster preparedness plan.

Any consideration of facilities will include factors related to site selection, such as ease of supervision and provision for separation of pedestrians, bicycles, automobiles, buses, and delivery vehicles. In addition, adjacent land use, existence of toxic materials, traffic volume, street access, and the neighborhood crime rate need to be evaluated as compatible with school use. Other considerations include whether adjacent homes (or other property) that back up to school property lines provide a buffer from neighborhood problems or instead offer concealed access to the site.

Site considerations include the provision of access routes for emergency vehicles acceptable to the local fire department and the implementation of the recommendations contained in *School Area Pedestrian Safety*.

"Concerns for campus layout include easy supervision of buildings and grounds. . . ."

Concerns for campus layout include easy supervision of buildings and grounds and ability to secure the campus when necessary. *Questions for consideration:* Are the main outdoor spaces and playgrounds (especially kindergarten) on the campus easily supervised from the school office? Does the campus layout facilitate after-hour supervision by police vehicle patrols? Have the recommendations contained in *Safe Schools: A Planning Guide for Action* been implemented?

The facility should provide protection from the elements. In cold-weather climates, is there adequate access for snow removal? Have snow cleats or special ventilation to attics been provided to prevent ice from sliding off roofs onto passersby? Do rainwater leaders present any projection hazard? Do they carry roof drainage directly to underground

piping to eliminate water flowing across sidewalks? If the facility is to be used for year-round education, has there been planning for necessary shade areas? Are there emergency supplies for use if the campus is isolated because of inclement conditions (weather, floods, earthquake, and so forth)? Is there an evacuation plan?

Safety equipment, including fire hydrants, speed bumps, and contrasting paving surfaces to protect pedestrians, must be provided as needed to protect students and staff from injury.

Design and detailing should eliminate conditions that allow unauthorized access to rooftops, electrical equipment, and other dangerous places to inhibit children who like to climb and explore. Architectural features can be concealed, recessed, or located so that they cannot be climbed on or injure a playing child. Are walking surfaces slip-resistant and other surfaces smooth, with no sharp projections? Are exterior-wall finish materials smooth enough not to be an abrasion hazard to passersby and still repel graffiti and vandalism?

Have curbs and wheel blocks been used sparingly? Are changes in flooring or paving materials transitioned to minimize trip hazards? Are window projections and door swings located so that they cannot injure users or passersby?

Do bicycle racks promote the safe handling and storage of bikes? Are outdoor sports facilities (basketball courts, baseball fields, soccer fields, tennis courts, and so forth) configured in the desirable solar orientation for each sport? Have all playgrounds and play structures been designed/specified/arranged in compliance with the *Handbook for Public Playground Safety* and the current California Department of Health Services regulations?

Have all the requirements of the Americans with Disabilities Act been met? For additional information call the California Department of Rehabilitation at (916) 322-7581.

Special care must be executed in designing adequate lighting and providing a healthful ventilation system. Layout should promote visual supervision and consider the comfort of neighbors in regard to noise, parking, lighting, and so forth.

Decide whether your security system is to protect life or property or both. Should a central security system be monitored on site or off site? Should it provide intrusion detection or motion detection (or both) at the doors and windows? Should there be telephones in every room? The best security is the ability of staff to observe campus areas in a casual manner and for neighbors to be positive toward the school so that when they notice unusual activity, they will call authorities as necessary.

Building and equipment safety issues are those items that, with thought in selection of materials, design of details, and the maintenance of the facility, can prevent injury in the use of the facility.

Below is a checklist for new and modernized construction prepared in collaboration with the Lionakis-Beaumont Design Group, Architects. The checklist does not supplant information and standards available from the California Department of Education or others regarding school safety. It also does not cover basic life-safety considerations that are required by building codes and covered in the review and approval process of the Division of the State Architect.

A. Site Selection

1. Have all of the site selection criteria issued by the California Department of Education been met? Has the site been approved by the Department? The use of adjacent lands should be evaluated as to compatibility with the functions of the school. Included in the evaluation should be the presence of railroads or other avenues of transportation, the existence of toxic materials, the location of power lines, the volume of traffic, street access, and the neighborhood crime rate.
2. Has a corner site been considered to provide primary separation of bus and automobile access from two different sides of the site?
3. Do adjacent homes back up to the playground area? Consider safety issues raised by the adjacent homes. Do they provide a buffer from neighborhood problems? Or do they impede visual supervision of the site during nonschool hours and provide multiple access points to the site?
4. Are the geotechnical characteristics of the site compatible for structures and playfields?

B. Site Circulation

1. Have separate bus, automobile, and pedestrian routes been provided?
2. Are the bus-loading area and the parent drop-off area fully separated from one another?
3. Do students have a vehicle-free path of travel on foot from all pedestrian, bicycle, and drop-off and loading areas directly onto the campus?
4. Do bicyclists have a clear path from surrounding surface streets or bicycle lanes directly onto a parking refuge for bicycles on the site? Must the bicyclists cross the paths of automobiles, buses, or pedestrians?
5. Has a complete access route for emergency vehicles been planned around or through the campus (or both) in full compliance with requirements for local emergency response personnel (e.g., local fire department personnel)?

6. Have the recommendations contained in *School Area Pedestrian Safety* been applied?

C. Campus Building and Open-Space Layout

1. Has the campus been designed so that, with relatively short sections of fencing, the campus can be closed to access after hours?
2. Has the number of exterior spaces between buildings been minimized to maximize supervision?
3. Is the main outdoor gathering space on the campus easily supervised from the school office, the campus security office, and teacher areas?
4. Does the campus layout facilitate after-hour supervision by police department patrols?
5. Have the recommendations contained in *Safe Schools: A Planning Guide for Action* been implemented?

D. Site Accessories

1. Has a covered walkway system for the campus been considered as a means of providing safe, all-weather access to all facilities?
2. Have the number, spacing, and pressure requirements of fire hydrants been approved by the local fire marshal?
3. Have outdoor electrical distribution cabinets been adequately enclosed, locked, and protected?
4. Have speed bumps and ramps in parking areas been considered as a means of slowing traffic to improve safety?
5. Has the addition of contrasting paving materials in the parking lots been considered for delineating pedestrian areas?
6. Is there a safe transition from the playground equipment to the surrounding hardcourt paving?
7. Have curbs and wheel blocks been used as little as possible?
8. Have bicycle racks been specified that promote the safe handling and storage of bikes?
9. Does the plan for landscape planting support security and safety goals through the selection and location of plant materials?
10. Have the outdoor sports facilities, such as basketball courts, softball and hardball fields, soccer fields, and tennis courts, been configured in the desirable solar orientation for each type of sport?
11. Are play structures, furnishings, and the environment designed to be age-appropriate and developmentally appropriate for the student population?

E. Rooftops

1. Do conditions exist that allow unauthorized access to the rooftops (e.g., fences next to low overhangs)?
2. Do skylights have security bars to prevent forced entry and falling through?
3. In cold-weather climates, have snow cleats or special ventilation to attics been provided for sloped roofs to prevent ice from sloughing off onto passersby below?
4. Do any parts of the roof system present an overhead obstruction problem to passersby below (e.g., rain gutters, headers, or scuppers)?

F. Exterior Detail

1. Do rainwater leaders (downspouts) carry roof drainage away directly in underground piping to eliminate roof water flowing across sidewalks and creating a slipping hazard? Do rainwater leaders present any projection hazard to passersby in sidewalk areas?
2. Have exterior wall-mounted hose bibs been provided in recessed boxes as opposed to standard ones that present a projection hazard in areas of close contact by passersby?
3. Has a safety review been conducted on the layout and type of equipment to be used in the playground?
4. What cushioning material is used in the playground?
5. Have all playgrounds and play structures been designed/specified/arranged in compliance with the *Handbook for Public Playground Safety?*
6. Have all the requirements of the Americans with Disabilities Act been met?
7. Are the finish materials on the exterior walls smooth enough not to present an abrasion hazard to passersby and yet still function reasonably with respect to graffiti and vandalism?
8. Have possible overhead obstructions lower than seven feet six inches been eliminated from the design?

G. Walking Surfaces

1. Are changes in the flooring and paving materials adequately transitioned to avoid tripping hazards?
2. Are all doorway thresholds in full compliance with the Americans with Disabilities Act to provide accessibility and avoid tripping hazards?
3. Where door walk-off mats are desired, have they been appropriately designed to fit into floor recesses to eliminate slipping hazards?

4. Has a slip-resistant finish been specified for outdoor concrete walks and other walking surfaces?
5. Has a resilient flooring system of free-lay rubber grid mats been considered for locker room and shower areas?
6. Have toilet rooms been outfitted with slip-resistant flooring materials?
7. Do rainwater leaders present projection hazards to passersby in sidewalk areas?
8. In cold-weather climates has access to primary pedestrian walkways by snow plows been facilitated for ease of clearing snow? Are imbedded heater wire systems needed in any critical paving area?

H. Doors and Windows

1. Has the use of projecting-type windows (e.g., awning, casement, hopper) been avoided?
2. Have appropriate locking mechanisms been included as part of the window hardware package?
3. Have doors been located in recessed wall niches? Have vision windows in or alongside the door been provided to prevent injury to passersby from the swinging out of the doors?
4. Has the use of floor-mounted doorstops been avoided to reduce tripping hazards?
5. Has the use of rounded door stiles been considered to reduce the possibility of finger injury in door jambs when the door is closing?
6. Have all code provisions for the use of impact-resistant safety glass been met in all required locations in doors and/or windows (see *California Building Code* Section 5406)?

I. Interior Details

1. Are drinking fountains provided in recessed niches or with safety rails for the protection of those using the fountains and passersby as required by the Americans with Disabilities Act?
2. Have drinking fountains in gymnasium spaces been placed away from the action of the play courts?
3. Have flush-mounted floor receptacles been specified where floor receptacles are required?
4. Have interior miscellaneous details been implemented that lessen projection hazards (e.g., rounded versus pointed coat hooks and semirecessed versus fully projecting fire extinguisher cabinets)?
5. Has casework been designed to be free of sharp corners?

J. Lighting

1. Have exterior parking lots and other outdoor spaces, especially between buildings, been illuminated evenly throughout? (Use more than minimum requirements in troublesome areas.)
2. Have interior spaces of buildings been illuminated in accordance with the latest guidelines for school use issued by the Illuminating Engineering Society?
3. Are the types of fixtures used inside and outside designed to be vandal-resistant?

K. Security Systems

1. Has space on the campus been provided for campus security?
2. Is there a clear path of vision from the campus security office or the school office (or both) into the heart of the campus, where students ordinarily gather? Are circulation paths clearly designated so that students or outsiders in other spaces may be questioned as to their business in those spaces?
3. Has a central security system been installed that is monitored on or off site? Is door and window protection provided? Is motion detection provided? Are there telephones in every room? Decide whether your security system is intended to protect life or property or both and design it accordingly.

L. Toilet Rooms

1. Have vandal-resistant components and hardware been used on all toilet room accessories and partitions?
2. Are mirrors made of impact-resistant glazing or polished stainless steel?
3. Is the flooring slip-resistant?
4. Are the campus toilet rooms arranged so that they are reasonably easy to supervise by a staff person when necessary? Have you considered alternate layouts to group toilets, such as single-user private toilet spaces with toilet and wash basin (and urinal at boys' toilets) opening to a common open corridor or toilets in pairs attached to each classroom?

M. Food Service

1. Do the facility food service areas comply with local health department regulations for the preparation, storage, and serving of food?
2. Does the facility comply with all regulations included in the *California Health and Safety Code*, specifically Section 27500 et seq., the California Uniform Retail Facilities Law?

Appendix 8

School Disaster Preparedness Plan

"Implementation of the school disaster preparedness plan must be included in the educational specifications."

Natural disasters and criminal activity are the safety issues that concern students, parents, and staff more than any others. Schools must address those issues and include them in a school disaster preparedness plan. Implementation of the school disaster preparedness plan must be included in the educational specifications. More importantly, because the safety issues are a concern of the whole community, they cannot be fully addressed *except* in partnership with local law enforcement and community organizations. Schools can be effective in providing positive and safe after-hour and off-campus events for youths; however, community sponsors and support are necessary.

Title 5 of the *California Code of Regulations* (referencing *Education Code* Section 33031) has required schools to have civil defense and disaster preparedness plans since the 1950s. Currently, no state agency has lead responsibility for ensuring preparedness for school emergencies. No consensus exists as to a standard with which to evaluate school site or district emergency plans, nor is there any approval authority. The responsibility for such plans rests with local entities, such as school districts, county offices of education, and boards of private schools. The *Education Code* states that those entities may work with the State Office of Emergency Services but does not mandate any authority or responsibility at the level of the California Department of Education.

The following checklist may help in focusing on the problems to be faced and solved:

A. List Each Issue to Be Addressed

- Maintain accurate records about the most pressing crime and safety issues confronting your school. Identify school personnel requirements for safety issues. Develop agreements with local agencies for help in specific ways for each issue pertinent to your area.

B. Analyze Each Issue

In analyzing each issue, remember that children are required to attend school. The school must protect them and at the same time provide facilities that are inviting and conducive to learning.

Common wisdom holds that schools should be open and unconfining. Common sense indicates that they must also be safe, secure, and defensible. You should reconcile those apparently conflicting requirements in your planning process as each issue is studied.

C. Develop a Planned Response to Each Issue

1. Criminal Activity. Do schools need to be made into fortresses? Would fortress-like structures protect us from some problems and at the same time make us more vulnerable to others? Have the recommendations contained in *Safe Schools: A Planning Guide for Action* been considered?

a. Riots or Civil Disobedience. Schools fared reasonably well in the recent Los Angeles riots. But will they fare equally well in the next riot? The commercial establishments that survived the riots were fortresses. They had impenetrable walls without windows, had steeply sloped roofs, or were multistoried. Made of concrete and corrugated metal, they were designed not to have picture windows or visible courtyards. None of those design features would seem to be conducive to learning. The defense of school facilities against insurrection may lie in cooperation with local law enforcement agencies and in training programs emphasizing cooperation with those agencies.

b. Invasions and Child Abductions. An open-plan school might be protected better against armed intruders and child abductors than a closed-plan school if the whole site could be surveyed from one or two key points. Applying defensive design concepts might be preferred to constructing forbidding facades, moats, or guard towers.

The campus layout should allow for easy supervision of buildings and grounds and the securing of the campus when necessary. A central, easily observed entry point for all students, staff, and visitors would allow monitoring of comings and goings in a casual way and simplify closure of the campus if necessary.

c. Graffiti and Vandalism. Are exterior-wall finish materials smooth enough not to present an abrasion hazard to passersby and yet still repel graffiti and vandalism?

Are public circulation paths clearly designated so that students or outsiders in other spaces may be questioned as to their business in that space?

Are the fixtures used inside and outside designed to be vandal-resistant?

Does the district have 24-hour removal or repair policies for graffiti or vandalism?

d. Theft. Design and detailing should eliminate conditions that allow unauthorized access to rooftops and other concealed places.

Security systems should be provided as necessary to protect life and property. The best security is the ability for staff to observe campus areas in a casual manner and for neighbors to have positive feelings toward the school so that they notice unusual activity and call authorities when necessary. Layout should promote visual supervision and consider the comfort of neighbors. Other considerations might include the following:

- Has the campus been laid out so that it can be closed, partly or completely, to after-hours access?
- Are the main outdoor spaces and playgrounds (especially the kindergarten area) on the campus easily supervised from the school office?
- Does the campus layout facilitate after-hour supervision by police department patrols?
- Do skylights have security bars to prevent forced entry? Are appropriate locking devices provided throughout on doors, windows, and grilles?

2. Natural Disasters. A fortress might offer some protection against riots, invasions, and child snatchings. But how would a large population of children escape a fortress in an earthquake, fire, or flood? The rescue of children and teachers in case of a natural disaster would be easier in an open-plan school than in a closed-plan school.

The Federal Emergency Management Agency may be able to help you in developing a planned response to natural disasters. Their California addresses are 339 North Bernardo, Mountain View, CA 94043, telephone (415) 966-9000; and 1414 Soquel Avenue, Santa Cruz, CA 95062, telephone (408) 426-1209.

a. Earthquakes. Refer to the *Report of the Earthquake Preparedness Task Force in Compliance with Assembly Bill 3730, Chapter 1352, Statutes of 1988*, authored by Assembly Member

Roybal-Allard and published by the California Department of Education (1989). This document and other information are available from the School Facilities Planning Division, California Department of Education; telephone (916) 322-2470. The document includes suggestions on preparation drills and supplies and on evacuation and shelter procedures.

b. Fire. Consult your local fire marshal for information on the design of buildings, the storage of materials, evacuation procedures, and drills. Fire prevention, which is critical, requires ongoing programs.

c. Flood. The response to floods is similar to the preparation for and response to earthquakes. Depending on the flood danger in your area, plans should be developed for evacuation, short-term supply storage and shelter, and cooperation with local, state, and federal agencies. For information on areas subject to dam inundation, telephone the School Facilities Planning Division, California Department of Education, at (916) 322-2470.

d. Inclement Weather. Severe storms, snow conditions, tornados, and other unusual weather conditions require planning similar to that required for earthquakes. Evacuation, short-term supply storage, shelter, and cooperation with other agencies are to be included in your preparedness plan.

D. Develop School and Community Response and Training Plans

Develop school and community plans for dealing with safety and emergencies. Include provisions for campus security, such as access control, visibility, landscaping, fencing and gates, exterior lighting, monitoring, communications systems, and alarms. Develop interagency agreements so that everyone knows what is expected when an emergency occurs. Develop training plans for staff and students in all aspects of emergency response: current safety trends and information, crisis intervention and management, and, especially, student response to the crisis and to authorities dealing with the crisis. Identify school security personnel and equipment needs and phase them into your budget.

Appendix 9

Facility Activation, Orientation, and Postoccupancy Evaluation

Facility activation, user orientation, and postoccupancy evaluation are important to educational specifications in that evaluation completes the planning cycle and provides corrective feedback for the next project.

Facility Activation

Activation is the process of placing the facility in operation. The educational specifications are especially important for reference as the project progresses from the completion of construction to the functioning of the facility.

During the activation process individual equipment and components as well as systems are checked to ensure that they function together properly. Records of this process attest to the acceptability of the facility in relation to the educational specifications and provide a database for future evaluation.

"Evaluation completes the planning cycle and provides corrective feedback for the next project."

Facility activation should also deliver a set of maintenance and operations manuals for all systems, subsystems, and building materials. Maintenance and operations manuals and on-site training for employees should be included in the construction documents and provided by the contractor, reviewed by the architect, and supplied to the project as specified in the construction contract. The manuals should be assembled in a permanent library for use throughout the life of the project, together with drawings and construction specifications edited to reflect as-built conditions. Copies should be available in the school office permanent records as well as in the maintenance offices of the district and at the site.

Orientation and Training Programs

Orientation of staff, students, and the public is necessary if the facility is to be used properly by the community. The potential of many design features may never be realized if users are not made aware of them.

A new environment alone will not change behaviors that have developed through experience with existing facilities. The users should,

therefore, be represented in the initial planning stages, and changes in the curriculum should be initiated in existing facilities long before occupancy of the new school. Each user group's involvement with a facility differs. Consequently, a variety of orientation programs directed specifically at details for each group will be needed.

The orientation sessions might take the form of building tours conducted by the design team, including the architect, other consultants, and members of the educational specifications committee. Project background, design concepts, and facility relationship to the educational program should be explained. If the proposed educational program is new or facility components very sophisticated, more intense in-service training may be required for teachers or operational staff.

Public information programs may be less detailed than user orientations and may be designed to promote acceptance of the educational program and its relationship to the facility. Means of informing the public about the school include media features, brochures, and open-house tours that discuss and illustrate the new educational facility and its relationship to the curriculum.

The educational specifications serve as part of the user's facility manual. They provide a summary of the project's history and design concepts as well as a basis for evaluation of facility effectiveness.

A separate maintenance and operations manual is the second part of the user's facility manual (see the previous section titled "Facility Activation"). This document provides technical data on the facility systems and components, cleaning instructions, guarantees, and other vital information. The construction documents normally include requirements for operation and maintenance manuals on most building materials and systems.

The contractor can also be required by the construction documents, as part of the cost of the project, to include personnel training in operation and maintenance items related to the products or systems supplied to the project.

Both volumes of the user's facility manual should provide guidance as to how the building was designed to be used, telling users what was intended.

Postoccupancy Evaluation

Once the facility has been completed, the occupants and community oriented, and the program implemented, it is time to look at the results of the planning, design, and construction efforts. Postoccupancy evaluation includes both a technical evaluation of all facility subsystems and a functional evaluation of the extent to which the facility meets educational program objectives. *Questions to be asked:* Does the environment contribute or not contribute to better learning by students, better teaching, and professionalism by teachers and administrators? Does the

building teach about sustainable architecture and ecology? Well-documented postoccupancy evaluations of existing facilities provide information vital to development of subsequent projects.

Postoccupancy evaluation is an essential part of the total planning process. It should be a continuing activity, at least during the first year the project is in operation, and then repeated at intervals through the next three to five years. It can be used to identify changes in the planning process that might be required and identify particular features of the building that should or should not be repeated in future projects.

It is the last stage of the planning process, and, if carefully documented, is the first step in writing educational specifications. At this point the planning process has come full circle.

For additional information on facility activation, user orientation, and postoccupancy evaluation, please refer to *The Guide for Planning Educational Facilities* and *The Guide for School Facility Appraisal.*

Appendix 10

Sample Form ES-3
Facilities Inspection Summary

Name: _____

Title: _____

Firm: _____

Date: _____

Project: _____

Instructions

Inspect all designated facilities to provide an assessment of the condition of the school or schools. All major building systems (structural, electrical, mechanical, heating/cooling, roofing, fire alarm, and intercom) as well as site conditions are to be examined.

Inspect for compliance with the Americans with Disabilities Act, Title 24, accessibility standards, and health and life safety codes.

Spaces should be inspected for conformance with current standards (lighting, acoustics, square footage, heating/cooling, electrical outlets, and adaptability for future technology systems). Rate each item against current standards on a scale of 1 (low) to 10 (high).

FACILITIES INSPECTION SUMMARY

Item	*Rating*
Site Considerations	
1. School is close to students' residences.	
2. School is close to community facilities.	
3. Site is away from freeways, railways, flight patterns.	
4. Site is away from excessive noise, obnoxious odors, toxic conditions, electromagnetic fields, earthquake faults, flood zones.	
5. Site has good access and dispersal roads.	
6. Site size is adequate for present and future buildings, playfields, parking, and so forth.	
7. Topography provides for proper drainage.	
Average rating—site considerations: _____	
Existing Conditions/Maintainability	
1. Roofing and flashing are in good condition and are appropriate to the site/building.	
2. Sidewalks are relatively free of cracks and uneven surfaces and are slip-resistant.	
3. Interiors are free of chipped paint, cracked floors, and uneven surfaces.	
4. Exterior walls are adequately insulated, free of graffiti, and easy to maintain.	
5. Exterior soffits/overhangs/fascias are free of leakage, cracks, and damage.	
Average rating—existing conditions/maintainability: _____	
Mechanical	
1. Existing equipment is relatively new and in good repair. Servicing is not a consideration.	
2. Existing equipment is easily serviced. Parts and repair are readily available.	
3. Existing heating and cooling system provides a comfortable learning environment.	
4. Existing system is efficient in use of power.	
Average rating—mechanical: _____	

FACILITIES INSPECTION SUMMARY (Continued)

Item	*Rating*

Learning Environment: Aesthetics

1. Design characteristics are appropriate to the community.
2. Interiors are conducive to effective teaching/learning.
3. Exteriors provide a continuity of building forms and a scale appropriate to children.
4. Existing landscaping is pleasing.
5. Sources of natural light are used.
6. Advantage is taken of beautiful views and natural site features.

Average rating for learning environment—aesthetics: _____

Learning Environment: Space

1. Size and shape are adequate for the functions housed.
2. Maximum consideration is given to the use of nonbearing, easily relocatable interior walls.
3. Existing buildings allow for potential increased enrollment, additions, and changes in function.
4. Exterior of buildings form spaces that can be utilized for outdoor activities.
5. Classrooms contain the following as a minimum:
   a. Adequate electrical, Internet, and telephone outlets to accommodate equipment
   b. Chalkboards and tackable walls
   c. Adequate storage and shelving
   d. Sink and drinking fountain

Average rating for learning environment—space: _____

Learning Environment: Sound

1. Loud activities are separated from quiet ones.
2. External noise is mitigated.
3. Acoustics within rooms has been planned in terms of room shape, geometry, and selection of wall and ceiling materials.
4. Existing construction reduces unwanted sound from light ballasts, mechanical equipment, and plumbing.
5. Interior walls utilize construction that prevents sound transmission between adjacent rooms.

Average rating for learning environment—sound: _____

FACILITIES INSPECTION SUMMARY (Continued)

Item	*Rating*

Learning Environment: Technology

1. Existing facility utilizes current educational technologies:
   a. Computers
   b. Interactive video
   c. Satellite reception
   d. Fiber optics
   e. Cable television
2. Existing facility can be easily retrofitted for the above.
3. Existing facility can be easily retrofitted for future telephone and data systems.
4. Existing systems have networking capabilities between campuses.

Average rating for learning environment—technology: _____

Life Safety/Code Compliance: Structural

1. Integrity of existing foundations
2. Integrity of existing structural columns and bearing walls
3. Integrity of existing structural beams and horizontal framing
4. Existing structural system provides easy expansion.

Average rating for life safety/code compliance—structural: _____

Life Safety/Code Compliance: Electrical/Fire Alarm/Special Systems

1. Interior spaces are adequately lighted.
2. Existing electrical system has no major code violations.
3. Exterior lighting is adequate for night time functions.
4. Electric service is adequate for future expansion and retrofitting.
5. Existing fire alarm system meets all current life safety codes.

Average rating for life safety/code compliance—electrical/fire alarm/special systems: _____

Accessibility: ADA and Title 24

1. There is an accessible route from outside the campus to the campus entry.
2. There is an accessible route from the campus entry to all buildings.
3. Existing signage meets code requirements.
4. Existing stairs/ramps meet code requirements.
5. Existing toilet rooms meet code or can be easily retrofitted.

Average rating for accessibility—ADA and Title 24: _____

Appendix 11

Constructibility Reviews

The constructibility review is a critique of project contract documents for accuracy and coordination. Usually performed by an architect or special consultant, the constructibility review is done in addition to the architect's normal contract document review and coordination.

The constructibility review is designed to coordinate the contract documents to minimize project change orders, improve building quality, ensure compliance with educational specifications, meet budgets, and comply with schedules.

1. Constructibility Reviews to Prevent Change Orders

"Change orders are to be expected on every project. . . ."

The most vexing problem in the construction of school facilities is the accumulation of unanticipated costs due to change orders after the project is under construction. Change orders are to be expected on every project because building systems are increasingly complex. In addition, market conditions may lead to a highly competitive environment that forces contractors to bid as low as they can and then use attorneys to enhance their profit margin through unbid change orders. Such problems may be minimized if the contract documents are accurate and well coordinated. A constructibility review, as a procedure in addition to the architect's coordination of his or her work and the work of consultants, may minimize the need for change orders but does add costs to project administration.

You should define a problem you are trying to solve before you select a solution. What are the reasons in your district for change orders? Discuss the question with local contractors, architects, and your inspector and review past projects if possible. Use input from the public and various professional organizations, such as local building officials and local chapters of professional organizations. Be aware that the point of view of each of these groups is different and therefore may not be totally

accurate. This topic is included under educational specifications because some mediation measures can be included in the criteria for building systems, selection of the architect, determination of the need for additional consultants, and decisions on project delivery systems. In any case the topic is one that needs consideration early in the planning process. Some of the reasons for change orders on a project, their predictability, and mediation procedures that may prevent change orders are presented as follows:

a. *Unforeseen conditions,* such as utilities, tanks, and other structures buried underground that no one knew were there, are impossible to deal with except through change orders. Careful development of contract documents that shift the responsibility for such items to the contractor is possible but risky because the contractor will have to add a mitigating factor to cover liability.

   Other unforeseen conditions might include geological faults, water, and other hidden natural phenomena as well as hazards caused by human intervention, such as work done subsequent to preparation of site studies or the existence of toxic materials left over from earlier use of the site. Those factors can be minimized by district policies that require documentation of all work done at each site and the commissioning of geotechnical studies early in project planning, with accuracy being verified just prior to the start of the development of construction documents. Responsibility for those items can be shifted to the contractor in the construction documents by specific directions, by allowance, or by a requirement for contract surveys.

b. *Errors in interpreting the requirements of the code* may also require change orders. In school projects electrical, mechanical, plumbing, and fire/life safety code requirements are checked at the state level for minimum safety standards only. Those systems are not checked for basic code compliance except by the designer. The Division of the State Architect checks structural and accessibility code requirements more thoroughly but is limited by staff availability. The district might usefully contract with the local building department or with a private consultant to provide a cross-check on code compliance. That procedure will not prevent all change order possibilities but will tend to minimize the chance that field inspectors will disagree with the interpretations of those hired by the district to check compliance.

c. *Confirmation of the completeness of documents* is an area where a constructibility review by an independent consultant may be of great value. The procedure can be viewed as similar to an editor's proofreading a document before it is published.

d. *The sequencing of trades* on a single project can require change orders if one group of workers installs equipment that blocks the installation of other materials or systems. Paragraphs can be included in the contract documents that clearly makes the coordination function the responsibility of the general contractor. If change orders resulting from the sequencing of trades are a common occurrence in your locale, the district may be wise to initiate prequalification of contractors' procedures to ensure that the bidders have the experience and staff needed to coordinate a school project. A constructibility review should determine whether the contractor's responsibilities are spelled out completely in the construction documents.

e. *Coordination of multiphase or multiprime projects* expands on the problems encountered in the sequencing of trades on a single project. Change orders made necessary by the difficulty of coordination endemic to multiphase or multiprime projects can wipe out the savings anticipated by the chosen project delivery method. (See Appendix 6 for additional information.) A constructibility review directed to the coordination of phases or prime contractors may mitigate the problem. The development of contracts with architects, construction managers, constructibility review consultants, and contractors must be developed as a set and reviewed against one another to prevent overlapping of duties or dilution of responsibilities.

f. *Interdisciplinary coordination errors* that may induce change orders are the simplest to mediate through the constructibility review process. A fresh view of the documents by an independent consultant can show where interferences between each discipline can result in problems. Special care should be taken at points of interface and for careful correlation of information within a single discipline, such as electrical and/or mechanical engineering. A constructibility review might include all or some of the following checkpoints:

- Two or more solid objects cannot occupy the same physical space.
- A feature shown on one drawing should be shown in the same place, with the same features, and with the same terminology on all other related documents.
- Drawings should be explicit. Do not make the contractor guess or defy the laws of physics.
- There is no such thing as a *small* change in construction documents. Changes require a detective mentality. What else is changed? Where else does the change affect construction?

"There is no such thing as a *small* change in construction documents."

A well-coordinated set of construction documents has all plans of the same type drawn at the same scale, keeps the same orientation for all plans (the north arrow is always the same direction on the paper), and uses consistent terminology for the plans and specifications. Cross-references are very specific in avoiding the use of such phrases as *See architectural* or *See structural.* The word *new* is to be avoided, and the use of existing should be fully documented and verified on site.

Correct information is shown the least number of times possible to communicate the intent of the designers. But where duplicate information is offered, it is consistent and properly cross-referenced. Where used, match lines must show the same information on both sides of the match. Wall sections (and, possibly, details) on the same sheet should be shown at relative elevations to each other.

The use of a standard checklist for checking drawings in a constructibility review may simplify procedures. A registered list titled "Remedy Check" may be obtained by you or your architect from PC Associates, 145 W. Main Street, Suite 200, Tustin, CA 92780; telephone (714) 730-0933; FAX (714) 730-1894. And William T. Nigro, AIA, has a system developed by the Redicheck Firm, 109 Greensway, Suite 100, Peachtree City, GA 30269, that may be obtained by calling (404) 631-4430. Use documents such as these during the preparation of plans and specifications as well as during a final quality-assurance (constructibility) review at the end of production. By that approach the project should avoid most change orders caused by unforeseen conditions, controversy over code interpretations, incomplete documents, inappropriate sequencing of trades, lack of coordination, or interdisciplinary errors.

2. Constructibility Reviews to Improve Building Quality

In addition to minimizing change orders, a constructibility review may improve building quality at no increase in cost to the project. Review by an independent consultant may note details in the design that are not physically feasible or otherwise do not achieve the purpose intended. A critical review may show where materials specified are no longer available or are not the best available for the intended use.

3. Constructibility Reviews to Ensure Compliance with Educational Specifications

The educational specifications for the project should also be compared with the final construction documents at the time of the constructibility review. This is the last chance to correct changes from the educational specifications that affect curriculum without a change order being required.

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